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**From preservice to inservice teaching: A study of conceptual change  
and knowledge in action**

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## ABSTRACT

It is argued in this thesis that pedagogical content knowledge is an essential knowledge base for effective teaching, and that its development may not depend on years of experience. The longitudinal study traced the knowledge growth of novice social science teachers, especially pedagogical content knowledge, over their final year of study and first year as practising teachers, and sought to answer the following questions:

1. What is the conceptual structure of effective social science teaching held by preservice and novice teachers?
2. To what extent is pedagogical content knowledge a component of this conceptual structure?
3. What is the importance of pedagogical content knowledge to preservice and novice teachers' conceptions of good practice?

The study adopts the theoretical framework of Shulman's (1987) categorization of teacher knowledge. At a minimum, this includes

- general pedagogical knowledge components of (1)behaviour management, (2) teaching strategies, (3) personal beliefs, and (4)classroom communication;
- content knowledge;
- curriculum knowledge;
- knowledge of learners and learning;
- knowledge of educational contexts;
- educational ends, goals, and purposes and values; and,
- pedagogical content knowledge

The participants were ten preservice teachers in the final year of their Bachelor of Education (Secondary) studies. Four participants were post-graduate students: two held Bachelor of Applied Science degrees; one a Bachelor of Arts; and the other a Bachelor of Behavioural Science degree.

Methods used to identify the participants' knowledge bases were a concept map of "effective social science teaching", a Think Aloud Protocol of the concept map, and video stimulated recall based on a lesson taught by the participant. Three sets of data

were elicited during the phases of the study; at the end of the first semester in their final year of study; at the conclusion of that year; and after six months of independent teaching. A case study was constructed for each participant using an interpretive approach. The convergence of the data at each phase of the data collection provided the identification of each participant's knowledge base of teaching.

The participants' conceptual structures of social science teaching over time indicated both consistency and change over time. Educational ends, goals, purposes and values and knowledge of learners and learning became significant components of the participants' conceptual structures on realization of teaching practice. The data showed that behaviour management was an important component of their conceptual structure of teaching throughout their development as social science teachers. Pedagogical content knowledge was also a consistent focus of participants' conceptual structure and indeed, on realization of independent teaching practice, most participants' pedagogical content knowledge showed greater links to other aspects of effective teaching than previously.

The findings of the study indicate that pedagogical content knowledge does not develop only with experience, and that it can exist as a key component of effective teaching at the novice stage of their teaching. The study showed that novice teachers had a substantive as well as a procedural understanding of pedagogical content knowledge, and that they focused more on goals and purposes of learning and knowing the learner after they began teaching practice.

## **STATEMENT OF ORIGINALITY**

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by any another person except where due reference is made in the thesis itself.

Paul Reitano

March 2004

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## **CHAPTER ONE: INTRODUCTION**

### ***Aim and purpose of study***

This thesis reports a longitudinal study of ten preservice teachers as they moved from their 4<sup>th</sup> (and final) year of studies to their first year of teaching. The focus of the study was to look at participants' conceptions of effective Social Science teaching, especially with the knowledge base of pedagogical content knowledge over a period of time, that is, a study of conceptual change. Teachers who possess pedagogical content knowledge have that capacity to combine pedagogy and content into ways that make topics understandable to learners.

### ***Importance of study***

A paucity of information exists as to how teachers acquire knowledge, especially pedagogical content knowledge for teaching. While there is a great deal of interest in reflective teaching and teachers' knowledge base, there is little evidence to show how teachers' knowledge changes and develops over time (Calderhead 1991). Whilst there are descriptions of the differences between the novice and expert teacher, notably Berliner's (1986) writings, there are no accounts about the nature of change (Deforges, 1995). The historical understanding of novice and expert teachers has been described (Wilson & Wineburg, 1988) in terms of the evolution of learners' understandings of critical historical concepts and their notions of what history means, but has not been investigated. In their critique of research about learning to teach, Wideen, Mayer-Smith and Moon (1998) noted the increased attention of researchers on how novice teachers learn to teach, but their critique also showed that "...authors need to pay more careful attention to data selection and presentation and the links made between data and conclusions" (p.130).

Much of the research on preservice education learning has focused on general issues of cognition rather than the development of knowledge and understanding of specific disciplines. Sosniak (1999) suggests that the issue of generic vs. subject – and situation-specific - applicability of instructional methods is a dilemma facing the field of education. To avoid the need for a myriad of studies of subject specific pedagogy, Sosniak suggested a study involving “... a small number of big subject-specific ideas and concepts, well articulated and well elaborated, that have broad consequences for teaching and learning” (pp.197-198). To date, there do not appear to have been any longitudinal studies conducted on the knowledge growth of novice social science teachers. This study, then, seeks to make a contribution to the research in the specific areas of teaching of the social sciences in the junior school, Senior Geography, and Senior History

Shulman (1987), in his publication of “Knowledge and Teaching: Foundations of a New Reform”, presented a “portrait” of teaching expertise in which he asked

What does Nancy believe, understand, and know how to do that permits her to teach as she does? Can others be prepared to teach with such skill? (p.8)

Shulman concluded that Nancy possessed a body of knowledge that included not only content, curriculum, learners, contexts, values and purposes, but a unique body of knowledge, pedagogical content knowledge that is the “...province of teachers, their own special form of professional understanding” (p.8). He argued that pedagogical content knowledge should be an integral part of teacher education because

...it identifies the distinctive bodies of knowledge for teaching. It represents the blending of content and pedagogy into an understanding of how particular topics, problems, or issues are organised, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction. Pedagogical content knowledge is the category most likely to distinguish the understanding of the content specialist from that of the pedagogue (p.8).

Shulman argued that one distinguishing feature between the expert and the novice is the capacity of the expert to unpack knowledge into ways "...that are pedagogically powerful and yet adaptive to the variations in ability and background presented by students" (p.15).

There is dispute, however, about the capacity of teacher education programs to address the development of pedagogical content knowledge in novice teachers. Sosniak (1999) acknowledged the importance of pedagogical content knowledge as the explanation of the knowledge held by teachers in order to teach, but also noted that it was difficult to achieve in practice because "...the potential combinations of specific subject matter with particular types of students and other situational factors are seemingly infinite..." (p.2). Inquiries by Onslow, Beynon and Geddis (1992) found that acquisition of pedagogical content knowledge at university could not occur during professional practice teaching. Kagan (1992) echoed these sentiments by stating that universities fail to provide the preservice teacher with sufficient pedagogical content knowledge for the classroom. Indeed, for many preservice teachers, the professional practice teaching and the early years of teaching are a time of survival (Smith & Rhodes,1992; Feiman-Nemser, 2001). Turner-Bisset (1997) indicated that the acquisition of pedagogical content knowledge takes years to develop.

Other researchers, however, have not supported this perspective. According to the findings of Artiles and McClafferty (1998), novice teachers (and expert teachers) are constantly transforming their cognitions and teaching repertoires as they refine their practice. Jones and Vesilund (1996) found that preservice knowledge was fluid and thereby sensitive to experiences designed to reconstruct beliefs. They noted that interaction with school students was the most powerful source of information in

knowledge acquisition of preservice teachers. Studies have also shown that teacher education programs can assist preservice teachers to develop appropriate representations of, and reason pedagogically about, their subject matter. Ethell (1997) for example, sought to address this lack of pedagogically appropriate representations by having student teachers participate in a Beginning Teachers as Reflective Practitioners program. By the end of the program teacher education students developed a strong awareness of the link between knowing what to teach and how to teach.

This study, then, seeks to investigate the growth of teachers' knowledge especially the application of pedagogical content knowledge to practice by novice social science teachers. The dissertation is divided into five chapters. Chapter Two provides a review of the literature on the nature of pedagogical content knowledge that includes a discussion about the process of pedagogical reasoning and action, the personal nature of pedagogical content knowledge, the value of pedagogical content knowledge, its specific and generic makeup, how scholars have reformulated the idea, and the place of pedagogical content knowledge in the Queensland Social Science Syllabi. The second part of the chapter discusses those knowledge bases that make up pedagogical content knowledge, while the final part examines literature on teacher development, principally drawing on Fuller and Brown's (1975) stages of the contextual influences of teacher development, as well as conceptual change and knowledge in action.

Chapter Three explains the methodological framework including the theoretical-analytical framework, that is, the constructivist theoretical approach used to interpret the data; procedures of analysis of the concept map diagram, Think Aloud Protocols (TAPs) and video stimulated recall interviews; the use of case method in qualitative

research; ethical approval; and the selection procedures used to involve participants in the study.

Chapter Four contains results and discussions for the case studies of the ten participants. The case studies are structured so the reader can take the journey with the participant that begins in May 2002 and concludes in May 2003. The case studies begin with the participants' initial thoughts on teaching, before moving onto their constructs of social science teaching, and their knowledge in action and reflection over the course of the three data collection phases. An "overall summary" identifies the changes and consistencies in participants' conceptions of effective teaching and the role of pedagogical content knowledge in their conceptual structure through an examination of the focus knowledge bases in the three summary phases.

Chapter Five discusses the knowledge growth of participants in terms of new conceptual understanding and consistencies about effective teaching, including the participants' pedagogical content knowledge in relation to the social science syllabi. The participants' journey from preservice to inservice teaching is discussed in terms of Fuller & Brown's (1975) model of teacher development, as well as the contextual influences during their first six months of teaching. The implications for the study are tied specifically to the participants' final conceptual understanding of effective teaching with recommendations for future practice. Suggestions for future research are proposed, along with the limitations, strengths of the study. In order to address these issues the study described the following chapters to address the following research questions:

1. What is the conceptual structure of effective social science teaching held by preservice and novice teachers?
2. To what extent is pedagogical content knowledge a component of this conceptual structure?
3. What is the importance of pedagogical content knowledge to preservice and novice teachers' conceptions of good practice?

## **CHAPTER TWO: LITERATURE REVIEW**

### ***Introduction***

Expert teachers possess pedagogical content knowledge; not all experienced teachers have it, and only a minority of novice teachers may have it. This review, then, discusses the nature of pedagogical content knowledge, the knowledge bases fundamental to its formation, and other knowledge bases which contribute to it. The second part of the review focuses on the conditions for knowledge acquisition and teacher development that eventually lead to the development of teacher expertise in the classroom.

### ***Teachers' knowledge***

#### ***Knowledge and teaching***

Consistent findings in cognitive psychology over the past three decades show that the knowledge learners possess is a powerful determinate in how they attend to new knowledge and indeed, to future learning (Alexander, 1996). Knowledge is now viewed as multifaceted, covering a myriad of interrelated dimensions, ranging from socio-cultural knowledge, strategic abilities to personal beliefs and goals ( Alexander, 1996). That is to say, knowledge is organised and individuals differ in the way they organise their knowledge: the knowledge structure of individuals influences their perception, understandings and recall of information; experience and instruction lead the learner to construct new knowledge; and, prior knowledge is the basis for construction of new knowledge (Anderson, 1982).

With regards to Social Science classrooms, it is the job of the teacher to engage the learner so he/she can select, test, and reconstruct knowledge of the past, people and events and become more “knowing” (Dewey, 1897/1959). Since the 1970s the Queensland Social Science syllabi (for example, History and Geography) have sought

to address the needs of the students by having learning experiences that encourage a learner-centred approach by the teacher. In the most recent Queensland Syllabus for Years 1-10, Studies of Society and Environment (SOSE) Syllabus (QSA/QSCC, 2000), the approach is to regard learning "... as an active construction of meaning and teaching as an act of guiding and facilitating learning" (P.8). Knowledge is seen as ever changing and building on prior experience. The Global Aims in the Queensland Modern History Senior Syllabus (QSA/BSSSS, 1995) clearly articulate the kinds of knowledge students will gain through the study of history. These include, inter alia, understanding that history is an interpretative, explanatory discipline; ability to engage in historical inquiry; and refinement of their own values. The Global Aims of the Queensland Senior Geography Syllabus (QSA/BSSSS, 1999) seek to: develop students' knowledge of factual information, concepts and generalizations; develop a range of investigative skills; develop attitudes and values related to the sustainability of the environment, social justice and democracy. The Social Science Syllabi imply that teachers require a particular type of professional knowledge that primarily involves an inquiry approach to teaching.

Shulman (1987) developed a categorical framework for knowledge that underlies the understanding needed by teachers to promote comprehension among students.

**Figure 1: Categories of the knowledge base** (Shulman, 1987).

- *content knowledge*;
- *general pedagogical knowledge*, with special reference to those broad principles and strategies of classroom management and organization that appear to transcend subject matter;
- *curriculum knowledge*, with particular grasp of the materials and programmes that serve as 'tools of trade' for teachers;
- *pedagogical content knowledge*, that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of understanding;

- *knowledge of learners and their characteristics;*
- *knowledge of educational contexts*, ranging from the workings of the group or classroom, the governance and financing of school districts, to the character of communities and cultures;
- *knowledge of educational ends, purposes and values* and their philosophical and historical grounds.

### **Content knowledge**

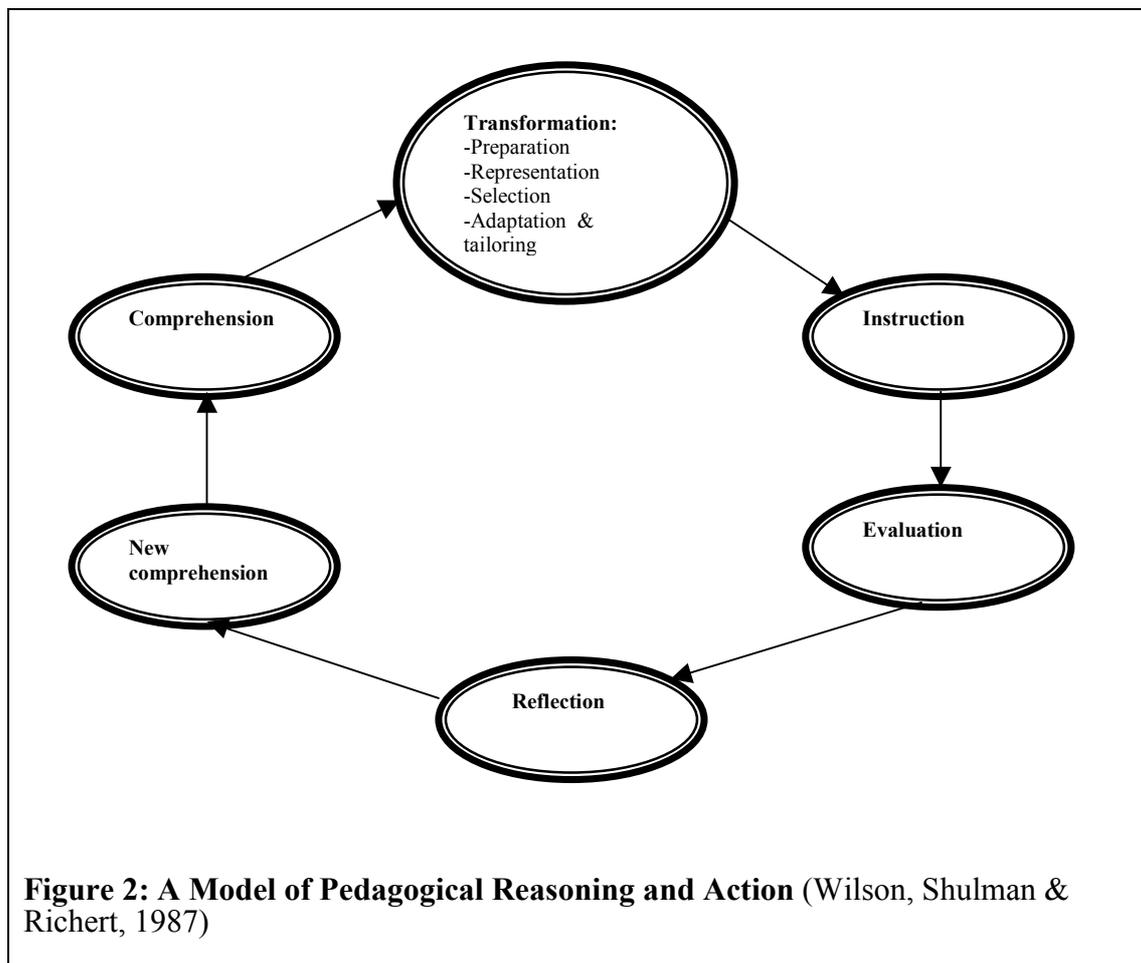
Shulman (in Tell, 2001) stated that good teaching is dependent upon the capacity of teachers to have "...deep and flexible understanding of *what* (my italics) they are teaching" (p.6). In fact, Feiman-Nemser and Parker (1990) state that the "Understanding of subject matter is *sine qua non* in teaching" (p.40). If a teacher is expected to prioritise key ideas, skills, and concepts in content knowledge and determine representation during the transformation process, he or she should have an understanding of the structural organization of the content knowledge (Bruner, 1977). A teacher is expected to have knowledge of structure that combines both content knowledge (facts, skills, concepts, generalizations) and pedagogical content knowledge (representations). Shulman (1986b) pointed out that content knowledge was the 'missing paradigm' of research on classroom teaching.

Shulman (1987) argued that most teaching begins with some kind of "text": a textbook, a unit of work, or a syllabus. Under a constructivist philosophy the concept of 'text' is broadened to a concept explicitly written or implicitly agreed that is the focal point for instruction. In the Social Sciences curriculum, the 'text' and the methodology for attaining the 'text', the pedagogy, are interrelated. Lessons are about something, and while there may be several purposes to them, the means of attaining the learning are directed by the text. In geography, the teacher's purposes might be about industrial pollution (content knowledge) and the actions by voluntary

organizations (content knowledge) to combat it. In history, the aim of the unit may be to investigate the causes of the Vietnam War (curriculum knowledge) through a class, cooperative approach (curriculum knowledge). In the junior curriculum of Studies of Society and Environment (SOSE) the aim of the lesson might be to teach students aspects of the value systems of the Aboriginal people (content knowledge) through an interactive workshop with local elders (curriculum knowledge). The text becomes an essential component of the teaching process. As Shulman (1987:14) explains

The text may be the vehicle for the accomplishment of other educational purposes, but some form of teaching material is almost always involved.

The starting point, then, in Shulman's cycle of pedagogical reasoning and action (See Figure 2) begins with *comprehension* of text, purposes, ideas, and the needs of learners. The act of comprehension is also the terminus of the cycle.



Shulman's first phase in the cycle, that is, "comprehension" of content knowledge relates to the particular skills and principles within a particular discipline. Content knowledge is probably the foundational knowledge base that contributes to pedagogical content knowledge. Content knowledge is the knowledge, understanding, skill, and disposition that is to be learnt by children (Shulman,1987). The challenges that lie ahead for the Social Science teacher, in terms of knowing the discipline are enormous. Getting students to apply knowledge to new situations, to reflect and make decisions about issues related to societies, as guided by the Queensland Studies of Society Syllabus and Environment (QSA/QCSS, 2000), requires the teacher to draw upon a variety of disciplines and areas of study. Content knowledge then, is a critical component of pedagogical content knowledge (See Figure 2)

### ***Pedagogical content knowledge***

It is asserted in this study that pedagogical content knowledge is the knowledge base necessary for Social Science teachers to achieve effective teaching of their subject area to meet the cognitive and emotional needs of students. First enunciated by Shulman (1986b:9) pedagogical content knowledge involves the blending of content and pedagogy into an understanding of how particular content knowledge is organised, represented and adapted to the diverse interests and abilities of students, and presented for instruction (see Figure 2). That is to say, pedagogical content knowledge is that "...particular amalgam of pedagogy and content [that] makes teachers different from [other] scholars in the field..." (Gundmundsdottir, 1987b:4), and distinguishes those who are content specialists or subject matter "knowers" from those who are subject matter "teachers" (Berliner, 1986:9-10). The amalgam concerns

...the most regularly taught topics in one's subject area, the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations...an understanding of what makes the learning of specific topics easy or difficult: the conceptions and preconceptions and misconceptions that students of different ages and backgrounds bring with them to the learning of those most frequently taught topics and lessons (Shulman, 1986b:9).

The comprehended ideas are not taught in a form as stored in the teacher's memory, but *transformed* by thinking "...one's way from the subject matter as understood by the teacher into the minds and motivation of learners" (p.16). The transformations of *preparation, representation, selection, adaptation* and *tailoring* to student characteristics, as shown in Figure 2 require combinations or ordering of these processes, "...each of which employs a kind of repertoire" (Shulman, 1987:16).

Shulman (1987:16) states that these forms of transformations

...are the essence in the act of pedagogical reasoning, of teaching as thinking, and of planning – whether explicitly or implicitly – the performance of teaching.

Gudmundsdottir (1987b) likened this process of transformation as a continual rearranging and restructuring of content knowledge for the purpose of teaching.

Buchmann (1984) spoke of transformation as a "flexible understanding" where good teachers maintain a fluid control of their subject matter, including their ability to view concepts from a variety ways, depending on the needs and abilities of learners.

Whilst *representation* forms a part of the transformation process, its role is nevertheless pivotal in the pedagogical process. Shulman (1987:15) stated that

The key to distinguishing the knowledge base of teaching lies at the intersection of content and pedagogy, in the capacity of the teacher to transform the content knowledge he or she possesses into forms that are pedagogically powerful yet adaptive to the variations in ability and background represented by the students.

Representation, then, is the point at which the teacher uses multiple alternate ways such as analogies, illustrations, explanations, metaphors of representing ideas to

learners, that is, a stage in the cycle where content, pedagogy and knowledge of learners combine to produce pedagogical content knowledge (Wilson et al., 1987).

In other words, the integration of content knowledge and general pedagogical knowledge in teachers' knowledge structure allows them to establish representational repertoires that are critical to teaching. Teachers need to know "the key ideas in the text or lesson and identifying the alternative ways of representing them to students" (Shulman, 1987:16). It also involves knowing a repertoire of instructional selections, ranging from the lectures, recitation to other forms of cooperative learning, such as reciprocal teaching, discovery learning, and learning outside the classroom setting (Shulman, 1987). The general goal of teaching is to equip students with the intellectual resources to engage in the major domains of human thought and inquiry.

Pedagogical content knowledge also has an emotional dimension that is shaped by considerations of culture and local context. Rosiek (2003) argues that the teaching of content knowledge is often restricted to the cognitive dimensions of the teaching experience. The author reports on a number research projects that took place over a 10-year period with more than 40 interns and experienced teachers concerning the use of pedagogical representations vis-à-vis student emotional responses. The examples from the study show that the teacher use of analogies, metaphors and narratives to influence student emotional responses to content knowledge that promoted student learning.

### *Social science teaching*

The goal of social science teachers is to teach students both content knowledge and the tools of social science inquiry. To elaborate, 'facts' are the most elemental of knowledge, while 'concepts' are abstractions that give order to factual knowledge. Conceptual knowledge can involve understandings of facts at its most simple to

concepts of greater complexity, and learners who possess only the former, have difficulties with comprehension and lack critical judgement, while the latter gives the learner skills in application and task performance. Decision-making plays a key role in conceptual knowledge because it synthesizes all of the available information and values (Engle, 2003). 'Generalizations' "are more powerful combinations of ideas because they transfer from one situation to another and, more so than concepts, allow prediction" (Thornton, 2001:294). Another element of Social Science pedagogical content knowledge is 'skills', that is, the knowledge how to perform specific order procedures such as placing dates in chronological order, to the use of higher order strategies during problem solving activities. Thornton (2001) also states that effective social science teachers should have knowledge of a variety of teaching repertoires as a means of developing critical thinking amongst students such as, conceptual teaching, the primary source method, simulations and problem solving.

Additionally, social science teachers must know the language of social science, namely, the specialist and shifting terminology of the past, the language of historical time; the language of historical processes; and, the language of historical description and analysis (Husbands, 2001). The classroom is not the ideal setting for students to reconstruct and understand the past and its populations since "it lacks the colour of the theatre, the dusty atmosphere of the archive or the architectural brilliance of the castle" (Husbands, 2001:88). The words of teachers, students, actors of the past, documents, videos, and textbooks, then, become the principal means of developing historical understanding. The way language is used and opportunities created for students to use language will determine the way they think about the past (Husbands, 2001; Rudham, 2001).

Teachers need to know more than just the specific topics they access in the

curriculum. "...Teachers must not only be capable of defining for students the accepted truths in a domain. They must be able to explain why a particular proposition is deemed warranted, why it is worth knowing, and how it relates to other propositions" (Shulman, 1986b:9). In specific areas, application of this can promote pedagogical content knowledge. The Queensland Studies of Society and Environment (SOSE) Syllabus (QSA/QSCC, 2000), for example is, a "...key learning area that centres on human fascination with the way people interact with each other and with the environment" (p.1). This requires the teacher to plan investigations of challenging and controversial issues, and to promote critical thinking and reflection among students in a range of interrelated concepts, key values and processes (p.1).

In the discipline of History, teachers must not only know about people, events, and the past, they must also understand what history is, the nature of history and what it means to know something about the past (Pendry & Husbands, 2000; Bernard, 2002; McLaughlin, 2002). Gudmundsdottir and Shulman (1987) compared an outstanding history teacher with a novice social studies teacher and found that the expert could visualize and articulate six different ways of organizing topics taught in American History. The novice, on the other hand, could not establish links between units and often relied on a movie or a text to teach a unit.

#### *Experience Vs Novice*

Sanders, Borko and Lockard (1993) found that experienced teachers teaching outside their field, often resorted to behaviour similar to that of novice teachers – more time was spent on planning and preparation, and less on topic importance, content knowledge structure and student background knowledge. Despite reliance on their pedagogical knowledge from other content areas, they had difficulty in dealing with content specific student ideas.

In assisting students to acquire an understanding of content knowledge, teachers draw on a variety of knowledge and skills. Wineburg and Wilson (1991) described how two very different outstanding history teachers related their content in exciting and dynamic ways. They held organized networks of facts, which were organized by themes and ideas, and both used stories to reconstruct evidence of the past, and they possessed a generalized body of knowledge along with methods of inquiry central to their discipline. Because of their exceptional knowledge of content knowledge, they were able to represent content in a variety of ways for student understanding.

Another example of pedagogical content knowledge was shown in a study of “Nancy”, an experienced English teacher (Shulman 1987). Shulman (p.2) explained that

Nancy employed a conceptual framework in her teaching, using it to guide her own sequencing of material and formulation of questions. She taught the framework explicitly to her students over the semester, helping them employ it like a scaffolding to organize their own study of texts, to monitor their own thinking. Although as a teacher she maintained tight control of her classroom discourse, her teaching goals were to liberate her students’ minds through literacy, eventually to use great works of literature to illuminate their own lives.

A number of observations can be made from Nancy’s teaching of literature. First, she had a repertoire of resources and materials that were organised for different pedagogical purposes, at different levels of difficulty, for different kinds of learners. Second, she had, as Shulman (1987) noted, an organising framework for her outstanding content knowledge that she was able to structure and share with her students. She tailored her instructional repertoires to suit the learning characteristics of her learners. And finally, she adapted her teaching according to the level of difficulty in the texts and changing circumstances in the classroom.

In their studies of science, Smith and Neale (1989) found that not all science teachers transformed their content knowledge into pedagogical content knowledge during their teaching. They suggested that teachers needed a set of specific representations such as strands of spaghetti to represent rays of light. Van Driel, Verloop and de Vos (1998) found that the results of an in-service workshop that focused on teachers' pedagogical content knowledge were mixed when applied to the classroom. They acknowledged that teachers' pedagogical content knowledge develops in different ways – not by generating a checklist of indicators for effective instruction but by

...providing teachers with a knowledge base which enables them to teach specific topics effectively and flexibly in situations that are subjected to different contextual, situational, and personal influences. (p.691)

Other research such as that conducted by Geddis (1993) studied a group of preservice science teachers to understand why their knowledge about electrical current flow was not accessible to many learners. The preservice teachers discovered that by representing the analogy of 'the banana cartons on the conveyor trucks', they were able to establish a critical distinction between electrical charge flow and electrical energy flow. The process of inquiry into students' conceptions and misconceptions showed that novice teachers were able to gain a greater understanding of content knowledge representations in science teaching. The study by Geddis (1993:677)

...illustrates how the ideas about transforming content for instruction, pedagogical content knowledge, and reflection that 'gives-students-reason' can come together to provide novice teachers with a more sophisticated view of the nature of their craft.

In a study to explore novice science teachers' awareness of students' likely misconceptions, Halim and Meerah (2002) found that the majority of novice teachers

had problems in understanding scientific concepts, and were inclined to make incorrect judgements about students' misconceptions. The preference shown by novice teachers to teach concepts according to their own understanding, supports the findings by Hogan, Rabinowitz and Craven (2003) that novice teachers tended to view teaching as telling rather than representing content for student understanding.

Other studies have found that novice teachers were not only concerned with survival and behaviour management, but also with how to generate representations of subject matter that would facilitate understanding in their students (Wilson et al., 1987). One of their teachers wanted to introduce Julius Caesar with the theme of moral conflict. He used the scenario of the first officer on the Starship Enterprise having to grapple with the decision of arresting Captain Kirk, just as Caesar's closest supporters were in a dilemma as to what to do with their leader. The novice teacher transformed his understanding of moral conflict into an activity that tapped into the interests and intellectual understanding of his students.

In contrast to the studies on expert history teachers (those who had a degree in history), Wilson and Wineburg (1988) compared four novice teachers in terms of factual knowledge, place of interpretation and evidence, significance of chronology and continuity, and the meaning of causation – all elements related to history. Some saw history as a field of static facts while others viewed interpretation and use of evidence (application) as one of the same thing. The role of causation was often coloured by their disciplinary roots. Because of their lack of understanding of the structure of history, the novices were inclined to over-generalize their knowledge. This lack of disciplinary knowledge prevented novices from learning new content. And the lack of understanding of history as mainly an interpretative endeavour prevented them from seeking further explanations.

Gestures can also play a key role in pedagogical content knowledge. Roth (2001) found in his study of four students who were stimulating motion phenomena, that attempts to explain velocity and acceleration by a member of the group to the others, failed because of his lack of physics language. The student then used the visual display (the monitor) and gestured to communicate in a way that his peers could understand. He did this by using his finger that indicates a trajectory across the screen of the monitor while at the same time, talking to give clues to the features of motion. The gestures and talk are about the events in the monitor; the monitor serves as a background for the words; and, the words act as a background for the gestures.

The importance of pedagogical content knowledge in teaching is evidenced by Penso's (2002) study of student teachers of biology during their professional teaching practice. The study focused on the ability of student teachers to identify the learning difficulties of their students. Whilst most student teachers identified student learning difficulties during their observation phase, they observed far less in the lessons they had taught. Furthermore, student teachers were inclined to focus on the characteristics of sources of students' difficulties and not on the teacher's methods, the type of content, student cognitive and affective characteristics, and factors inherent in the lesson. Penso suggested that teacher educators should be made aware of the importance of teaching processes in class that expose student teachers to students learning difficulties "...and help them deal with them effectively" (p.25)

It should be noted that in the context of their teacher education, participants in this study have been introduced to Shulman's categories of teacher knowledge. Whilst knowledge of Shulman in their curriculum areas may vary, all participants would have been exposed to his categories of teacher knowledge during their second Professional Practicing in Teaching course that is linked to a practicum.

The value of pedagogical content knowledge was demonstrated in a study by Walkwitz and Lee (1992) when they examined how pedagogical content knowledge could facilitate the effectiveness of teaching overhand throwing skills to teacher education students of physical education. One group of student teachers were provided with pedagogical content knowledge information, while the control group received only the content knowledge information. It was found that those students who were taught by teachers who possessed pedagogical content knowledge gained a better performance and understanding, because the overhand throwing skills were explained, demonstrated to the teacher education students, and practised by the students.

Sockett (1987) criticized Shulman's knowledge base of teaching for focusing on content knowledge and ignoring the moral side of teaching. However, as Gundmundsdottir (1990) showed in her study of four expert teachers, moral values are

...so fundamental to what these four teachers know and how they teach that it seems inappropriate to assign values to a separate category in the representation of knowledge of teaching (p.45).

Gundmundsdottir's study also showed that the reorganization of content in pedagogical content knowledge involved the personal values that were unique to each teacher. Their choice of pedagogical strategies was also influenced by values.

Shulman (1990) referred to these values as the "missing pieces in the missing paradigm" (p.3).

Some scholars have reformulated the concept of pedagogical content knowledge by identifying the constituent parts. Smith and Neale (1989) described pedagogical content knowledge as having three components: knowledge of typical student errors, knowledge of particular teaching strategies, and knowledge of content elaboration.

Integration of the three is vital for effective teaching. Grossman (1989) expanded her definition of pedagogical content knowledge, based on four central components: knowledge of students' understanding, curriculum, instructional strategies, and purposes for teaching. Cochran, DeRuiter and King (1993) renamed pedagogical content knowledge as pedagogical content *knowing* to acknowledge the dynamic nature of knowledge growth. Their model is defined as "a teacher's integrated understanding of four components of pedagogy, subject matter content, student characteristics, and the environmental context of learning" (p.266). Fernande-Balboa and Stiehl (1995) identified five components of pedagogical content knowledge: subject matter, students, instructional strategies, the teaching context, and one's teaching purposes. Turner-Bisset (1997) defined pedagogical content knowledge as an overarching knowledge base encompassing all eleven knowledge bases in her knowledge bases of teaching.

Studies of teachers' pedagogical content knowledge base indicate that it is a personal construct unique to the individual teacher. Chen and Ennis (1995) found in a study on high school physical education teachers that although they shared a common content knowledge, they differed in their personalized pedagogical content knowledge repertoire, based on their perceptions of students' physical ability to deal with "basic" or "advanced" concepts and skills in volleyball. As the above studies suggest because students are different in abilities, prior knowledge, and learning styles, effective teachers should be able to teach a concept in "150 different ways" (Wilson et al., 1987:104).

### ***Pedagogical content knowledge in the Queensland Social Science Syllabi***

The syllabi of Studies of Society and Environment (SOSE, QSA/QCSS, 2000), Ancient and Modern History (QSA/BSSSS, 1995), and Senior Geography (QSA/BSSSS, 1999), exhort teachers to engage in pedagogical content knowledge as their primary focus in teaching. Underpinning the pedagogical content knowledge base of teaching in the Social Sciences is a process called ‘reflective inquiry’ in which students are encouraged to reflect and monitor their thinking as they investigate selected topics. The teacher acts as a scaffolder as he/she guides students to develop the expertise in the following inquiry process that usually involves: the identification of an issue; framing and focusing questions; identifying possible relevant evidence; collecting and organising evidence; analysing and evaluating evidence; synthesising and reporting conclusions; possibly taking action; reconsidering consequences and outcomes of each of the above phases. The process of introspection and reconsideration of values and processes during the inquiry process will rarely follow a strict sequential order.

The key approach that supports pedagogical content knowledge in all three of the syllabi is constructivism. The SOSE Syllabus “...promotes a learner-centred approach by using problem-solving and decision-making techniques of various traditions of inquiry” (p.8). The Modern and Ancient History (QSA/BSSSS, 1995) syllabi state clearly that the “The focus of the curriculum is inquiry” (p.11), while Senior Geography Syllabus (QSA/BSSSS, 1999) is “...characterised by a process of inquiry through which students use key questions and concepts of geography to refine their understanding...” (p.5).

The success of pedagogical content knowledge in teaching has a strong basis on the teacher’s knowledge of learners and learning. The SOSE Syllabus explicitly states

that teachers should make a number of assumptions about learners and learning. These are listed in dot points under the general heading of “Understandings about learners and learning” (pp.7-8), and include: learners are unique individuals who possess divergent views of the world; learners learn in different ways; learners prior knowledge and experience will influence the meanings they make from new learning experiences; and, learning is most effective when students are working in collaboration. The Geography Syllabus states that “...the choice of learning experiences ...should reflect the interests and abilities of students undertaking the course” (p.18). In fact the Syllabus stresses the importance of framing the learning experiences to suit the abilities of students; as well, the learning experiences need to cater for students from a variety of backgrounds. Knowledge of learners is implicitly stated in the sample depth study (p.13) of the History Syllabus where the teacher uses stimulus material to motivate the interests of students. Clearly, the teacher will need to know the interests and abilities of students in order to motivate them with some kind of social evidence.

Teachers then need to combine their knowledge of curriculum with their skills of general pedagogical knowledge to transform knowledge to be understandable to students. Pedagogical content knowledge in SOSE teaching involves a learner-centred approach to teaching that guides students to new understandings of knowledge. Through this enactment of reworked knowledge, the teacher is facilitating opportunities for students to engage in “...critical and creative thinking, problem-solving and decision making” that involve “... the use of skills and processes such as recall, application, analysis, synthesis, prediction and evaluation...” (SOSE, 2000:8).

The Modern and Ancient History syllabi refer to students developing the skills of “...rigorous investigation, critical reflection, empathy and reasoned judgement” (p.4)

through research, critical use of sources, written and non-written communication. These skills are developed through mandatory depth studies that require students to identify historical issues, investigate those issues, and make judgements (p.11). The teacher as facilitator uses pedagogical content knowledge in order to help students develop expertise in how to proceed with the phases of historical inquiry in the depth study to reach new understandings of knowledge. For example, the teacher stimulates interest of students through proximity involvement, assists students in formulating hypotheses by acting as scaffolder, and acts as guide during the validation of conclusions.

The inquiry process in Senior Geography dictates the use of pedagogical content knowledge that requires teachers to impart more than just knowledge but also the processes of geographical inquiry that revolves around four key questions: (a) What and where are the issues or patterns being studied? (b) How and why are they there? (c) What are their impacts or consequences? (d) What is being and could be done? These questions help students "...explain, analyse, compare, contrast, evaluate and make decisions about improvements for current and future use" (p.15). Importantly, the Syllabus stresses the need for choices of elective units to answer these questions that not only reflect the abilities and interests of students but also "...the expertise, interests and experiences of the class teacher" (p.18). There is recognition that teachers need to have the combined knowledge of the curriculum and the necessary In terms of field studies, the Syllabus suggests that teachers should progressively move from teacher-directed activities to more learner-centred and constructivist "...situations in which students plan and conduct their own field investigations" (p.17).

The three Syllabi state explicitly and implicitly the importance of using both primary and secondary sources in the inquiry process. Both the Modern and Ancient History Syllabi state that the use of both primary and secondary sources will be crucial to the in-depth study. “This is a *principle of historical inquiry*” (p.11). The Senior Geography Syllabus states that the 20 minimum hours of field studies “...are essential for the collection of primary source data” (p.17), and that reports should show a greater evidence of primary sources than secondary sources (p.48). The Studies of Society and Environment Syllabus nurtures the collection of primary source data through field studies, especially in the ‘Place and Space’ Strand of the Syllabus.

Another aspect of the student learning experience that underpins the importance of pedagogical content knowledge teaching in the social sciences is that students should also work in a group setting. The Senior Geography Syllabus states that geographical issues and problems they study “...will not be solved by individuals” (p.18). Phase 6 of the Senior History Syllabus depth study states that “Each student experiences peer-group reinforcement” (p.13), while the Studies of Society and Environment Syllabus (SOSE) states that students should “... work constructively with others to make decisions, solve problems...” (p.5).

The pedagogical content knowledge of a teacher is essential to the effectiveness of approaching teaching in a way that initiates inquiry. Teachers act as guides in representing knowledge in ways that will connect to the interests and abilities of students. The SOSE Syllabus strongly implies that the overall outcomes will not be met if teaching does not take into account the characteristics of individual learners in the act of reflective inquiry. The Senior History syllabi have mandatory units of inquiry that places a strong emphasis on the teacher adopting a constructivist approach to teaching. For example, students will develop greater confidence in the use

of historical terms, such as nationalism, imperialism, colonialism, and militarism, if they are given the opportunity to use them in activities, like “Diplomacy”, a board game that seeks to recreate the atmosphere of political intrigue and military power in imperial Europe of the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries by having players, usually in teams, take the part of the Seven Great Powers of that time. Teaching strategies that only have students writing definitions of the terms from the white board or OHT, followed by an explanation and perhaps a few document studies, will not provide students with the same learning experiences. The process of inquiry in the Senior Geography Syllabus strongly implies that the learning experiences should enable students to develop their abilities across the four questions in the units of work. The syllabi further state the value of students working in collaboration, in both sharing knowledge construction and in the act of socially interacting with each other.

Students will not meet the attributes of lifelong learning or the global aims, however, if teachers are unable to meld their knowledge of content with their skills of general pedagogical knowledge. Together with content knowledge, the components of general pedagogical knowledge lay the foundation stone for pedagogical content knowledge. There are three interrelated components of general pedagogical knowledge: behaviour management; classroom communication; teaching strategies, and personal beliefs (See **Figure 3**).

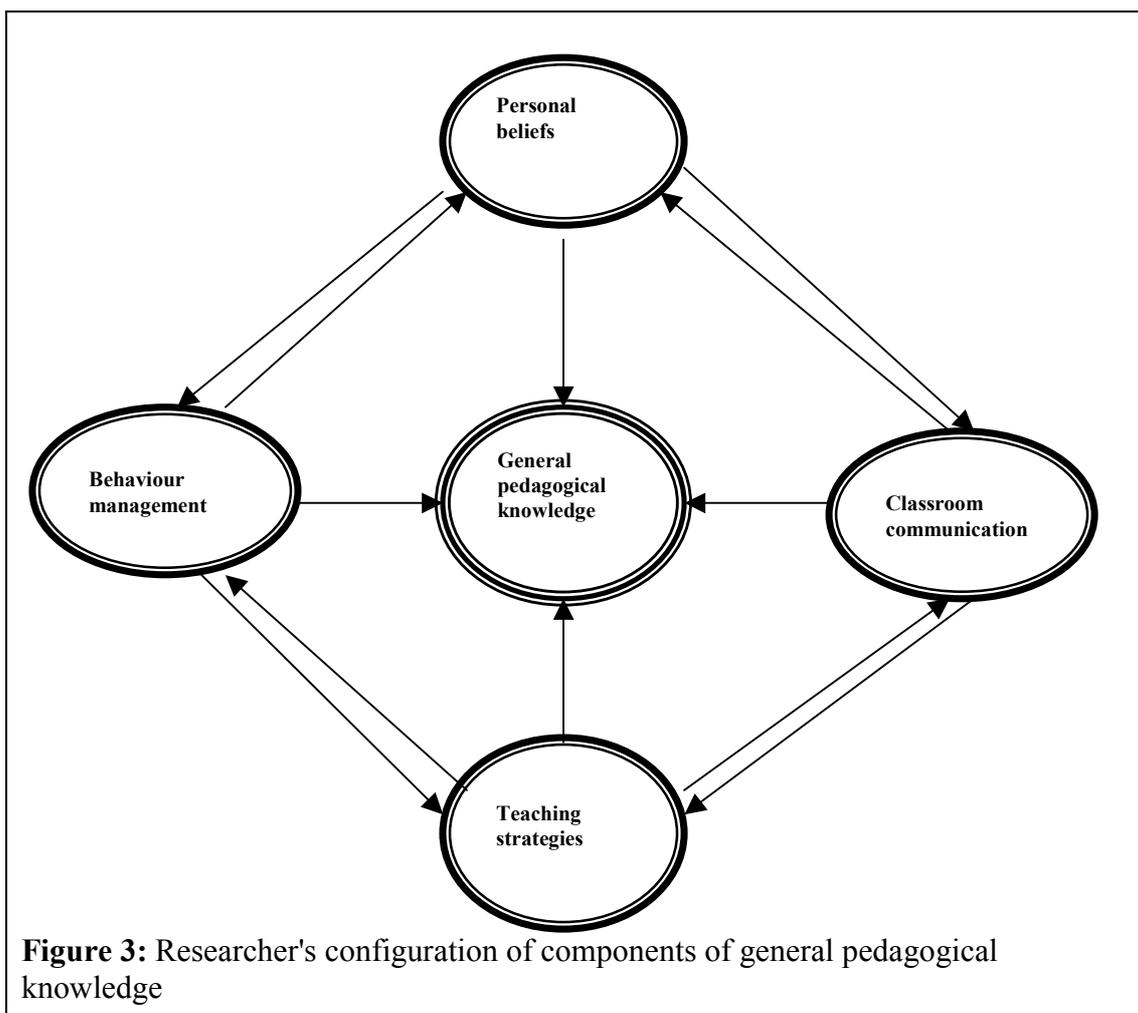
### ***General pedagogical knowledge***

#### *Behaviour management*

Traditional ideas about behaviour management focused on a reactive approach, that is, the teacher would have sound disciplinary measures in place, and “students would be obedient because they were afraid of the consequences of misbehaviour” (Groundwater-Smith, Cusworth & Dobbins, 2001:220). However, a focus on

discipline and the assumption that there is something wrong with a particular student or groups of students, is a myopic way of viewing classroom management.

Observations, then, by Jones (1997)) that student achievement is influenced by teachers' management practices by using such tools as 'withitness' and systems of consequences, need to be viewed within the total context of a classroom.



In their study of student behaviour and teacher practices, Cothan, Kulinna and Garrahy (2003) found that students generally preferred to work with those teachers who set early, consistent standards, and strove to develop positive relationships with them. Other researchers identified three dimensions to behaviour management: space, energy, and managing the self. The results of Fenwick's (1998) study, for example, showed that teachers tried to create a safe place for learning in a disciplined

environment, which paradoxically promoted independent learning. Teachers worked to "...sublimate student energy towards socially approved purposes..." (Fenwick, 1998:630), while at the same time maintaining a flow of energy. In terms of managing self, teachers had to balance a sense of caring with self as the authority. The author noted that teachers were comfortable with contingency, that is, their ability to embrace surprise by continually adjusting to the needs of individual students in a thoughtful and rational way.

Other researchers such as Van Tartwijk, Brekelmans and Wubbels (1998) argue that teacher educators also need to instruct preservice teachers in strategies that "bring on the image of an experienced teacher when they address the class as a group" (p.615) because they usually have problems in showing behaviour management techniques. The authors conducted a study of student perceptions of teacher interpersonal style, and they found students responded best to those teachers who were out in the front of the classroom, engaging in the types of behavioural strategies such as those advocated by Kounin (1970). No differences were found between preservice and experienced teachers when they were interacting with individual students, in a non-frontal orientation towards the rest of the class.

Behaviour management practices should also move beyond behaviour modification to incorporate a climate that supports all aspects of learning (Cole & Chan, 1987). That is to say, teachers should be proactive when dealing with students. Groundwater-Smith et al. (2001) identify three broad approaches to behaviour management: the person-centred; interactive; and, the interventionist approach. Although each can be placed along a continuum, many of the approaches would overlap during classroom practice. These approaches are reflected in the range of different discipline models Edwards (1997) reviews; each have their strengths and limitations, and the teacher

who is wanting to create his/her own personal theory of discipline, would need to consider a variety of models.

Studies show that there is a correlation between student achievement and teacher behaviour, that is, students learn best when the focus is on learning; when the teacher maintains consistent pace and momentum of instruction; and, when the teacher is actively engaged in teaching (Brophy, 1997). This last point refers to the teacher interacting with students, representing knowledge in the form of analogies, metaphors, explanations, and illustrations, rather than having lights off and copying down information from the overhead projector. In other words, the actively engaged teacher is one who engages the students to explore and reflect (Onore, 1992) – the key to effective pedagogical content knowledge in the social sciences.

#### *Classroom communication*

A further prerequisite for effective learning environments is an understanding of classroom communication. The classroom houses different levels of communication and multiple contexts for communication. Webb and Blond (1995) demonstrated in their study of two teachers and their students that the teachers' knowledge of caring and the relationships they had with their students altered their structure of pedagogy and curriculum for each student. The authors also show the level of subjectivity that exists between the teacher and student, and that knowledge is not limited to what one person knows

...but the intersection where the knowing of two persons in-relation overlap and the consequences for student learning (and teacher development ) when one of those persons is a teacher (p.624).

Other researchers have argued that the key criteria for enhancing performance amongst groups of people is emotional understanding (Hargreaves, 2000). "In teaching, this is central to high standards, good collegueship and strong partnerships"

(p.824). Emotional understanding can be enhanced or undermined depending on the expectations they have of themselves and the ways their schools are organized. These kinds of patterns of expectations, in turn, will determine the kinds of emotional understandings teachers will have of their students. Hargreaves (2000) identified three kinds of emotional geography in his study of fifty-three primary and secondary teachers' perceptions of their emotional interactions with students; professional, political and physical. He found that there was a greater emotional understanding between teachers and students since Lortie's (1975) study in the late 1960s. However, Hargreaves (2000) found that secondary teachers were more professionally distanced from their primary counterparts. He identified students having many teachers and vice versa, the subject specialist's timetable, and cognitive overload, as obstacles in achieving better emotional understanding. The author suggested that structural changes in the secondary school curriculum and the organization of mini-schools as a means of achieving stronger emotional bonds between teachers and students would provide a basis for high quality learning.

Emotional understanding between teacher and students helps lay the foundation for a democratic relationship. This relationship between the mature and the immature is what Kaplan (2000) called personal and impersonal, both of which he regards as dimensions within a relationship and not as opposites. Kaplan cited Sennet (1980) in discussing the impact of these kinds of extremes of authority; authority that is purely personal is paternalistic in which control is in the hands of the paternal figure; and authority that is purely impersonal that insists on an absolute division that cannot be compromised. These extremes of authority provide "...enormous amounts of disaffection" (Sennet, 1980:130). The good teacher, on the other hand, is one who is

able to "...balance the personal and the impersonal dimensions of daily contract with young people" (Kaplan, 2000:377).

Another source of conflict in the classroom is when teachers do not take into account the needs, values and interests of students in the curriculum. Cothan and Ennis (1997) studied teachers' and students' conceptions of power especially in terms of each group's preferred focus in class. Students resorted to such strategies as non-participation, personality power, disruptions, and teacher rewards to influence the class. Teachers, on the other hand, used student rewards and strategic withdrawal to pursue their values. The result was a negotiated curriculum of order rather than education. The authors suggested that university educators along with administrative support can provide teachers with skills to promote equity in the schools' curriculum that contributes to student learning while maintaining effective levels of behaviour management.

In their study of preservice teachers' understandings of caring, Goldstein and Lake (2000) found a constant theme of oversimplification, essentialism, and idealism. The authors acknowledged that they did not expect sophisticated understanding of caring and teaching, since students were embarking on their first practicum, but they were concerned that these novice teachers were leaving themselves vulnerable to such unquestioning and unexamined simplistic understanding of the caring teacher. The authors cited the research by Kagan (1992) who found that ideas about caring and teaching were unlikely to naturally change over time. But they also pointed to Dunkin et al.'s research (1994) that showed that properly designed teacher education programs can change prior knowledge and pre-existing beliefs.

Language is another aspect of teaching that teachers need to be aware of. Bernstein (1990) found that many students are ill-prepared for the way language is used in the

classroom. Teachers in his study often assumed that students would understand their ways of speaking. In a study of ‘at risk’ groups including Samoan students, Singh, Dooley and Freebody (2001) found that implicit instructions about knowledge expectations given by teachers were a potential source of confusion and disruption in class. The authors suggested a pedagogical content knowledge approach that entailed: (a) knowledge that is selected, organised and paced needs to be made explicit to students; (b) criteria to evaluate the acquisition of knowledge needs to be made explicit; (c) classroom knowledge to dovetail into students’ prior knowledge; and (d) pedagogies that ‘make a difference’ to focus on inquiry, not on conduct or moral order of schooling.

In another study, Michaels (1986) found that teachers were inclined to value the language of students with backgrounds like their own. Morine-Dersheimer & Kent, (1999) suggested that expectations of students, and the patterns of communication with the student should be considered in relation to the communication patterns of home. Clearly, then, the teacher needs to become knowledgeable about the background characteristics of students – their *skills*, *attitudes* and *interests* of learners. The need for pedagogical content knowledge is further reinforced with Cole and Chan’s (1987:29) statement that “The formulation and encoding of relevant messages requires sound knowledge of the personal backgrounds of students”.

### *Teaching strategies*

The third element of Shulman’s general pedagogical knowledge skills is teaching strategies. Teaching strategies can take many forms, and teacher knowledge about the kinds of instruction is a critical aspect of general pedagogical knowledge. Shulman (1987) identified instruction as having a myriad of features including “management, presentations, interactions, group work, discipline, humour, questioning...discovery

or inquiry instruction, and the observable forms of classroom teaching” (p.15).

Rosehine (1993) presented two general alternative sets of teaching procedures, referred to as “direct instruction” (Brophy & Good, 1986) and “expert scaffolding”(Watson-Gegeo & Boggs, 1977; Wertsch, 1979; Palinscar & Brown 1984; Pearson & Raphael, 1990).

The former can be likened to ‘the behaviourist model’ (Cole & Chan 1987) in which teaching and learning are conducted in a highly regulated way, involving “... exemplary lessons ..., allocating rewards and punishments..., and recording exact frequencies of learner responses” (p.4). Thornton (2001) identified a similar approach in the teaching of social studies; instruction usually involves recitation and lecture, and for most students this can be dull and unmotivating. However, studies conducted by Wineburg and Wilson (1991) demonstrated that recitational models of teaching can engage the student if lessons move beyond factual question-answer sessions to a more open-ended form of discussion.

One of the most important contributions to research on scaffolding has been the work of Vygotsky (Wertsch, 1979) in the area of the relationship between a child’s learning and the support provided by adults. He identified that ‘distance’ between what a child can do with help and what a child is capable of without help as the Zone of Proximal Development. Social interaction is pivotal in the child’s learning, and he argued that for the intra-psychological (that is, within the individual) to occur, the child must go through an inter-psychological (that is, social) plane. In other words, the child must first develop higher order functioning through scaffolding by peer support and adults, before he or she can perform a task alone. Wertsch (1979) arbitrarily identified four levels in which a child moves from other-regulation to self-regulation (p.19). As the child progresses along this four level continuum, the amount of

scaffolding needed decreases as he or she masters more elements of the task. In fact, scaffolding contributes to pedagogical content knowledge; for example, the teacher may use scaffolding strategies in preparation for assignment writing, modelling effective planning, drafting, and revising strategies. During reading instruction, it may be a fellow student who takes on the responsibility of scaffolding, so the less experienced reader can focus on acquiring strategies. In both cases scaffolding is temporary and adjustable (Pearson & Raphael, 1990).

Scaffolding and direct instruction are strategies that teachers would use in the classroom. For example, teachers of Modern History (QSA/BSSSS, 1995) are expected to teach at least one in-depth study unit of work a semester, using direct instructions for students to acquire a knowledge base of the topic, and then using less structured teaching procedures at the later stages of the unit (p.13). Likewise, teachers of The Real Game (Barry, 2000) are expected to assume a major role as facilitator, while direct instructional procedures should be limited to introducing the elements of the unit of work.

To summarize, effective behaviour management is determined by a proactive approach to teaching that includes setting early and consistent standards, when the teacher has presence in the classroom, and when the focus is on learning. Beginning teachers must develop the ability to use different strategies depending on the classroom and school contexts. The learning is further enhanced if there is emotional understanding between the teacher and learners, including knowledge of the learners' cultural background, and the learners' skills, needs, and interests in the curriculum. Understanding different aspects of classroom communication can help teachers become more responsive to the individual needs of students. Direct instruction and scaffolding are generally considered to be the two alternative sets of teaching

procedures, although effective teachers would utilise both in the course of their teaching. As Figure 7 shows these three facets of general pedagogical knowledge are intertwined, and beginning teachers need to take into account all three in their teaching. The research by Morine-Dersheimer and Kent (1999), Porter (2000), Edwards (1997), Brophy (2001), indicates that general pedagogical knowledge is an essential form of teachers' knowledge.

### *Personal beliefs*

An explanation of general pedagogical knowledge would not be complete without the recognition of the input from teachers' personal beliefs of teaching and learning, since they serve as the basis for classroom practice and curriculum (Ross, Cornett & McCutcheon, 1992). These belief systems, whether they are right or wrong, provide a framework for meaning, assist in historical interpretation, and give coherence to arguments (Romanowski, 1997). All teachers become curriculum choice makers when making decisions about particular content they will teach (Ben-Peretz, 1990). Gudmundsdottir (1990) described these pedagogical decisions as a "dialogue between the textbook, their own subject matter and the class". In short, teachers rearrange knowledge and curriculum to fit their individual orientations towards subject matter.

In addition to the general pedagogical knowledge skills, Shulman identified other interrelated categories of knowledge bases that contribute to pedagogical content knowledge. These included knowledge of learners and learning; curriculum knowledge; knowledge of educational contexts; and knowledge of ends, goals, purposes, and values (See Figure 3).

### ***Knowledge of learners and learning***

Knowledge of learners and learning clearly relates to students and characteristics as learners – in a cognitive and empirical sense. The cognitive side of learners deals with child development and how children's knowledge is structured, and of what they can

and cannot readily do. Empirical knowledge of the learner involves knowing a learner's family background, his/her out-of-school interests (Hegarty, 2000). Both can be related to Shulman's (1987) idea of adaptation, activities and representations to meet the needs of particular learners. In order to successfully transform subject matter for student learning, teachers must then have a knowledge base of their learners; in fact, writers such as Cochran, DeRuiter and King (1993) give 'students' equal standing to content knowledge when identifying the components contributing to pedagogical content knowledge.

A study of 871 high school students by Vaugh, Schumm, Niarhos and Daugherty (1993) showed that most students preferred those teachers who made adaptations to their learning. They appreciated those teachers who attended to their individual needs, were sensitive to a range of learning patterns, and who adjusted their instruction to student ability levels. There were also a small number of differences amongst student responses. These students did not like the teacher making adaptations to books and materials, text and homework. The students were "...less supportive of adaptations that might overtly indicate differential treatment of students" (Vaugh et al., 1993:115). The authors noted that the latter sentiment was more pronounced in the upper grades. Other findings showed that those students who preferred adaptations were the high achieving students, while low achieving students felt less strongly about teachers making changes to the way they delivered their lesson. The authors suggested that after a history of failure at school, students did not want to be further stigmatised by being seen to be different and unable to cope with the curriculum.

Another study found that middle school students were affectively oriented towards the role of the teacher while high school students were cognitively oriented (Bergen, 1999). All students, however, regarded the teachers' cognitive role of having well

prepared lessons and materials well explained, as central to the teachers' role. In general terms, students considered teachers to be effective when there was an increase in student learning that involved a variety of teaching strategies (Cooper & McIntyre, 1994). The most important feature of teaching was to create structures that foster understanding by enabling students "...to perceive personally meaningful connections between their existing knowledge and new knowledge" (Cooper et al., 1994:636). Integral in this process is the teachers' understanding of students' prior knowledge. In their review of the literature on prior knowledge, Dochy, Segers and Buehl (1999) found that prior knowledge is an effective aid for learning new knowledge, especially within the constructivist framework.

However, Berry and Sahlberg (1996) found in their study that few middle school students understood learning and knowledge as a constructivist approach. Students' "... ideas of learning and schooling reflect the static and closed practices of school" (p.33). The authors concluded that students in their study had difficulties in "...conceptualising their own metacognition and to give clear personal statements about it" (p.33). The SOSE Syllabus (QSA/QCSS, 2000) recognises that learners need to understand the meaning of learning, and this concern is addressed in its statement on learner-centred approaches to teaching that "...view learning as an active construction of meaning..." (p.8), involving metacognitive approaches and the recognition that knowledge is ever changing "...and built on prior knowledge" (p.8). Berry et al. (1996) suggested that students can be taught to have an understanding of their metacognition by reflecting on their practices, and by "...developing teachers' conceptual metacognitive understandings" (p.34).

The results of a study by Kagan and Tippins (1991), of knowledge that 12 novice teachers (5 primary and 7 secondary) acquired about their students over three separate

periods, found that primary novices were more forthcoming in their student profiles than their secondary counterparts; primary novices viewed their students in more multifaceted terms than the secondary novices "...who consistently focused on academic skills and disruptive classroom behaviours" (p.463). The authors suggest that the reasons behind the different perspectives of the novice secondary teachers is due to the different rates of cognitive development in their students; the nature of the discipline problems; learning objectives; practices and beliefs of teachers; class sizes; and, the number of students a teacher interacts with during the day. Whilst the sample was small, the results of this study and other studies of students' perceptions of teacher behaviour, show that teachers need to consider both the cognitive and affective characteristics of learners. The concern for both the cognitive and affective domains of learners is reinforced in the statement about the "Understanding about learners and learning" in the SOSE Syllabus (QSA/QCSS, 2000:7-8).

### **Curriculum knowledge**

While content knowledge is essential for teaching, the effective teacher is one who is then able to accommodate it into curriculum knowledge, that is, knowing the syllabi and work programs for a particular subject area, the particular topic, the level at which it is to be taught, the resources, and materials to be used. As Shulman (1986b) explains, "The curriculum and its associated materials are the *materia medica* of pedagogy, the pharmacopeia from which the teacher draws those tools of teaching that present or exemplify particular content and remediate or evaluate the adequacy of student accomplishments" (p.10). In order to teach Modern or Ancient History, teachers must be familiar with both the Syllabus and the Program, for example, the course organization, learning experiences, general objectives, and assessment. Furthermore, teachers will need to become familiar with the increasing focus being placed outcomes based education (OBE) (Groundwater-Smith, Brennan, McFadden &

Mitchell, 2001), along with the triad of “New Basics”, “Rich Tasks” and “Productive Pedagogies” (New Basics Project Technical Paper, 2000). Shulman identifies two additional aspects of curricular knowledge: first, the teacher should have lateral curriculum, that is, knowing what his/her students are studying at the same time; and second, having the vertical equivalent to that curriculum knowledge to know what has been taught, and what will be taught in the future. In the case of Social Sciences, topics can overlap into other subject matter areas, so the teacher needs to have an understanding of curriculum at both the macro and micro levels. Teachers also need to take into account the prior knowledge and experiences students bring with them to the classroom.

### ***Knowledge of educational contexts***

Teachers cannot teach effectively in schools in a detached way that makes them oblivious to the input from the wider school community. They need to have knowledge of the school environment, system of governance, finances, the political terrain, and where students are coming from. In fact, every school is different, with its own history and sense of belonging in the community. A large state high school in Brisbane will be different from a one-teacher school in Central Queensland. Whilst Education Queensland’s strategic planning will have generic performance indicators regarding teachers and their technology skills, for example, individual school annual operational plans will have performance indicators which reflect their own school community needs. The development of knowledge of educational contexts is essential for beginning teachers during their initial teacher education. The Professional Practice in Teaching requires 3<sup>rd</sup> Year teacher education students at Griffith University to ‘read’ schools, that is, developing the tool of “deconstructing” the surface and deep features of the school environment, so that they know how to manage their own roles in any school (Groundwater-Smith et al., 2001).

***Knowledge of educational ends, goals, purposes and values***

Educational ends, goals, purposes and values, is another key link of pedagogical content knowledge. It provides the socio-moral framework that is integral in the teaching/learning relationship. “To teach is first to understand. We expect teachers to understand what they teach and, when possible, to understand it in several ways” (Shulman,1987:14). Preparation, then, is an essential feature of this knowledge base since teachers need to critically interpret and analyse texts, developing a curricular repertoire, and clarifying the purposes of the lesson or unit (Shulman,1987). Implicit in this preparation is the transmission of values; they are an inevitable part of Social Science instruction, despite their sometimes controversial nature. Gundmundsdottir (1990) cited Kerr (1981) in stating that there would be no excellence in teaching if teachers did not bring into the school what they value about their discipline and life in the outside world. Students also bring their own values to school; the teacher then seeks to supplement and develop students’ values having them explore the range of values in society (Halstead & Taylor, 2000). As Thornton (2001) noted, Social Science instruction can never be value-neutral, but of greater significance, or of concern, “is whose values will be represented and how those values are examined” (Thornton, 2001:295). For the Social Science teacher, the knowledge base of ends, goals, purposes and values has a multiplicity of meanings and demands, depending on their particular subject matter.

The SOSE Syllabus (QSA/QSCC, 2000) identifies ‘democratic process, social justice, ecological and economic sustainability, and peace’, as key values students should develop when studying peoples and environments (pp.1-2). The Syllabus is also designed to assist students to become lifelong learners, that is, a knowledgeable person with deep understanding; a complex thinker; a creative person; an active investigator; an effective communicator; a participant in an interdependent world;

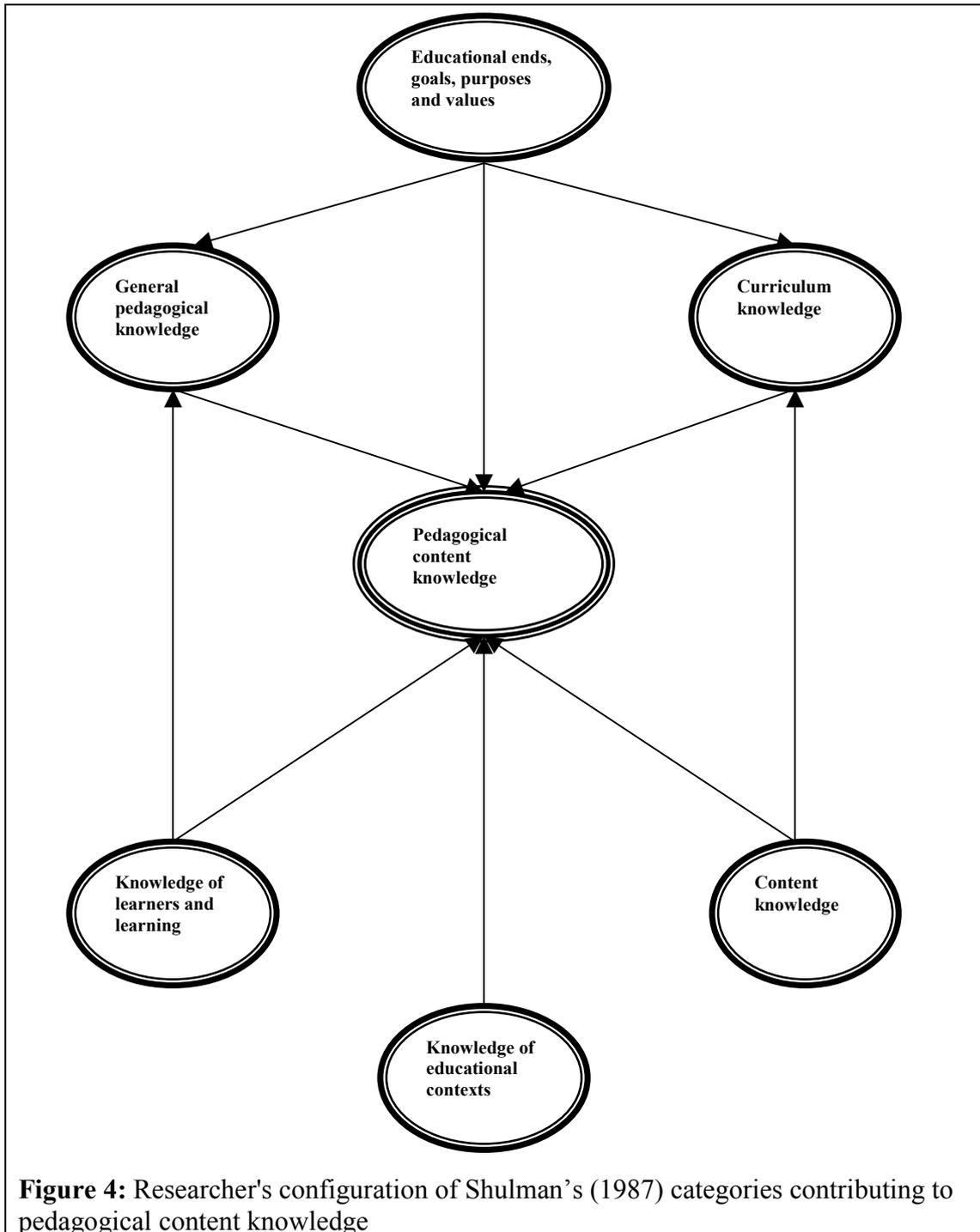
and, a reflective and self directed learner (pp.4-5). In terms of key learning area outcomes, students are expected to (a) understand past ideas, events and actions; (b) understand social, natural and built environments; (c) understand the ways people form groups and develop material and non-material aspects of cultures; (d) understand human experiences in various economic, business, ecological, legal, political and government systems; (e) investigate events concerning societies and environment; (f) understand the diverse and dynamic nature of societies and environments; and, (g) participate cooperatively to reflect and act upon ethical and informed visions of possible and preferred futures (pp.10-11).

A goal of the Queensland Modern History Syllabus (QSA/BSSSS,1995) is to help students "...become more effective and committed participants in their society... by expanding their knowledge of human experience and achievement in diverse contexts in space and time" (p.1). In helping to achieve this goal, teachers will show students how to use knowledge "... to address problems, make considered decisions and take action in the contemporary world". In terms of affective values, the Syllabus lists seven dot points, including, (a) understand the relevance of historical study to their own lives; (b) value the historical environment; and, (c) interact with others in a social learning situation" (p.7). The educational purposes for studying Modern History are both cognitive and affective, and state amongst other things, that students will (a) become proficient in the processes of historical inquiry and explanation; (b) develop the knowledge, abilities and ethical commitment to participate as active citizens in shaping of the future; and, (c) value the study of history (pp.3-4).

Geography justifies its existence in the curriculum on the basis that it is a "...valuable medium for the education of young people" (Senior Geography Syllabus, QSA/BSSSS, 1995:2). That is, the Syllabus provides the content, cognitive processes,

skills and processes that help students “...explore, understand and evaluate the social and environmental dimensions of the world” (p.2). The Global Aims state in dot form the benefits of studying Senior Geography, namely, that it helps students develop an understanding of the contributions of Geography in sustaining environments and improving the quality of life; it helps students gain knowledge of factual information “...that can be organised around the guiding concepts of geography to form generalizations” (p.5); and, the study of geography helps students develop a concern for the sustainability of the environment by exploring the attitudes and values related to “...ecologically sustainable development, social justice and democratic processes...” (p.5). Students should also be able to communicate in a variety of ways including oral, written, graphic and electronic, and be able to comprehend and manipulate data.

It is acknowledged that all of Shulman’s categories are interrelated. However, pedagogical content knowledge – as demonstrated in Figure 4 – provides the integrating point for these knowledge bases. Figure 4 implies that pedagogical content knowledge exists when teachers are aware of the interrelationship of their knowledge bases of *general pedagogical knowledge*, the elements of which are behaviour management, classroom communication, teaching strategies and personal beliefs; *content knowledge*; *curriculum knowledge*; *knowledge of learners and learning*; *knowledge of educational contexts*; and, *knowledge of educational ends, goals, purposes and values*. As a result, they develop strategies to transform difficult subject content in ways that can be understood by their specific group of learners.



### ***Teacher development***

Data collection for this study was undertaken over twelve months in which the participants' journey in teaching included attending lectures and tutorials on their university campus, completing a four week practicum, and six months of inservice

teaching. A key to teacher development is the capacity of novices to engage in systemic reflection of their knowledge in action. Conceptual change is said to occur during a process of assimilation and when learners express dissatisfaction with old ideas (Posner, Strike, Hewson & Gertzog, 1982). Research into the developmental stages of teaching show that there is a transition from teacher-centred to student-centred outcomes as an indicator of competence. Teachers' conceptions of teaching are influenced by context – how individuals respond to their experiences with university teachers, professional practice teaching, induction, and professional development.

### ***Conceptual change***

One model of conceptual change suggested that learners use assimilation to deal with new phenomena. In his study of conceptual change, Ausubel (1985) stressed the importance of prior knowledge in new learning. He said that learners use a process of 'assimilation' in which "... the processes of acquiring information result in a modification of both newly acquired information and the specifically relevant aspect of cognitive structure to which new information is linked" (p.74). This new information is generally linked to a relevant concept or proposition, which Ausubel called 'ideas' within the cognitive structure, the relationship of which may be subordinate, superordinate or a combination of both. Since cognitive structures are usually hierarchical in terms of ideas and abstractions, the inclusion of new propositional meanings typically involves a subordinate relationship to the existing cognitive structure. "Most meaningful learning is essentially the assimilation of new information" (Ausubel, 1985:76). Questions by Shulman (1986b) are relevant here: "What are the sources of teacher knowledge? What does a teacher know and when did he or she come to know it? How is new knowledge acquired, old knowledge retrieved and both combined to form a new knowledge base" (p.8)? In terms of this study, these

questions will be asked within the constructivist theoretical framework. Posner et al. (1982) argued that conceptual change takes place when learners experience dissatisfaction with old ideas. Thus new understandings and reorganization of thought processes should be enhanced if novice teachers are given the opportunity to watch and reflect on their own teaching practices. Participants in this study had the opportunity to watch and reflect on their knowledge in action using the video stimulated recall technique on two occasions. Therefore, the significance of the methodology for this research project to the actual outcomes of the study are recognised.

### ***Knowledge in action***

More than a century ago, Dewey suggested the need for an intervention program in the learning to teach processes that would facilitate the development of student teachers' knowledge in action. Dewey said that preservice teachers should be involved actively in the reflective inquiry process in order to understand what takes place when learning occurs (Dewey, 1904/1974). Reflection involves what Rodgers (2002) refers to as a "...meaning-making process that moves a learner from one experience into the next with deeper understanding..." (p.845) of the relationships and connections with other experiences. Reflection is a disciplined way of thinking that needs to happen in interaction with others, and it requires an attitude that values "...the personal and intellectual growth of oneself and of others" (Rodgers, 2002:845). It involves "reviewing, reconstructing, re-enacting and critically analysing one's own and the class's performance, and grounding explanation in evidence" (Shulman, 1978:15). There is now a general consensus that reflective practices lead to professional growth (Van Manen, 1977). Wildman, Magiaro, Niles and McLaughlin (1990) argued that professional growth will only come through systematic reflection,

while others see reflection as a means of allowing teachers to take responsibility for their own growth (Zeichner & Liston, 1987).

Dewey (1904/1974) suggested that novice teachers should also observe the practices of effective teachers, but added that the observations need to be done within the context of understanding how the minds of teachers and students interact, rather than just focusing on the observable behaviours of the teacher. Otherwise, novice teachers' practices would be limited to imitation, ensuring that they would continue to have a limited understanding of the practice that guides the theory of education. Therefore, students who can observe and reflect from a psychological perspective, will not only see what works, but why it works, and hence be able to make decisions about their own teaching, based on sound educational principles.

Schon (1987) explored this idea of aspiring teachers who learn from experts by being coached so that the learner can "...see on his own behalf and in his own way the relations between means and methods employed and results achieved" (p.17). Schon discussed the expert practitioners' ability of knowing through reflection-in-action and reflection-on-action. Those who engage in reflection-in-action are revising their personal constructs of teaching and learning during practice, while reflection-on-action refers to "...the ordered, deliberate, and systematic application of logic to a problem in order to resolve it" (Russell & Munby, 1991). Schon (1987) argued that reflection-in-action provided the opportunity for the novice teacher to learn by experience through a dialogue of reciprocal reflection-in-action between the expert teacher and aspiring teacher.

As Ethell (1997) showed in her study, beginning teachers' final understandings of an expert's thinking differed from their initial interpretations after they had "merely observed" the expert's teaching practice. The preservice teachers were able to access

the reflections of an expert teacher (based on stimulated recall), and through collaborative reflection, gain a better understanding of the procedural nature of teaching – of self and of others. Having novice teachers examine their knowledge in action and to reflect, is vital in their development as teachers. Ultimately, preservice teachers must be able to engage their own data collection so they can analyse and learn from their experiences” (Wear & Harris, 1994:45).

### ***Stages of development***

A number of studies of teacher development have noted that teacher education is a period of uncertainty (Veenman, 1984; Smith & Rhodes, 1992; Guillaume & Rudney, 1993; McNally, Cope & Inglis, 1997; Kauffman, Johnson, Kardos, Liu & 2002), and a time when teachers see their images of teaching shattered (Cole & Knowles, 1993). Britzman (1991) described the dilemma confronting the novice teacher as one that is in conflict with the traditions of the school with their own desire “...to carve out one’s own territory, develop one’s own style, and make a difference in the education of students” (p.19).

Fuller and Brown (1975) identified three stages of learning to teach: concerns about self (survival); concerns about tasks/situations (mastery of routines and procedures); and, concerns about impact on students (settled and resistant to change or become responsive to his/her students). One of the earliest models depicted six stages (Fuller, Pilgrim & Freeland, 1967): Where do I stand? How adequate am I? Why do they do that? How do you think I am doing? How are they doing? Who am I?. Fuller (1969) later narrowed the model down to three stages: concerns and self; concerns about tasks/situations; and, concerns about impact on students. Fuller and Brown’s (1975) model endures to this day because of its clarity, as other teacher educators have noticed similar concerns with their own student teachers; and because the ultimate concern is about student learning (Conway & Clark, 2003).

In his review of teacher development, Burden (1990) noted that most models included between two and four stages, although most tended to overlap. The movement from self to student is probably the most decisive stage in teacher development (Ben-Peretz & Kremer-Hayon, 1986). A later model included five components of growth: an increased metacognition; acquisition of knowledge about pupils; a shift in attention from self to pupils; development of standard procedures...; and, growth in problem solving skills” (Kagan,1992:156). Kagan was later criticised for not considering subject matter in her study (Grossman, 1992). Alternatively, Goddard and Foster (2001) used a critical constructivist approach to reveal six conceptual and temporal stages which beginning teachers pass during their early experiences as teachers: (a) “archetype”, a pre-conscious and instinctual expression of human nature that is recurrent; (b) approaching the gates; (c) clearing the gates; (d) the gloss wears off; (e) disillusionment and blaming; and (f) alternate routes across the Rubican.

Conway et al., (2003) used Fuller’s model to conduct a study on six Interns over a period of two semesters by focusing on the Interns evolving concerns and aspirations. The results of their study both supported and extended Fuller’s model, that is, the participants’ concerns and aspirations moved outward as predicted by Fuller, but also inward as greater attention was paid toward self as teacher. Pigge and Marso (1997) also applied Fuller’s model in their seven-year longitudinal study of sixty teachers. They noted that there were significant developmental changes in teachers’ concerns, starting as Fuller had predicted from concerns about self (survival), then to concerns about the task of teaching, and finally to concerns for students.

### ***Contextual influences***

An important facet in these developmental stages of the novice teacher is the process of socialization into the school and university culture. For example, these

contextual influences on teachers can take a number of forms, such as colleagues, university teachers, students, teacher-induction programs, class sizes, curriculum policies, gender issues, and school facilities (Fuller & Brown, 1975; Martinez, 1994; McNally et al., 1997; Cart & Francis, 2001; Harrison, 2001; Maguire, 2001; Beijaard & Papandoum, 2002). In a study of the socialization of three beginning teachers, Gratch (2001) concluded that teacher educators need to consider both the internal and external forces in the experiences of beginning teachers. That is, the focus needs to be on developing reflective practice in teacher education, and preparing teachers "...to negotiate the political terrain of teaching" (p.2). Gratch cited research by Hargreaves' (1995) that showed that relations with colleagues "...are critical factors in the socialization and development of teachers" (p.2). The results of research conducted by Weiss (1999) found that there was a strong relationship between a school culture that supports collaboration and teacher participation, and higher morale and stronger commitment to teaching.

Teacher education students enter a new world that has "...certain customs, rules, belief systems and behaviour patterns ..." (Groundwater-Smith et al. 2001:139) when they embark on professional practice teaching. They are implicitly reminded by teachers of their low status in the school, and explicitly reminded by students – "You can't tell me what to do, you're only a student teacher ... Where's our real teacher?" (Groundwater-Smith et al., 2001:140). Groundwater-Smith et al., (2001) cited Zeichner and Tabachnick (1981:9) in their discussion of university staff who give mixed messages to preservice teachers. On one hand, preservice teachers are urged to engage in various teaching and learning strategies, but on the other hand, they were encouraged to "...fit in as smoothly as possible ..." (Groundwater-Smith, 1998:140) with current school practices. Moreover, mentor teachers will "...often feel the need

to protect student teachers ...” (Feiman-Nemser, 2001:1020) from unworkable ideas promoted by an ‘out of touch’ university teacher. The school culture, in fact, can act as a barrier for professional practice teaching where “Teachers are supposed to work with students” (Feiman-Nermser, 2001: 1021), and anything else that takes them away from the classroom, is considered a problem. These kinds of constraining factors on preservice teachers and the short duration of the practicum mean that preservice teachers only get a glimpse of the realities of the classroom.

Workplace conditions were a “...powerful variable in the process of becoming a new teacher” (Flores, 2001:140). The novice teachers in Flore’s study had a negative perception towards school policies and leadership; new teachers felt “...that they were not encouraged to plan and implement curriculum projects and to develop professionally” (p141). A major theme that emerged from Flores’s study was the lack of a formal induction process. Other studies, however, have found that the first year of experience can be a positive one. For example, a study of the experiences of a first year physical education teacher by Herbert et al. (2001:897) revealed three important themes for success:

(a) match between expectations, personality, and workplace realities; (b) evidence of impact; and (c) using successful strategies to manage student behaviour and enter the social and political culture of the school.

The first few years of teaching, according to Moir and Gless (2001), are critical because these early experiences will “...set the professional norms, attitudes and standards that will guide practice over the course of a career” (p.1). The authors argued that the “trial-by-fire” method of launching a teaching career exacts not only a high price on new teachers, but on students and the school community as well. Another author states that induction programs are often abrupt and lonely processes, in which beginning teachers are expected to ‘sink or swim’ (Feiman-Nemser, 2001).

The result is that too many new teachers become disillusioned and leave the profession. Quality induction programs, the goal of which is not only to retain teachers but also to promote high levels of classroom instruction (Moir & Gless, 2001) should help students reach their potential. Moir and Gless posit five essential components of successful induction programs: program vision; institutional commitment and support; quality mentoring; professional standards; and, classroom-based teacher learning.

Following the preservice and induction stage of learning to teach, researchers have identified a third stage – the professional development stage, where teachers “...are no longer rookies but who are still in the early stages of their career” (Feiman-Nemser, 2001:1039). Many current professional development programs, however, are still focused on traditional modes of teaching and learning that “...offer teachers a set of disconnected and decontextualized experiences” (Feiman-Nemser, 2001:1041). The author suggests that professional development should involve “...serious, ongoing conversation...in communities of practice...” with a focus on “...the particulars of teaching, learning, subject matter, and students” (Feiman-Nemser, 2001:1042).

Content knowledge was also a concern in a national study of 1,027 mathematics and science teachers about the effects of professional development (Garet, Porter, Desimore, Birman & Yoon, 2001). The focus concerns were found to be (a) focus on content knowledge; (b) opportunities for active learning; and (c) coherence with other learning activities. The success of the above was found to be dependent upon the type of activity; the duration of the activity; and participation of teachers from the same school, grade and subject.

The results of a 10 month study by Rodrigues, Marks and Steel (2003) show that knowledge bases of teachers can be promoted, including pedagogical content knowledge, through the development of partnerships involving schools, education authorities, universities, and subject specialists. Teachers in Rodrigues 's et al. study were also encouraged to use information and communication technology to refresh their understandings of science concepts, and teaching and learning strategies as part of the professional development program.

It has been argued that professional development is needed because teacher education cannot provide all the knowledge that grows with practice (Knight, 2002). Knight stressed the importance of subject departments as prime sites for professional learning, and questioned the value of the traditional forms of professional development such as workshops and courses. While the principal provides the leadership in the school community, the head of department is key to sustained school improvement. To develop a learning culture, Knight suggested that heads of department should embrace the following procedures: publicize the learning message; be a role model; evaluate for learning (use connoisseurship); clarify what subject learning is for; and assume all children can be learners. Ongoing professional practices should also involve building a collective pedagogical repertoire and auditing what teachers do in a department.

The participants in this twelve month study were subjected to various external pressures during their journey from preservice to inservice teaching. These external pressures such as the university and workplace conditions were expected to impact on their development as teachers in terms of their knowledge base of teaching, especially pedagogical content knowledge. It has been noted that the first years of teaching are critical because the early years set the standards for novice teachers' careers.

Productive relationships with colleagues, a school culture that supports collaboration, and a subject department that promotes ongoing professional practices, including support of expert teachers to novice teachers, will mean that novice teachers are more likely to focus on the task of teaching and cater for the needs of learners rather than on strategies of survival.

### ***Implications of review of literature for the effective social science teacher***

The current Social Science syllabi of Studies of Society and Environment (SOSE) (QSA/QCSS,2000), Ancient and Modern History (QSA/BSSSS, 1995) , and Senior Geography (QSA/BSSSS, 1999) are not the content driven documents that characterised social science syllabi of previous years. Instead, the three syllabi strongly require teachers to move beyond the content oriented approach to teaching and to adopt constructivism as the cornerstone to teaching and learning. Shulman's (1987) categories of the knowledge base of teaching provide the understanding needed by teachers to promote learning among students, especially pedagogical content knowledge.

Effective teachers have deep content knowledge. Content knowledge is a critical component of teaching; effective social science teachers should not only have knowledge of the topics they are teaching, but also knowledge that is multidisciplinary as well, especially in teaching Studies of Society and Environment. As noted earlier in Shulman's model of pedagogical reasoning, almost all teaching begins with comprehension of text and concludes with the comprehension of new text.

Although content knowledge is critical in teaching, it is the way in which content knowledge is transformed for student understanding that indicates expertise in teaching. It is having knowledge of what makes learning easy or difficult; knowing

the learners' conceptions, preconceptions, and misconceptions enables the teacher to engage in appropriate representations. An essential component of pedagogical content knowledge for effective social science teaching is primarily inquiry-based learning that utilises both primary and secondary sources. The research shows that the use of gestures, language that is particular to the social sciences, and the ability to teach concepts in a variety of ways, are also contributing factors for effective pedagogical content knowledge. The research also shows that effective teachers develop pedagogical content knowledge in different ways, that is, it is a personal construct unique to the individual teacher.

Shulman's (1987) category of general pedagogical knowledge, the components of which are behaviour management, classroom communication, teaching strategies and personal beliefs is also critical to the success of pedagogical content knowledge. The research supports Shulman's assertion; that effective teachers possess a repertoire of general pedagogical skills in their teaching that in a sense provides the platform for the deliverance of content knowledge for student understanding. That is to say, behaviour management is about incorporating a climate that supports all aspects of learning; classroom communication is about establishing effective relationships and using suitable language of instruction; teaching strategies should involve a variety of methods ranging from direct instruction to scaffolding techniques; and, personal beliefs provide a framework that serves as a basis for curriculum interpretation and classroom practice.

Additional categories that contribute towards effective pedagogical content knowledge are knowledge of learners and learning; curriculum knowledge; knowledge of educational contexts; and, educational ends, goals, purposes and values. Effective teachers consider both the cognitive and affective domain of the learner;

they understand the language of the social science syllabi, they know how to write work programs, and are familiar with the associated resources; they know the culture of the school and broader school community; and, they help students understand the purposes and goals behind their learning, and to explore the range of values in society.

Other factors are considered in the development of novice teachers. Research into conceptual change shows that learners use a process of assimilation to reconcile newly acquired information with an existing cognitive structure. This study used a constructivist theoretical approach to determine the source of novice teacher's knowledge, and how a new knowledge base of teaching, especially pedagogical content knowledge, is formed. An important element in the growth of teachers' knowledge bases of teaching is their capacity to reflect upon their knowledge in action, thereby moving beyond the 'survival' stage of their initial stages of teaching as characterised by Fuller & Brown's model of stages of development. Research also shows that there are contextual influences such as the university and school environments that impact upon the developmental processes of the beginning teacher.

This study investigates the knowledge growth of novice social science teachers, especially pedagogical content knowledge, as they move from preservice teaching into inservice teaching. Specifically, this study seeks to answer the following questions:

1. What is the initial conceptual structure of effective social science teaching held by preservice and novice teachers?
2. To what extent is pedagogical content knowledge a component of this conceptual structure?
3. What is the importance of pedagogical content knowledge to preservice and novice teachers' conceptions of good practice?

The following chapter describes the design and methodology of the thesis. The study used a qualitative approach and case study methods to investigate the

knowledge growth of ten participants. Shulman's categories of the knowledge base of teaching were used as the theoretical framework, and the methods used to collect the data were concept mapping and video stimulated recall.

## CHAPTER THREE: DESIGN AND METHODOLOGY

This qualitative study used case methods and design in the investigation of preservice teachers' conceptions of effective social science teaching as they journey into six months inservice teaching. The study used Shulman's (1987) knowledge base of teaching as the theoretical framework to categorise participants' knowledge growth, especially pedagogical content knowledge. The following techniques were used to capture the participants' knowledge growth at three points over a twelve month period: video stimulated recall (VSR) which allowed the participants to confront their own actions and make explicit their implicit beliefs to understand the 'how' and 'why' of their actions; concept map diagrams enabling the research to elicit the 'what' of teaching; and Think Aloud Protocols (TAPs) allowing the researcher to elicit the 'why' behind their choices of concepts on their maps.

### ***Research design***

#### ***Qualitative research***

The role of the qualitative researcher is to establish empathetic understandings with the reader (Stake, 1995) by analysing data interpretively through data categorization, the identification of patterns, and then by producing a narrative. The interpretive role is cyclical as the researcher engages in three forms of concurrent activity: data reduction, data display, and conclusion drawing and verification (Miles & Huberman, 1984).

Denzin (1998) likened the act of interpretation to storytelling. It is a

productive process that sets forth the multiple meanings of an event, object, experience, or text. Interpretation is transformative. It illuminates, throws light on experience. It brings out, and refines, ... the meanings that can be sifted from a text, an object, or a slice of experience (p.322).

Effective writing involves what Stake (1995) called “thick descriptions”, in which there is context to an experience, and the creation of conditions that allows the readers to experience what has been described and interpreted” (Denzin, 1998). Thick descriptions also allow the reader to construct a clearer reality and hence provide them good raw material for their own generalizing.

There are a number of challenges that qualitative research presents. First, by its very nature, qualitative inquiry is subject to and, therefore, interpretations draw on, the investigator’s own framework. Second, the phenomena studied can take a long time to happen – they evolve along the way. Third, because of the data collection methods and efforts to understand events as much as possible from the participant’s own perspective, issues of privacy may arise (Stake, 1995).

Despite these challenges, the strength of qualitative studies is that they can help researchers go beyond initial preconceptions and frameworks. The data collection “...provide a broader view on theory than simply a relationship between variables” (Silverman, 1997:27). Qualitative data can maintain a chronological flow, assess local causality, and gain fruitful explanations. Stories that have a concrete, vivid, and meaningful flavour, often prove far more convincing than pages of numbers (Miles & Huberman, 1984).

A qualitative approach suited this study as it sought, through words, to explore novice teachers’ conceptions of teaching in the Social Sciences and to answer the three research questions:

1. What is the conceptual structure of effective social science teaching held by preservice and novice teachers?
2. To what extent is pedagogical content knowledge a component of this conceptual structure?
3. What is the importance of pedagogical content knowledge to preservice and novice teachers’ conceptions of good practice?

### **Case study**

“Constructivism helps a case study researcher justify lots of narrative description in the final report” (Stake, 1995:102). The study also used an interpretive case study approach (Merriam, 2001). The purpose of case studies in this thesis was to trace the conceptions of individual Social Science teachers over time and in context, needing “...an empirical inquiry that investigates contemporary phenomenon within real life contexts, using multiple sources of evidence” (Yin, 1994:13).

Case studies, like all research methodologies, have been the subject of criticism. These include, use in only the early stages of a study, and second, limited basis for scientific generalization (Yin, 1994; Robson, 2002). However, as Yin (1994) argued, the selection of an appropriate methodology is reliant on the research question. If the researcher wanted to know what were outcomes of the Studies of Society and Environment literacy component, he/she could answer the question by doing a prevalence survey. But if the researcher wanted to know ‘how’ and ‘why’ the literacy worked, then a case study approach is not only preferable, but more likely to be essential. These questions are explanatory and as such, “ deal with operational links over time, rather than mere frequencies” (Yin, 1994:7). The questions in this research study are essentially ‘how’ and ‘why’ and seek explanation about knowledge acquisition over time. Case studies were, therefore, the appropriate methodology to use.

Indeed, a case study approach was empathetic to the goals of the new social science syllabi.

Case studies allow generalizations either about an instance or from instance in time. Case studies recognise the complexity and embeddedness of social truths. Case studies, considered as products, may form an archive of descriptive material sufficiently rich to admit subsequent reinterpretation... Case studies present research or evaluation data in a more publicly accessible form than

other kinds of research report... (Adelman, Jenkins & Kemmis, 1976:148 -149).

### ***Theoretical framework***

This study sought to identify the trends in the development of the knowledge bases of ten novice teachers as they progressed from preservice to inservice teaching, by establishing a profile of each participant with a specific focus on pedagogical content knowledge over a period of time. Analyses of data used Shulman's Knowledge Base of teaching.

Other frameworks for investigation were considered, such as 'productive pedagogies' (The Queensland School Reform Longitudinal Study, 2001), the novice/expert model (Benner, 1982, 1983; Dreyfus & Dreyfus, 1986), and Sternberg's and Horvath's (1995) prototype of expert teaching. However, these theories lack the research base of Shulman's (1987) knowledge base of teaching of how new teachers learn to teach in complex environments. Shulman's (1987) knowledge base of teaching provides meaningful categories that can be identified using a number of data collection methods.

As indicated in the review of literature, Shulman's (1987) categories include

- general pedagogical knowledge (GPK) incorporating behaviour management (BM), teaching strategies (TS), classroom communication (CC), personal beliefs (PB));
- content knowledge (CK);
- curriculum knowledge (Curr K);
- knowledge of learners and learning (KLL);
- knowledge of educational contexts (K of Ed Con);
- knowledge of educational ends, goals, purposes and values (EEGPV); and,
- pedagogical content knowledge (PCK);

As explained earlier, pedagogical content knowledge is a specific focus of the study, is unique to teachers and is argued to separate, for example, a social science teacher from a social scientist. "Teachers differ from biologists, historians, writers, or educational researchers, not necessarily in the quality or quantity of their subject

matter knowledge, but in how that knowledge is organized and used” (Cochran, King, & DeRuiter, 1993:266). Pedagogical content knowledge is seen as the special set of attributes that help someone represent his/her knowledge of subject matter in order to teach others.

### ***Participants***

Letters were written to 60 final year Bachelor of Education teacher education students at Griffith University (Mt Gravatt Campus) who had a Social Science subject as one of their teaching areas, inviting them to participate in a research study (see Appendix A). The researcher then visited the tutorial groups a week later to explain once again the nature of the study, and to reiterate the value of participating in the program. Ten teacher education students volunteered and during preliminary discussions, formally agreed to participate in the research project by individually signing a Consent Form: Teacher Education Student (see Appendix B). Participating teacher education students were then given a list of Focus Questions to complete (see Appendix C). A selection of some of the responses is used in the study to indicate initial thoughts of each teacher. Arrangements were then made to meet with each one in May, 2002; again in October, 2002; and finally, in May, 2003 (See Table 1).

The first data collection point in May 2002 entailed a concept mapping activity at the Griffith University library (Mt Gravatt Campus), while the video stimulated recall interviews were conducted at the participants’ schools, all of which were state high schools within the Brisbane metropolitan area. The second data collection, a concept mapping exercise, was also conducted at the Griffith University library (Mt Gravatt campus) in October 2002. A month later the ten participants were appointed to schools in the far north and northern parts of Queensland, Sunshine Coast, and the Brisbane metropolitan region. Four out of five who taught in the northern parts of the state were allocated both senior and junior classes, while four out of five who taught

in the Sunshine Coast and in the Brisbane area had junior classes. Three participants were allocated teaching duties outside the social science area; two were given science and mathematics classes, and the other participant was given English classes. Nine participants were appointed to state high schools, while the other was appointed to an independent, ecumenical school. All schools were coeducational. The final concept map activities and video stimulated recall interviews were conducted on site at each participant's school.

### ***Ethical approval***

Ethical issues were also addressed. All participants in the study were volunteers, fully informed of the nature and purpose of the study and could withdraw at any stage (see Appendix D). All were given anonymity. Each school was identified in a general

***Table 1. Overview of data gathering sequence***

Time of data collection	May 2002 <b>Final year of study</b>	October 2002 <b>Final year of study</b>	May 2003 <b>First year of teaching</b>
<b>Type of data</b>	Concept map Video stimulated recall	Concept map	Concept map Video stimulated recall

way, and consent was obtained from principals, supervising teachers, and parents/guardians to collect the data. Ethical approval was obtained from Griffith University (see Appendix E), and Education Queensland (see Appendix F) gave permission to the researcher to conduct research in the state schools concerned. Permission was also sought from school principals, supervising teachers, and parents/guardians of students to collect data from schools (see Appendices G, H, and I)

### ***Methods of data collection***

Constructs such as pedagogical content knowledge are complex and not easily assessed. For example, Gess-Newsome and Lederman (1999:158) noted that pedagogical content knowledge is

both an external and internal construct, as it is constituted by what a teacher knows, what a teacher does and the reasons for the teacher's actions.

Simply focusing on what the teacher knows about the knowledge bases of teaching and how they are organized, gives a limited view of knowledge structure. However, as Gess-Newsome and Lederman pointed out, research that relies mainly on teachers' actions also has its problems. They cited research by Brophy and Good (1986) that showed that a multiplicity of factors influence classroom instruction and student understanding. By asking teachers to state reasons behind a teaching action, we may risk a choreographed response for the benefit of the researcher. A combination of concept mapping and video stimulated recall with unstructured interviews was therefore used in this study, so that information could be gathered about what the teacher knows, what the teacher does, and the reasons for the teacher's actions.

### ***Concept maps***

The concept map is a schematic device that provides an external representation of structural knowledge (Novak & Gowin, 1984). In other words

Concept maps allow people to make explicit their views about how different concepts are related and why certain links are more or less valid. (Prawat, 1989:11)

Concept mapping, as a tool was first used by Novak and his graduates at Cornell University in 1972 to explore the nature of learning acquired by audio-tutorial instruction in schools. Since then concept maps have been used to examine how individuals organize their knowledge (Novak & Gowin, 1984). Concept maps were used to investigate the organization of conceptual knowledge about chemical

equilibrium held by students and their teachers (Wilson, 1994). The results of the study revealed that (a) high achieving students demonstrated a "...greater expertise in their knowledge of chemical equilibrium than do low achievers (Wilson, 1994:1142) – low achievers were inclined to organize their knowledge of chemical equilibrium around memorised formula, (b) there was a greater uniformity in the cognitive structure of high achievers, and (c) there was a greater contrast "...between high and low achievers than between teachers and high achiever students" (Wilson, 1994:1142).

As the above study showed, the concept map is intended to reveal the knowledge representations of its author rather than the reproduction of facts (Jonassen, Reeves, Hong, Harvey & Peters, 1997). The construction of a concept map, then, is unique to the author, "...reflecting his/her experiences, beliefs and biases in addition to his/her understanding of a topic" (Kinchin, Hay & Adams, 2000:44). As Novak (1990b) stated, "... the primary benefit of concept maps accrues to the person who constructs the maps" (p.37).

A number of studies have shown that concept mapping is an effective method for assessing conceptual change (Novak & Masonda, 1991; Morine-Dershimer, et al., 1992; Markham, Mintzes, & Jones, 1994; Jones & Vesilind, 1995; Markow & Lonning, 1998). It is regarded as particularly useful for those researchers who seek an insight into how teachers construct their concepts (Trowbridge & Wandersee, 1994; Winitzky & Kauchak, 1995; Zanting, Verloop & Vermunt, 2001). By comparing successive concept maps as the teacher develops mastery of the domain, "the researcher can see how knowledge is structured in the course of the acquisition" (Cary, 1986:1126). Morine-Dershimer (1989) suggested that concept maps could provide teacher education students with valuable feedback on their knowledge, and

could show both the extent and organization of students' knowledge (Lawless, Smee & O'Shea, 1998).

Student teachers have found concept mapping activities useful because (a) the instrument was able to elicit thoughts behind their mentor teachers' teaching; (b) student teachers found the concept mapping exercise useful for teachers to reflect about their teaching; and, (c) they found that they were able to make useful comparisons between their mentors' and their own maps (Meijer, Zanting & Verloop, 2002).

As in all techniques, concept maps have critics. Kagan (1992) has, however, offered criticisms such as that researchers typically used them in short-term studies. This research project is not a short-term study, it is of novice teachers moving from preservice education to inservice teaching.

Concept maps can be undertaken in a structured or non-structured way. In structured concept maps, the participants are provided with a fixed list of concepts to draw upon, to construct (Hashweh, 1987; Markham, Mintzes & Jones, 1994; Wilson, 1994; Pomson & Hoz, 1998). In the non-structured method, only the key concept is prescribed, while the remainder of concepts are brainstormed by the individual, before being organised and displayed on a concept map (Morine-Dershimer et al., 1992; McMeniman, Cumming, Stevenson & Sim, 2000; Zanting et al., 2000; Meijer et al., 2002). Both approaches have their advantages and disadvantages. The structured approach permits "...focused analysis and cross-subject comparisons ..." (Winitzky, Kauchak & Kelly, 1994:126), but is not so useful when seeking to understand an individual's growth in knowledge. The unstructured or free choice method on the other hand, provides a picture of the individual's knowledge domain, but "...cross-subject comparisons are rendered more difficult and cumbersome" (Winitzky et al.,

1994:126). This study used an unstructured procedure in which preservice/novice teachers were asked to generate concepts related to the key concept of “effective social science teaching” and organise these concepts on a map. The unstructured method was preferred in this study because it would provide a better understanding of the individual’s growth in knowledge over a twelve-month period of study.

Concept map diagrams constructed by participants identified what they knew about effective social science teaching. The *Think Aloud Protocols (TAPs)* (Ericsson & Smith, 1996) that were used in conjunction with each concept map diagram provided further elaborations and facilitated the externalisation of participants’ understanding and reasons for their selection of concepts (Rye & Rubba, 1998).

### ***Administration of concept maps***

Prior to the construction of their concept maps, the participants were instructed in how to construct a concept map. They were also shown a series of concept maps, ranging from simple ones to those of greater complexity. At an agreed later date, time and place, each novice teacher was then given an A3 sheet of paper, a block of ‘Post-it’ page markers, pencils, erasers, and then instructed to draw a map based on his or her understanding of ‘effective Social Science teaching’. Participants were also given an ‘Instructions for Completion of Concept Map’ (See Appendix J), to help complete the map. After they had written down as many concepts they could think of on the page markers, they were asked to rearrange the concepts into a hierarchy, adding more concepts if they wanted. At this stage the researcher turned on the audio player, and reminded participants that they were being audio-taped as they ‘thought aloud’ their reasons for using such concepts and the reasons for their location within the map. Not all concepts were the focus of participants’ Think Aloud Protocols (TAPs) because they either chose not to, or because they were unable to articulate what they knew (Shuell, 1985). If participants paused for longer than a minute during the

construction of their maps, the researcher used prompts such as “Can you explain the relationship...” or “Can you give reasons for ...”. Participants were required to “think aloud” during the three occasions they constructed their maps (See Table 1. Overview of data gathering sequence).

Once participants were satisfied with the location of their concepts, they glued them onto the A3 paper. They then added arrowheads with linking words to show the relationship between concepts. At the completion of each concept mapping exercise, the researcher and the participant briefly reviewed the completed activity. The concept maps were constructed before the video stimulated recall at the first data collection point, and sometimes after the video stimulated recall the third data collection during their inservice teaching.

### ***Video stimulated recall***

Video stimulated recall is a term used to denote a variety of techniques, usually involving making audiotapes and videotapes of skilled behaviour, that are then used to help participants recall their thoughts at the time of that behaviour. Bloom (1953) was the first reported to use stimulated recall when he played back the audio-tapes of his lectures and discussions for students to comment. Kagan, Krathwohl and Miller (1963) and Kagan, Krathwohl, Goldberg and Campbell (1967) first developed the video stimulated recall method as a way of increasing a counsellor’s awareness of interpersonal reactions during interviews.

Since then, the use of video stimulated recall as a means of investigating teachers’ thoughts has increased dramatically as educational researchers investigate a range of thought processes including teachers’ decision making (Marland, 1977; Peterson & Clark, 1978); teachers’ cognitive beliefs (Morine-Dershimer, 1983); preservice teachers’ personal theories of teaching (Cunliffe, 1994); preservice teachers as

reflective practitioners (Ethell, 1997); and, sources of teachers' knowledge (McMeniman et al., 2000).

In other words, video stimulated recall has been shown to be an effective tool to make explicit the beliefs and implicit theories of teachers. Meijer, Beijaard and Verloop (2002) noted that teachers' interactive cognitions were characterised by (a) split second thoughts; (b) tied to the specific context (that is, the lesson); (c) closely connected to teachers' knowledge and beliefs; (d) closely connected to classroom practice; and (e) integrative in nature.

Criticisms of the technique point to the possibility of participants selecting 'acceptable' comments in their recall (Clark & Peterson, 1986). This possibility was minimised in this study as participants were asked to talk about any aspect of their teaching in the lesson.

Other criticisms suggest that preservice teachers will notice more on the video than in real life (Calderhead, 1987a). Preservice teachers may be unaware of most of the unfolding events in the lesson, and therefore will need such stimulus for discussion. In fact, Wear and Harris (1994) argued that if teachers were to reflect on and learn from their experiences in the classroom, they must have a clear picture of what actually happened. Their study showed that the video stimulated recall technique provided preservice teachers with the opportunity to engage in reflection by recalling significant aspects of their teaching experience that they may have forgotten. The results of their study justified the use of video stimulated recall as a way of providing clear insights into the performance of preservice teachers (p.50).

### ***Videotaping of a lesson***

The researcher arranged with participants to videotape one of their social science lessons, usually just before lunch break or on the last period of the day, so the thoughts of their lessons were still fresh in their minds for the video stimulated recall

interviews. The length of lessons ranged from thirty-five to sixty minutes. A compact VHS camcorder was positioned on a tripod, and on most occasions, located at the rear of the classroom to videotape the novice teacher because some parents/guardians refused to give permission for their children to appear in the film. These students were seated at the rear of the classroom, just beneath the camera and therefore, out of range of the recording. The second reason for videotaping from the back of the classroom was to focus on the novice's teaching because the study was primarily about them. The third reason was to minimise disruptions to students, since recording at the side of the classroom proved to be a distraction for some. The researcher preferred to see the lesson unfold on the monitor because it was also possible to watch the teacher and students through the naked eye, rather than spending the entire lesson peering through the viewfinder.

As mentioned earlier, three participants were allocated teaching areas outside the social sciences. One was video taped teaching a senior English class while the other two were videotaped teaching junior science classes, thereby providing an opportunity for the researcher to observe teaching practices outside the social sciences, especially in terms of ways participants sought to translate one form of pedagogical content with other subject areas.

### ***Video stimulated recall interviews***

Review of the videotape took place as soon as possible after the lesson either in the participants' classroom, the school library or somewhere quiet in the school. The tape can be stopped by the researcher or by the participant at selected incidents, or at predetermined times (Calderhead, 1983; Keith, 1988). Interviews were audio-taped, the transcription of which formed the basis for analysis. The first stimulated recall interviews in this study were conducted during the Practicum in May, 2002, and the second, and final, interview in May 2003. The interviews were unstructured, using

Nespor's (1985:204) technique, "... I'd like you to stop the tape when you see yourself making a decision and tell me what you were thinking at that point". If, however, a pause between the recall of interactive cognitions proceeded longer than expected, the researcher used a prompt such as, "Would you like to comment on that?". On other occasions, participants would reflect on their actions whilst the videotape was still rolling, in which case, the researcher suggested that the participant would like to record his/her comments on the audiotape. At the conclusion of each recall session, the participant and the researcher would engage in a discussion about his/her classroom teaching, and the stimulated recall interview – a form of debriefing and feedback on the experience of the participant. The interviews were then transcribed and categorized.

## ***Analysis of Data***

### ***Analytical framework***

In the interpretation of the data, a constructivist theoretical approach was used. Constructivism is the cornerstone of qualitative research in so much as reality is socially constructed. Guba and Lincoln (1994:110) defined constructivism as an approach in which

...realities are apprehendable in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature... and dependent for their form and content on the individual person or groups holding construction.

That is, people at particular times of their lives establish meaning from events and phenomena as a result of "compiler processes of social interaction involving history, language and action" (Schwandt, 1994:118). Even with a theoretical framework such as Shulman's categories of teacher's knowledge in action, different constructions or interpretations of data, can and almost will, occur. Sometimes called interpretive

(Schwandt, 1994) or naturalistic (Lincoln & Guba, 1985; Guba & Lincoln, 1994), constructions are not seen in terms of truth in the absolutist sense but in terms “of the best informed and most sophisticated construction on which there is a consensus at a given time” (Schwandt, 1994:128).

The task of the researcher is to understand the multiple, often conflicting social constructions of meaning and knowledge. The personal nature of these social constructions “suggests that individual constructions can be elicited and refined only through interaction between ... investigator and respondent” (Guba & Lincoln, 1994:111). The researcher and participants in this study were interactively linked, both formally and informally, “so that findings are literally created as the investigation proceeds” (Guba & Lincoln, 1994:111). Constructions from this study occurred when the transcriptions from the interviews of concept maps and video stimulated recall sessions had to be interpreted by the researcher. Through this act of inquiry – a dialectic of reiteration, analysis, critique, reiteration, reanalysis – a consensus or joint construction between this researcher and participants was sought (Guba & Lincoln, 1989). A validating procedure of the construction of the case studies, for example, was to have the draft reports reviewed by participants, as “a way of corroborating the essential facts and evidence presented in the case” (Yin, 1994:144). Participants in this study had the opportunity to view the data at anytime and comment on the draft reports. The response from participants was positive.

The validity of these joint constructions in this study was determined by the extent to which they ‘fitted’ the data and information collected; the level of understandings of these joint constructions; and, the relevance of these constructions and the extent to which they were modifiable (Guba & Lincoln, 1989).

### ***Analysis of concept maps***

Several ways exist to analyse and interpret concept maps, depending on

the purpose of the exercise. Quantitative evaluation procedures involve assessing the number of concepts used, the number of main categories, and the number of levels in a hierarchy. Other scoring models entail a more complex scoring method, using propositions, examples, hierarchies, and cross-links (Novak & Gowin, 1984; Novak & Musonda, 1991; Markham et al., 1994). All these scoring systems are based on Ausubel's construct of three levels of meaningful learning: hierarchical structure; progressive differentiation; and integrative reconciliation (Novak, 1981). Jones and Vesilund (1996) used Novak's method when they investigated the changes in the organization of preservice knowledge about teaching. The concept maps in their study showed which concepts and their related hierarchies and cross-links were important to participants throughout the year-long study.

Other authors have encountered difficulties using Novak's scoring system. Markow and Lonning (1998) found three components of Novak's scoring system "...straightforward and easy to evaluate..." (p.1026), but encountered problems in determining the levels of hierarchy. Stuart (1985) argued that adding the components for a total score resulted in the loss of reliability, so the individual 'scores' should be retained as a means of ascertaining meaningful learning. Stuart criticised the scoring methodology used by Surber (1984) on the basis of the presence or absence of concepts and their relationships, without considering the quality of the relationships.

Markham et al. (1994) modified Novak's scoring system to include the number of concepts, relationships, branchings, hierarchies, cross-links, and examples. Anderson and Huang (1989) scored their maps on the basis of accuracy, linkage and direction, using a scoring method that included general concepts, subordinate concepts, relationships, branches, hierarchy levels, cross-links, and outcomes concepts.

Lawless et al. (1998) argued that a quantitative scoring system can conceal the uniqueness of the concept map, believing that more meaningful results were likely to result when concept maps are presented as an essentially qualitative instrument. A qualitative approach can observe changes in perceptions over time (Beyerbach & Smith, 1990) and allow for the comparison of structures before after instruction (Champagne et al., 1981). McMeniman et al. (2000) used a qualitative approach, whereby the maps of fourteen participants were compared to determine the sources of their effective teaching. Whilst there was a degree of commonality of concepts across the participants' maps, there was variation in the sources of their knowledge, ranging from 'own learning and experience as a teacher', 'professional reading' to 'professional development activities'.

The concepts on the concept maps of this research study were categorized for the three separate occasions over a twelve-month period, according to Shulman's Knowledge Base of teaching, to determine the development of the participants' pedagogical content knowledge.

Validity of interpretation of the concept map is enhanced if interviews are used during, or after the construction of the concept map (Lay-Dopyera & Bayerbach, 1983; Novak & Gowin, 1984;). For example, Jones and Vesilind (1995, 1996) and Winitzky and Kauchak (1995) used structured interviews immediately after their subjects had constructed their concept maps. Rye et al. (1998) used open-ended and non-leading questions during their interview of science students, while primary teachers in Winitzky's et al. (1994) study were asked to think aloud and give reasons for the structure of their maps. Participants in this study were also asked to think aloud and comment on their reasoning for placing the concepts and explaining the relationships between concepts during the construction of their maps. At the

conclusion of each concept mapping activity, the researcher and participant discussed the structure of the completed map, and in the case of the second and third mapping activities, participants were allowed to peruse and reflect on their previous efforts.

### ***Specific coding strategies for concept maps***

The researcher identified and categorised concepts on the concept map diagrams have been developed using Shulman's (1987) knowledge base of teaching. The categories used are:

- Behaviour management (BM)
- Teaching strategies (TS)
- Classroom communication (CC)
- Personal beliefs (PB)
- Content knowledge (CK)
- Curriculum knowledge (Curr K )
- Knowledge of learners and learning (KLL)
- Educational ends, goals, purposes and values (EEGPV)
- Knowledge of Educational Contexts (K of Ed Con)
- Pedagogical content knowledge (PCK)

For example, a concept of 'teaching strategies' named by a participant was identified, or nominated by the researcher as one of the components of general pedagogical knowledge of 'teaching strategies' and given the initials 'TS' on the labelled concept map. The concept of 'communication' was categorized as 'classroom communication' (CC); 'lifelong learner' was assigned as knowledge of 'educational ends, goals, purposes and values' (EEGPV). As well as knowledge bases being nominated by the researcher to participants' concepts, reference is also made to participants nominating or identifying concepts on their maps throughout their case studies.

The researcher also attributed concepts to more than one knowledge base, depending on the nature of the concept. For an individual participant, behaviour management (BM) and educational ends, goals, purposes and values (EEGPV) were nominated to the concept of 'successful behaviour management', because behaviour management was seen as both a process as well as an outcome for learners and

participant's conceptual structure. Other concepts have been assigned multiples of the one knowledge base, when a participant identified five outcomes in the concept of 'outcomes', and therefore was awarded five 'educational ends, goals, purposes and values'. Although a concept may imply multiple knowledge bases, as in the case of one participant's concept of 'inquiry based approach', the researcher assigned one pedagogical knowledge base. On other occasions participants identified the strategies in the inquiry-based approach in a series of interlinking propositional concepts such as hypothesis formulation, comprehension, interpretation, evaluation, and decision-making, so therefore, a pedagogical content knowledge base was nominated for each concept that featured these strategies. The alternative would have been to compile these concepts into one concept under the heading of inquiry-based approach, but the researcher decided against modifying the map because it may misrepresent the original intentions.

The location and the connectedness of the concepts within the map diagram were also taken into consideration. The concept of 'critical thinkers' in one participant's map was categorized as 'PCK' (pedagogical content knowledge) because 'critical thinkers' was interpreted as a process, but in another participant's map, 'critical thinking' was identified as an outcomes concept and therefore, categorized as 'EEGPV' (educational ends, goals, purposes and values). Similarly, the concept of 'behaviour management' in one concept map was deemed to be a 'BM' (behaviour management) knowledge base, however, the concept in another map was categorized as 'EEGPV' as well because the concept was the superordinate concept in the hierarchy, and because the participant had indicated through the linking words that the concept was the result or a goal of effective planning.

Linking words also played an important role in the categorization of concepts. Examples such as ‘resulting in’, ‘leading to’, ‘and ultimately becomes’, ‘creates’, and ‘to achieve’, almost certainly indicate that the concept following would be ‘EEGPV’ knowledge base.

The researcher used different words to describe the structural makeup of concept maps. For example, ‘density’ was used to describe the number of concepts subordinate to a general concept; concepts that were in ‘item stream’ mode indicated concepts that were in linear file from the general concept; the ‘complexity’ of concept maps were determined the type of knowledge base assigned to the concept, its interrelationship with other concepts in terms of the concept’s place in the hierarchy, the linking words used between concepts, and the use of cross-links between hierarchies. Concept maps were considered to be ‘less developed’ or ‘more developed’ based on quantitative measures, such as the number of subordinate and general concepts, the number of relationships or links between concepts, the number of hierarchies, the number of branches (the links between a concept and two or more subsequent concepts) on a concept map, and whether participants have observed the protocols in constructing their maps that at least indicated a hierarchy of links from the key concept to general concepts, to subordinate concepts, and to outcome concepts.

Concepts were nominated for a PCK (pedagogical content knowledge) base when they were viewed as processes that delivered content in ways for student understanding. The words and phrases such as ‘constructivism’, ‘inquiry’, ‘analysis’, ‘creativity’, ‘authentic pedagogy’, ‘learner-centred approach’, ‘multiple intelligences’, and ‘effective facilitating’, for example, were nominated for ‘PCK’.

In order to gain a better understanding of pedagogical content knowledge, concepts were studied at the macro level perspective. It was noted earlier that Gundmundsdottir (1987:4) stated that pedagogical content knowledge is that “...particular amalgam of pedagogy and content ...”. Pedagogy is those general pedagogical skills that teachers incorporate into their strategies of behaviour management, teaching strategies, classroom communication, via their personal belief systems. Not all of these components would be at the forefront during the teaching process; the principal strategy during a phase of a lesson could be teaching strategies, but implicit or at the background of the teacher’s repertoire are strategies of behaviour management and classroom communication. Some components may be more explicit than others. A *broad* interpretation of pedagogical content knowledge was therefore used here, that is, if there was at least one component of general pedagogical knowledge (either teaching strategies, behaviour management, or classroom communication), which could be considered as integrated with a content knowledge concept. Concept maps were also studied at the micro level to determine the knowledge base of individual concept and the nature of their interrelationships with other individual concepts on a map

The components of general pedagogical knowledge are in fact intertwined in terms of actions and contexts. Whilst a concept may have been attributed to behaviour management, implicit in this knowledge category is also teaching strategies and classroom communication. Alternatively, teaching strategies may have been the nominated knowledge category to a concept, but implicit in this construct was also behaviour management and classroom communication. Like other categories of knowledge, the components of general pedagogical knowledge cannot be regarded as

an "... actual storage system in the human mind..." that is "...organized into abstract, isolated, discrete categories..." (Borko & Putnam, 1996).

While it would have been desirable to augment the concept maps with the TAPs simultaneously, to categorise concepts according to Shulman's categories, the differences in focus in TAPs made this impractical. Therefore, the concept maps including the concepts and links were coded at full value. The TAPs are then used to elaborate these concepts and codes.

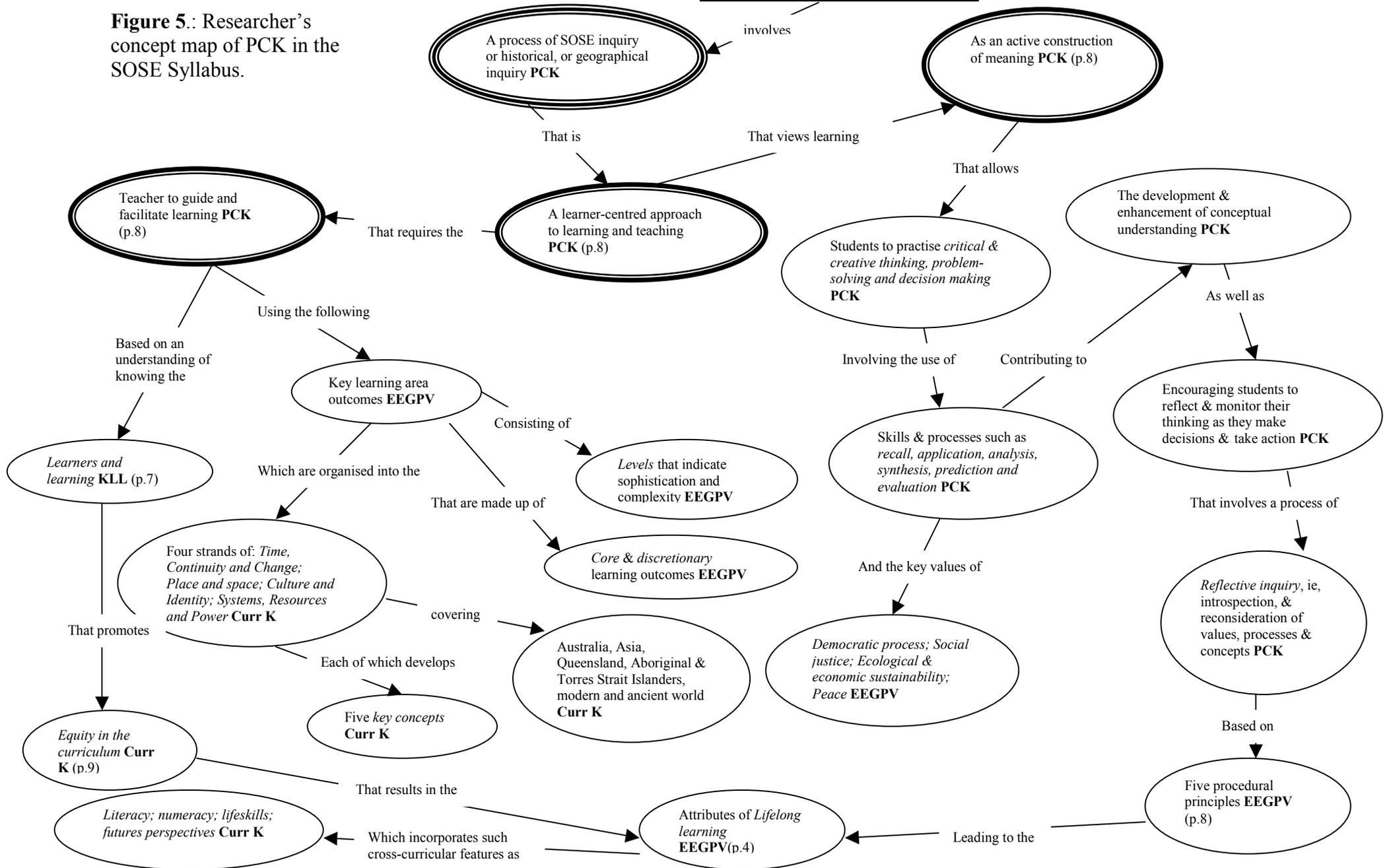
As noted earlier, the syllabus documents of Studies of Society and Environment, Senior History and Senior Geography indicate a strong emphasis on the constructivist approach to teaching, and help inform participants' learner-centred approaches to teaching. Figures 5, 6 and 7 tentatively represent the ways in which Shulman's categories are able to be identified in the current frameworks guiding Queensland teachers of the social sciences.

### ***Analysis of Video stimulated recall***

A number of ways have been used to analyse the data of video stimulated recall, for example, whether the categories are predetermined or derived empirically from the data. For example, Meijer, Beijaard, and Verloop, (2002) used predetermined categories in their study of pedagogical content knowledge of twenty language teachers; Cunliffe (1994) used predetermined categories in her study, linking personal theory and reflection on practice; and, Meade and McMeniman (1992) used Shulman's (1987) knowledge base of teaching categories to explore the knowledge bases of an expert teacher. Marland and Osborne (1990) and Dunkin, Welch, Merritt, Phillips and Craven (1998) on the other hand, used developed categories from the collected data. This study used Shulman's Knowledge Base of teaching categories to investigate the knowledge bases of novice Social Science teachers.

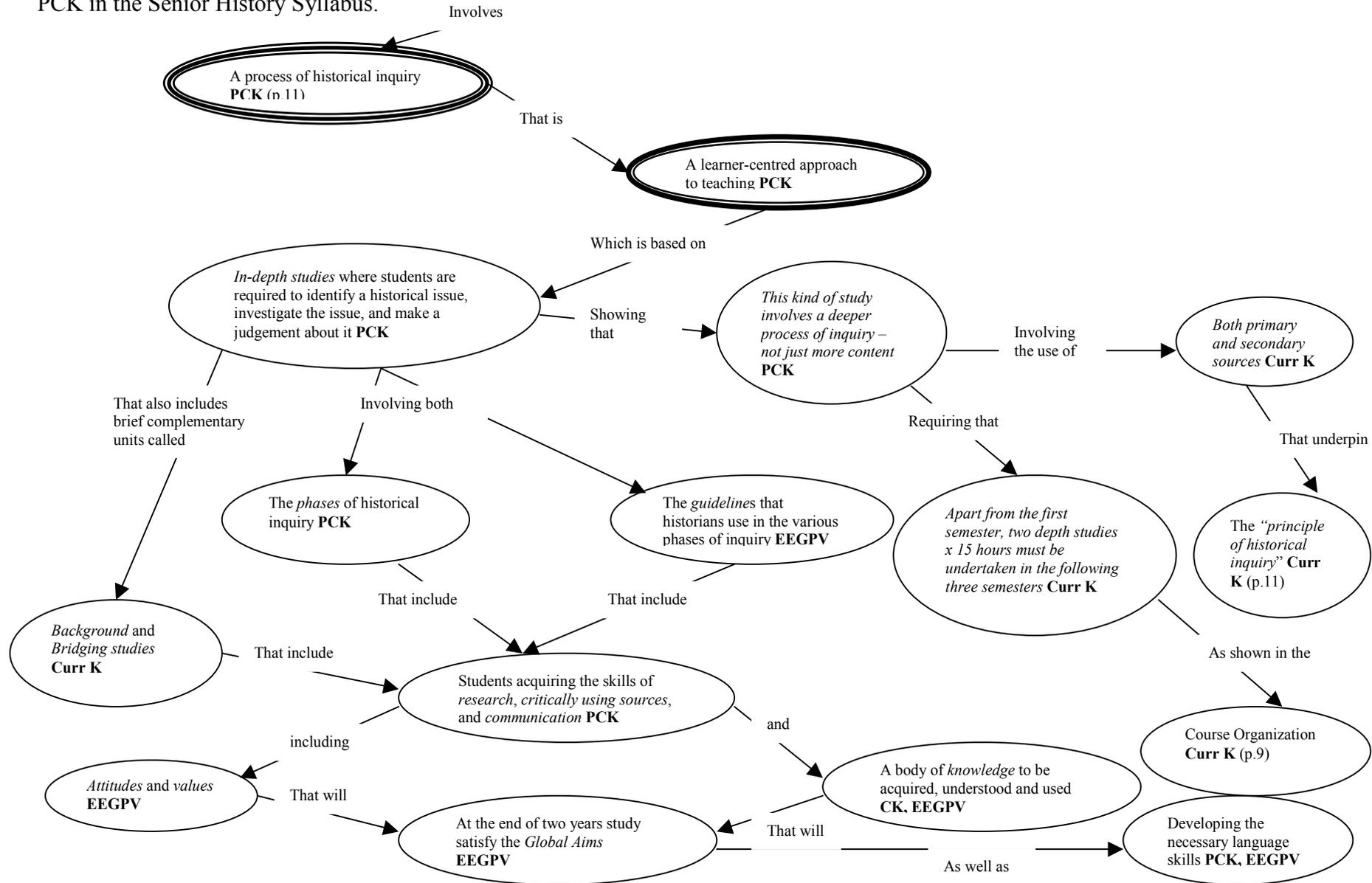
**Pedagogical content knowledge (PCK) in the SOSE Syllabus**

**Figure 5.:** Researcher’s concept map of PCK in the SOSE Syllabus.



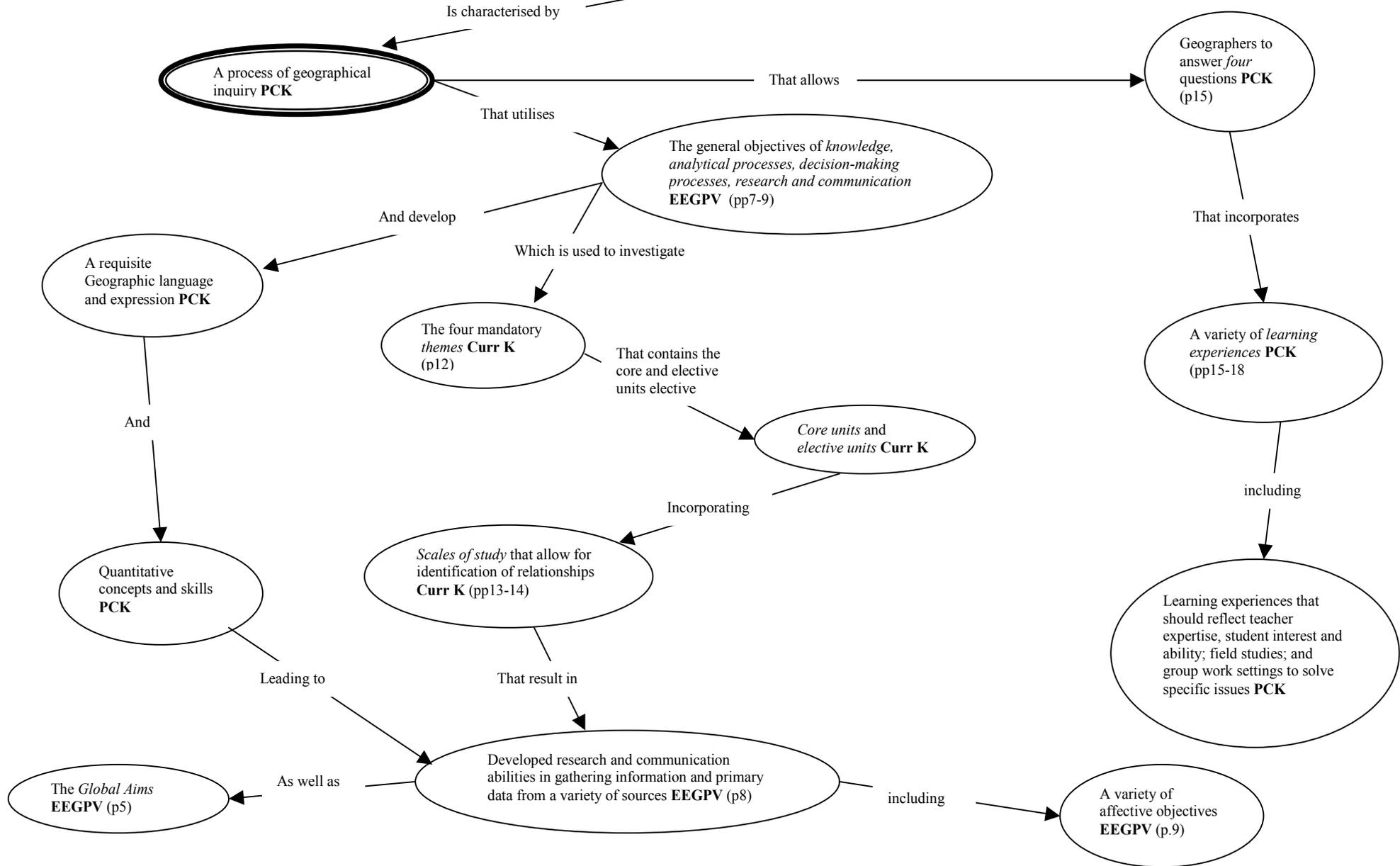
**Pedagogical content knowledge (PCK) in the Queensland Senior History Syllabus**

**Figure 6. :** Researcher’s concept map of PCK in the Senior History Syllabus.



**Pedagogical content knowledge (PCK) in the Queensland Senior Geography Syllabus**

**Figure 7. :** Researcher’s concept map of PCK in the Senior Geography Syllabus.



Participants' transcriptions were categorized according to Shulman's (1987) knowledge base of teaching. Each commentary within a transcription was assigned one or multiple knowledge bases depending on the nature of the commentary. A pedagogical content knowledge base was assigned when the commentary satisfied Shulman's general definition of reworking content knowledge that was pedagogically "...and yet adaptive to the variations in ability and backgrounds presented by students" (p.15). Shulman identified analogies, metaphors, examples, demonstrations and explanations as examples of the representational repertoire a teacher should possess in order for learning to occur. Participants in this study used a range of key words and phrases, such as 'clarifying', 'unpacking', 'connecting ideas', 'modelling' and 'linking information', to describe how they sought to transform their knowledge for student understanding. (See Appendix K lists a section of these key words and phrases participants used in both video stimulated recall transcriptions to determine to determine how they became coded as pedagogical content knowledge (PCK)). Overall, the videotaping of novice Social Science teachers in authentic contexts, coupled with the stimulated recall interviews almost immediately after recording, contributed to the validity of the video stimulated recall technique.

The following chapter presents the results and discussions of the case studies of ten participants. As noted earlier, the case studies are structured so the reader can take the journey with the participant that began in May 2002 and concluded in May 2003. Each case study begins with the participants' initial thoughts on teaching, their own school experiences, what they liked about their teachers, why they wanted to be a teacher, their university education, and subjects taught at their appointed school during the third and final data collection. The case studies are divided into three parts that reflect the three data collection phases: the participant's initial constructs for

effective social science teaching, the participant's initial knowledge in action and reflection as revealed through the VSR, and a summary of the participant's initial existence as a social science teacher. The second part of the case study shows the participant's maturing constructs, and a summary of the participant's developing thoughts in social science teaching, while the third and final part shows the participant's constructs of social science teaching on realization of practice, the participant's knowledge in action and reflection on realization of individual practice, and a summary of the participant's realization as a social science teacher. The discussion then sought to identify the participant's conceptual structures, especially the role of pedagogical content knowledge in their development as social science teachers.

To assist the readings of the case studies, Shulman's categories are listed here once more:

- general pedagogical knowledge (GPK) incorporating behaviour management (BM), teaching strategies (TS), classroom communication (CC), personal beliefs (PB);
- content knowledge (CK);
- curriculum knowledge (Curr K);
- knowledge of learners and learning (KLL);
- knowledge of educational contexts (K of Ed Con);
- knowledge of educational ends, goals, purposes and values (EEGPV); and,
- pedagogical content knowledge (PCK)

## CHAPTER FOUR: RESULTS AND DISCUSSION

### PEACE

Peace had attended a Queensland suburban, coeducational state high school where she studied Geography, Modern History, and Ancient History. She reported her history teachers, both of whom were female, to be "...very gentle ..." and "...were inclined to let students go their own way", but they also encouraged a degree of higher order thinking skills. Her Geography teacher on the other hand, "... was much more of a chalk and talk or fill-in-the-boxes kind of man".

#### ***Peace's initial thoughts of social science teaching***

Peace's response to the initial focus questions indicated that she felt teaching should provide students with the opportunities to explore themselves and environmental issues at all levels of society. "Good teaching will motivate students to improve either, or both, of these things". Peace explained her metaphor of teaching in the following way:

*Being a teacher is little like fishing. You need to know how to find them and have just the right bait to hook them. You won't get every fish in the school, but every one you catch will be as exciting as the first!*

She said that the key to engaging students was to make compulsory subjects or compulsory units in elective subjects relevant to their experiences. "Sometimes this takes a little imagination". Peace states her reasons for wanting to be a teacher as a strong desire

*To contribute to society, or the future if you prefer, and I feel the best way I am able to do that is to contribute to the fostering of broad-thinking, analytical minds who are able to engage in their societies in thoughtful ways. I wish to advocate for young people and provide an environment in which they feel safe to test their*

*knowledge, skills and boundaries, whether these are academic or personal.*

Peace enrolled in a Bachelor of Education program as a graduate entry (2 year program), after completing a Bachelor of Behavioural Science, majoring in clinical psychology. Her curriculum areas in her teacher education program were Studies of Society and Environment (SOSE) and Drama. She spent her final professional practice teaching at a coeducational, suburban state high school where she taught Year 8 Integrated Studies, Modern History and Drama. A lesson to two classes of Year 8 Integrated Studies was videotaped for the first stimulated recall interview. Peace received a Suitability Rating of '1', the highest, from Education Queensland.

Peace was appointed to a coeducational, country state high school where she taught Years 8 and 9 SOSE, Year 8 English, Year 10 Civics, Year 10 History, and Year 11 Ancient History. A lesson of Year 9 SOSE class was videotaped for the second stimulated recall interview.

### ***Peace's initial constructs of social science teaching***

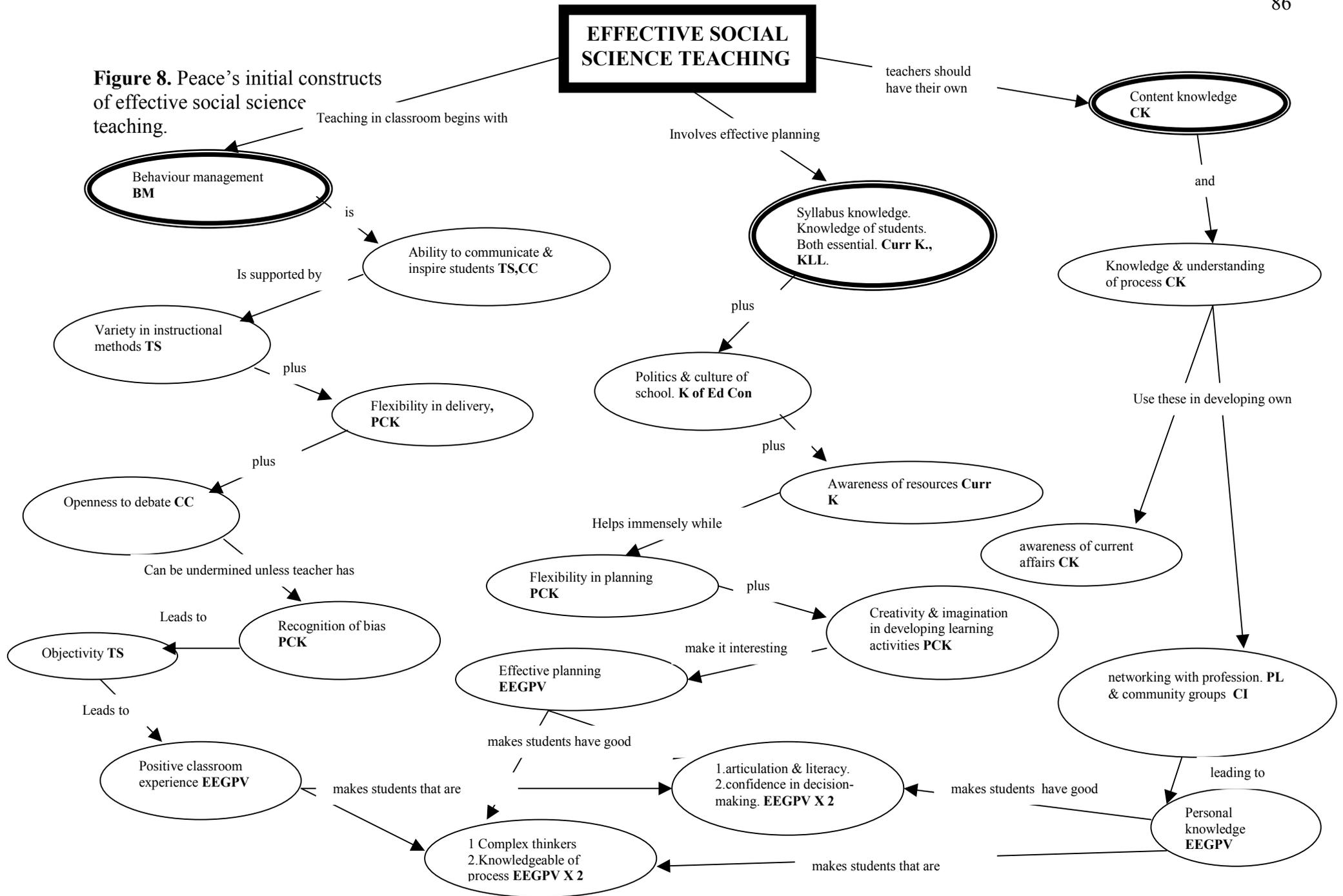
Peace's initial concept map showed a hierarchy of concepts, beginning with the three most general concepts of 'behaviour management' (BM), 'content knowledge' (CK), and 'Syllabus knowledge, knowledge of students, both essential' (Curr K, KLL), leading to the initial outcomes of 'positive classroom experience' (EEGPV), 'effective planning' (EEGPV), 'personal knowledge' (EEGPV), 'articulation and literacy' (EEGPV), 'confidence in decision-making' (EEGPV), 'complex thinkers' (EEGPV) and, 'knowledgeable of process' (EEGPV). Although linking arrows and their corresponding linking words establish logical relationships between concepts, the structure shows 'item streaming' below each general concept, that is, there are no

cross-links to show integration of knowledge bases across segments in other hierarchies (see Figure 8).

The nomination of her knowledge bases indicates that she had broad understanding of teaching and learning processes, the focus of which was on *behaviour management, educational ends, goals, purposes and values*, and *content knowledge*. The linking words, 'teaching in classroom begins with' that links 'behaviour management' (BM) with the key concept indicates the vital role of *behaviour management* in Peace's concept map. However, the success of *behaviour management* is dependent upon skills of communication, which encourage debate and objectivity in the classroom, and a capacity of the teacher to be flexible. The nomination of *educational ends, goals, purposes and values* showed a concern for both affective outcomes – 'positive classroom experience' (EEGPV), and cognitive outcomes – 'complex thinkers' (EEGPV). The nomination of 'content knowledge' (CK), 'knowledge and understanding of process' (CK), 'awareness of current affairs' (CK), 'networking with profession (PL), and community groups (CI)' indicated the importance of a variety of sources of knowledge necessary to develop her own construct of 'personal knowledge' (EEGPV) which then leads to the cognitive outcomes.

Peace's ideas of 'networking with profession (PL) and community groups (CI)' was an indication of thinking that went beyond the classroom, even more so than *knowledge of educational contexts*, to bring back into the classroom and contribute to effective social science teaching as aspects, perhaps, of pedagogical content knowledge (Figure 8). *Professional learning (PL)* and *community integration (CI)*, then, were coded as extensions of the knowledge bases for Shulman's categories.

**Figure 8.** Peace’s initial constructs of effective social science teaching.



Whilst *professional learning* infers membership of professional associations and other school based programs that inform development of knowledge bases, *community integration* means both within school and out of school collaborations and engagements in order to enhance the quality of learning within the classroom. In fact, *community integration* is the recognition of the changing dimensions and expectations on schools and teachers with others and the community that goes beyond either *knowledge of educational contexts* or *professional learning*.

Although *knowledge of learners and learning* was nominated to one concept at the general concept level, its status in Peace's initial constructs was important, because as the linking words 'involves effective planning' indicate, consideration of students is essential.

Peace's understanding of *pedagogical content knowledge* at a macro level was evident with the identification of 'behaviour management' (BM), 'variety of instructional methods' (TS), 'ability to communicate and inspire students' (CC), 'content knowledge' (CK). The concepts 'flexible delivery', 'recognition of bias', 'flexibility in planning', and 'creativity and imagination in developing learning activities' were nominated for *pedagogical content knowledge* at the micro level of her map because they are aspects of constructivism, and in this case, contribute to effective behaviour management, and knowledge of syllabus and students.

The focus of Peace's Think Aloud Protocol was *general pedagogical knowledge* focusing on *behaviour management*, *pedagogical content knowledge*, *knowledge of learners and learning*, and, *knowledge of educational contexts*. Only through effective *behaviour management*, according to Peace, can there be a 'positive classroom experience', which in turn, plays a major role in the core outcomes. Peace made two very important statements regarding her *behaviour management* practices in class;

first, there is the affective impact of one's own behaviour on the behaviour management of the class – "... what happens in the classroom is entirely dependent upon yourself ...". Peace said that there was a cognitive basis to *behaviour management*, because "... the transformation of knowledge... can only be done if students know that you are modelling what you are expecting them to do ...". Both statements show that Peace desired the type of *behaviour management* that was closely linked to a *pedagogical content knowledge* process of learning where teacher initiative, commonsense, and modelling are key to transforming knowledge for student understanding.

Peace reported a level of confidence in her *behaviour management* practices that contrasted her limited classroom experience as a preservice teacher. As she explained,

*...I must admit...I don't have a problem with behaviour management...that's because I have a presence...in my room ...as a teacher...and ...so therefore...kids who are going to play up are really only the naughty ones... and the really naughty kids...are...have a way of either... umm...embarrassing or ignoring really...Like... for example...we had a kid yesterday...who just calls out all the time...he's really just a bit of a show off... and we were doing mapping skills...I had to explain what a 'legend' was ...So I said... "Lukey...he thinks he's a legend doesn't he?" ...And all the kids in the class laugh...and he laughs too...because it's almost in a way ...flattering to be embarrassed ...by the teacher like that... but he was very quiet for the next ten minutes...*

Peace used practical intelligence (Cole & Chan, 1994) when dealing with isolated incidents like the one above,

*I don't see the point in stopping the whole class for one or two students ...for one or two students that might be causing me an inconvenience...unless that behaviour really gets to the point where it's impossible...to allow the other students to engage in any content work...That's the only time I'll stop the class...and then I'll address it as a whole class... and talk about the rights of other students to be involved in education...*

However, Peace was quick to add,

*...I don't ...I've never had behaviour management...its never really been an issue...but I know that there...that's probably because the second I walk into the classroom...I have my own presence...*

Some rules are developed through negotiation within a particular classroom activity, while others are non-negotiable.

*If there are other rules that develop...if we are engaging in a particular drama activity...then we will talk about ...umm... the appropriateness of content and rules in theatre like ...umm... blocking...Those are the sorts of rules I would negotiate... I lay my own rules on the table...One speaks at a time...if you waste my time...I'll waste yours with a detention...They are about the only two rules I have in the classroom...and they know it from the moment I open my mouth ...*

Importantly, Peace does not consider herself as above rules in the classroom, as she explains, "...and I follow them too...the kids all see...that I don't talk when somebody else is talking...".

Peace used proactive *behaviour management* strategies such as humour in the case of the attention-seeking student, commonsense when dealing with isolated behavioural incidents, and non-negotiable rules that are brief and understandable to students. Peace used *pedagogical content knowledge* to give students a broader understanding of the rules, such as the rules of theatre.

In terms of dealing with students with behavioural problems, Peace rejects the 'logical consequences' approach to discipline.

*I've never had to engage...in that ... what did I call it? ... You know ...logical consequences...both at... which are two schools I've done my prac. at... they both have logical consequences ... as their standard in school policy...I've never ...ever had to say to a child... "What are you doing? ... Do you think that's appropriate?" ...Just ...actually think its degrading ...to treat a child like that... because they know what they are doing ...Kids know how to get around these questions...They know what's happening... they've been institutionalised ...those questions...that Gordon model... and that Glaser model...Kids aren't stupid...*

Peace's emerging personal approach to discipline characterises that of 'assertive discipline' and 'reality therapy/choice theory' (Edwards, 2000). She gave the following example,

*...I think ...saying to them... "You having a bad day...mate? ... What was it that upset you ... before you came into the classroom? ...Because I know it wasn't me..." That might...well I hope ... that sort of...umm...openness to...just tell me your story... "What's your problem?" ...and then saying to them afterwards... "Okay ...so everybody has had a bad day ...but that doesn't really give you the right to come in here and give me a bad day...does it? ...You want to have a good lesson with me...we'll have a good lesson with me... you want to have a bad lesson with me...you are on detention..." There's no point ...for me...And I don't think there is any point in fellow students ...going through..."What did you do? ...What should you have done? ...because they just go..."I did this... I should have done that ...Yes...Miss..." ...and walk away... They know the questions...they know the answers...they are not interested... I've seen it happen...and that's why I wont use it...So...I think my **behaviour management**...comes from the fact that I talk to kids ...like they are people... not like they are children...*

Her *behaviour management* is closely linked with her desire to communicate and inspire those students, not only in an affective sense but also in the cognitive domain because,

*...it too easily becomes a transfer of knowledge ...instead of shared building... of knowledge...If they don't feel ...that they can talk back to you...you don't feel you can talk to them...with some degree of honesty...then I think it ...it's not effective teaching ...It's just ...putting facts out there... And I think it's important in the Social Science classroom to stimulate debate...and to allow people to test their own understandings...*

Peace's *pedagogical content knowledge* was also reflected in her statements of the constructivist classroom, where students are viewed as thinkers, where the teacher behaves in an interactive manner, and where the teacher seeks the student's point of view (Brooks & Brooks, 1999).

Peace demonstrated *knowledge of learners and learning*, and sought to make learning relevant to them. Peace stated that , "...two thirds of my class are of...

Polynesian or Aboriginal ...descent...and there are four white students in the classroom ...”. She used drama, such as role-play, in the classroom because most of the students find reading difficult, particularly as “...a lot of your sources are written ...it requires a lot of reading ...and that doesn’t engage a lot of kids...

Peace’s understanding of *pedagogical content knowledge* was evident in her statement about planning. Representational repertoires and topic selection depends on ‘flexibility of planning’ (PCK), and that it should reflect her knowledge of the syllabus, awareness of current affairs, and knowledge of processes. As Peace explained

*...make your planning interesting...make it effective ...instead of being... chalk and talk...I should know what’s happening in the world ...if I want to be a teacher...I should know and able to practise all the skills and processes...that I’m trying to teach the kids...like...comprehension...analysis...*

Peace’s *knowledge of educational contexts* was evident in her comments on planning. Planning is influenced by school politics, which according to Peace, “...stretches across all strands...and how the politics of schools affects what happens in your classroom ...”. The result is what Peace called ‘personal knowledge’, that is, a combination of content, processes, current affairs, professional development, syllabus knowledge, and knowledge of students all of which are essential to planning.

### ***Peace’s initial knowledge in action and reflection***

Peace’s video stimulated recall was based on a lesson about environmental relationships she had taught to students of a combined Year 8 Integrated Studies class earlier on in the day. She used both direct instruction and facilitation throughout the 60 minute lesson, using a combination of resources such as a blackboard and ‘butcher’s’ paper.

Peace stopped the videotape 17 times during the recall interview, and a total of 33 categories of teacher's knowledge bases were identified from her responses (See Table 2).

**Table 2: Breakdown of knowledge bases**

Knowledge base	No
General pedagogical knowledge:	
-Behaviour management	10
-Teaching strategies	6
-Classroom communication	5
-Personal beliefs	1
Content knowledge	-
Curriculum knowledge	-
Knowledge of learners and learning	7
Knowledge of educational contexts	1
Educational ends, goals, purposes and values	1
Pedagogical content knowledge	3

Peace indicated her *knowledge of educational contexts* regarding the nature of her class in terms of the overall structure of the Year 8 population, and the basis of this format within the whole school environment vis-à-vis its short-term and long-term goals of this program. As Peace explained

*...they decided to split the Grade 8 population. There are ...two integrated classes that are streamed. One is a high level achieving class and one is the low level achieving class. This is the low achieving class. The other half of the Grade 8 population operates...in the same way that you would normally do...when you come to high school. What they decided...what they would do at ... is have an experiment that leads Grade 7 to Grade 8. It introduces to the process occurring in Grade 9, 10,11 and 12. Umm...so they spend the first four lessons of every day in an integrated class ...in one classroom... with two teachers that they know...all the time. And then they go to their electives in the afternoon and they experience...moving around the school and having different teachers, and responding to the different expectations of each of those teachers. Umm...they are actually talking at the school about continuing this process into Grade 9, particularly with this low level achieving class. Umm...I think the long-term goal... is to move into the middle schooling situation, where 7, 8, and 9 are all the same.*

The observations made by Peace clearly show that she has taken the opportunity to

understand the contextual features of the school, or to ‘read the school’ by exploring its surface and deep features (Groundwater-Smith, 2001). The value of this integrated model of teaching and learning is something about which Peace was not entirely convinced:

*It has its positive and its negative connotations. Some of the kids feel stupid because they have been made to stay in that... sort of primary environment. Umm...some of them really like it ... it keeps them comfortable ...it helps to keep them focused. So, I guess it's a little bit of ... "six and one...and half a dozen of the other", but its an interesting way of developing students' abilities to work independently ... which is what they will need to do in the work force...particularly for kids like this who really do need that bridging...Umm... probably the biggest negative ...is that it encourages them to stay in that childish, primary mentality...*

Despite these concerns, the integrated model, according to Peace, helps students to develop a sense of independence, especially, “...for kids like this who really need that bridging”.

As well as her *knowledge of educational contexts*, Peace had developed a *knowledge of learners and learning* in her class in terms of adapting the activities to meet the needs of learners (Shulman, 1987). For example, she subtly uses her skills in spelling to challenge students to better themselves. As Peace explained,

*There are two girls in that class...who have spelling achievements better than myself...and they are my spelling monitors...And every lesson, I get one wrong ...and they put their hands up and tell me. Its part of ... the fun relationship that you build up, saying to them, “Well, I can do this. Can you do it better”? And that's part of teaching...of setting up a positive environment when they are not afraid to challenge me...by the time we get to Grade 11 and 12, we can have really intense debates...*

She had also developed a good knowledge base of their emotional and medical needs. One student she describes as “...a real little suck. He knows when he's in trouble and he will bend over backwards to try to make up for it ...”. And then there are those students who are reported to have attention deficit disorder: Peace said they

*all receive medication. Two are more dangerous for want of a better word, than the other ones, because they tend to react in violent behaviour. One of them is ... who just walked past, and the other one is...who just made the sarcastic comment.*

In fact, Peace identified these four students as continually disruptive, and “one of your biggest tasks in the classroom ... deciding what to ignore ...and what to act on”. As she pointed out, when dealing with those four students, “it’s a long involved process. You have to talk to them for a couple of minutes”, while the other students “respond much quicker”. Nevertheless there is the ripple effect, because other students can see that “so much of your attention is taken up by those...naughty kids ...” and “...they have learnt to use that...and ...will stir up the boys ...”. There were other forms of disruptive behaviour as well, such as one student who was caught throwing paper and pens at other students. He was given time out for twenty minutes. In another instance, a student had written “...eat shit and die...on a piece of paper...and put it across his forehead”. Peace’s initial response is perhaps understandable, “...I was so stunned ...I didn’t know what to do ...”, but she used what Cole and Chan (1994) call, practical intelligence, to continue on with the lesson, since stopping the lesson to make an example of him would only disrupt “the whole classroom”. A simple point of the finger in mid-sentence and the words, “ You’ll be here at lunchtime ...”, was enough to pull the student into line. Generally, a “negative attention” like the above example would be enough, because “...they tend to go, ‘Oops’... and pull themselves back in ....”

On other occasions Peace used *behaviour management* strategies to discipline students. This was done first in the form of lectures because as she explained

*...almost ( ) you getting angry with them for them to realize that this is a serious activity. I always try...to support my anger with some kind of reward. They were really good yesterday. And I want them to recognise that, and maybe try to use that behaviour again. And I think it’s important...particularly with Grade 8 to not*

*to continually just say, "You're naughty kids...you're naughty...". And particularly this class because so many of them are naughty ... It's important to recognise when they've been good and try to build on that. "Yesterday you were so good".*

Implicit in this 'behaviour modification' approach was the system of divide and rule (Ricklefs, 1981), in which team leaders were responsible for his/her groups . So "...all team leaders know when I say something, I mean it... and tend to carry that through, too". As Peace points out, "One of the advantages of having small groups...is it allows to problem-solve ...for that problem".

Group work also helped in Peace's *teaching strategies* because she can move between each group to

*...(1) to keep them on task...(2) to make that the task that they are completing is the right one...umm...and (3) it's really just an opportunity for that interaction... a lot of actual teaching occurs in that situation...reminding the kids of the knowledge that they don't have...that's when you get a chance to talk to kids, one to one ...and see what they know. Where in a class of 53...you don't get a chance to do that very often. So, small group work in this situation is really important ... gives me a great opportunity to control, check for knowledge, and build relationships.*

Of equal importance in teaching is the use of the *pedagogical content knowledge* base of modelling to develop knowledge. Peace explained that

*These kids, particularly, need to see what you expect of them. They need to see how the process develops, and then try to do it. Umm then afterwards, we expand on...we use each ...each part of the process and expand on it to build more and more knowledge.*

Peace also used the modelling process to encourage students to link their knowledge to previous lessons, to the current lesson, and to future lessons. By posing the question to students, "What did we agree?", Peace was seeking confirmation of identification of subject matter from students from the previous lesson, that is, have students got inside her thinking processes in order to learn particular new ways of thinking and behaving? (Cole & Chan 1994:143). The sequencing of lessons through

this linking process helps students, Peace notes as “...really important...” because it helps “...to orientate their knowledge and to orientate their understanding of me”.

### ***Summary: Peace’s initial experience as a social science teacher***

The two data types elicited from Peace at the initial stage of her conceptions of social science teaching indicated a focus on four of Shulman’s categories: *general pedagogical knowledge* focusing on *behaviour management*, *pedagogical content knowledge*, *knowledge of learners and learning*, and *knowledge of educational contexts*. Her concept map identified ‘positive classroom experiences’ as an initial affective outcome before the mainly cognitive outcomes are reached. Her Think Aloud Protocol (TAP) commentary placed the onus on teachers to act as role models for students to facilitate these outcomes. Commentaries from her VSR spoke of effective behaviour management as a means of building on good behaviour.

*Behaviour management* was the only component of general pedagogical knowledge that featured in the two data sets. The powerful linking words, ‘teaching in classroom begins with’ to link ‘behaviour management’ (BM) to the key concept, indicates the pivotal role of *behaviour management* in Peace’s teaching. An equally powerful linking word, ‘is’, that links ‘behaviour management’ with ‘ability to communicate and inspire students’ shows the importance of the latter in promoting and maintaining effective behaviour management practices. Other subordinate concepts in the hierarchy that relate to the variety and flexibility of teaching and open classroom discussions, play a strong supportive role in both maintaining effective behaviour management, and providing ‘positive classroom experiences’. As Peace stated in her TAP, effective *behaviour management* practices must also connect learners in a cognitive sense as well. In other words, both teachers and students should engage in

shared knowledge building, teachers should encourage students to debate and test their own understandings, and teachers should model their expectations. Peace's commentaries also indicated a common sense approach or use of practical intelligence in her behaviour management practices. As Cole and Chan (1994) pointed out, effective classroom management "depends on a teacher's attitudes and practical intelligence" (p.318). Peace also said that classroom rules are negotiable up to a point, and that decisions which affect the general welfare of the class and require accountability to the school community, are decisions for the teacher. Her video stimulated recall (VSR) commentaries also discussed common sense as a way of minimising disruptions to the whole classroom when dealing with miscreant behaviour. She discussed her use of team leaders as a means of reinforcing group behaviour, and of the convenience of group work, such as providing her with opportunities to interact with students and to check their work progress.

*Pedagogical content knowledge* was identified in the two data sets. Her concept map showed that *pedagogical content knowledge* was nominated at both the macro and micro levels. The concepts of *content knowledge*, *behaviour management*, *teaching strategies*, *classroom communication*, and *content knowledge* indicated Peace's understanding at the macro level of her map. *Pedagogical content knowledge* was nominated to 'flexible delivery', 'flexible planning', 'recognition of bias', and 'creativity and imagination in developing learning activities' at the micro level because they involve constructivist approaches to teaching and learning.

Commentaries from her TAP reject the transfer of knowledge based on chalk and talk, and instead she spoke of her constructivist approach to teaching where students are valued as thinkers. The Studies of Society and Environment (SOSE) Syllabus (QCSS, 2000) strongly implies that the teacher's role is to provide opportunities for students

to become, inter alia, complex thinkers, creative individuals, active investigators, and reflective and self-directed learners. Her VSR spoke of modelling by the teacher as a way of encouraging students to link their newly acquired knowledge with previously learnt knowledge.

*Knowledge of educational contexts* was apparent from the two data types. Her concept map indicated that the politics and culture of a school impact upon teaching. She stated in her TAP that politics encompasses all aspects of school life, and it is important for teachers to develop ‘personal knowledge’ about all facets of school culture. Knowing the politics of a school means knowing how to read a school, to deconstruct so the teacher can attune himself/herself to the surface and deep features of the school text (Groundwater-Smith, Cusworth & Dobbins, 2001). Commentaries from her VSR indicated her understanding of the integrated model of teaching and learning, and how students of Year 8 felt about the model.

*Knowledge of learners and learning* also featured in the two data sets. Her concept map indicated that knowledge of students was nominated at the general concept level of her map. Peace stated in her TAP that students from her class came from a variety of cultural groups, and that they were not keen readers of texts, so she used drama and role plays as ways of motivating students. Commentaries from her VSR show that Peace had developed a good understanding of individual learners in class, especially of those students whom she regarded as good at spelling and those students with behavioural problems.

Peace’s conceptions of social science teaching at this stage were strongly focused on *behaviour management*. She spoke of *behaviour management* in terms of effective classroom communication and inspiring learners to learn. Whilst she believed that negotiating class rules and the like, are important, there are procedures that affect all

class members and therefore, are not negotiable. She stressed the importance of common sense when dealing with potentially disruptive students. She also spoke of an effective *behaviour management* program that directly contributed to her *pedagogical content knowledge* approach to teaching that not only leads to positive classroom experiences but to core cognitive and affective outcomes. Peace showed that she had made an effort to understand the politico-cultural side of school life. Overall, Peace displays a strong presence in the classroom that seeks to proactively meet the learners' cognitive, emotional and social needs through a variety of teaching strategies and interventionist techniques that provide an environment of *pedagogical content knowledge* so students can become complex thinkers, confident decision makers, and articulate in a positive learning environment.

### ***Peace's maturing constructs of social science teaching***

The six month time lapse led to a refinement in aspects of Peace's map construction, and as a consequence, identification of fewer knowledge bases (See Figure 9). A cross-link on the map indicates that Peace has given some consideration to integrating knowledge bases across the hierarchies. The knowledge base of *teaching strategies* was not nominated this time, and there were less *content knowledge* and *educational ends, goals, purposes and values* nominated as well. *Content knowledge* was embedded within the 'learning style' (KLL, PCK) hierarchy. The nomination of 'articulate students' (EEGPV) and 'environment, parents, corporate society' (EEGPV), indicated a greater focus on developing students' astuteness to cope with the challenges of society. The identification of 'classroom management' (BM) as a general concept indicates the continuing importance of *behaviour management* in her concept map, based on a variety of teaching strategies that take into account the learning styles of students, including the additional

constructs of ‘curriculum’ (Curr K) that offers both academic and vocational subjects, and ‘school ethos’ (K of Ed Con). *Professional learning* and *community integration* were not nominated in her second map.

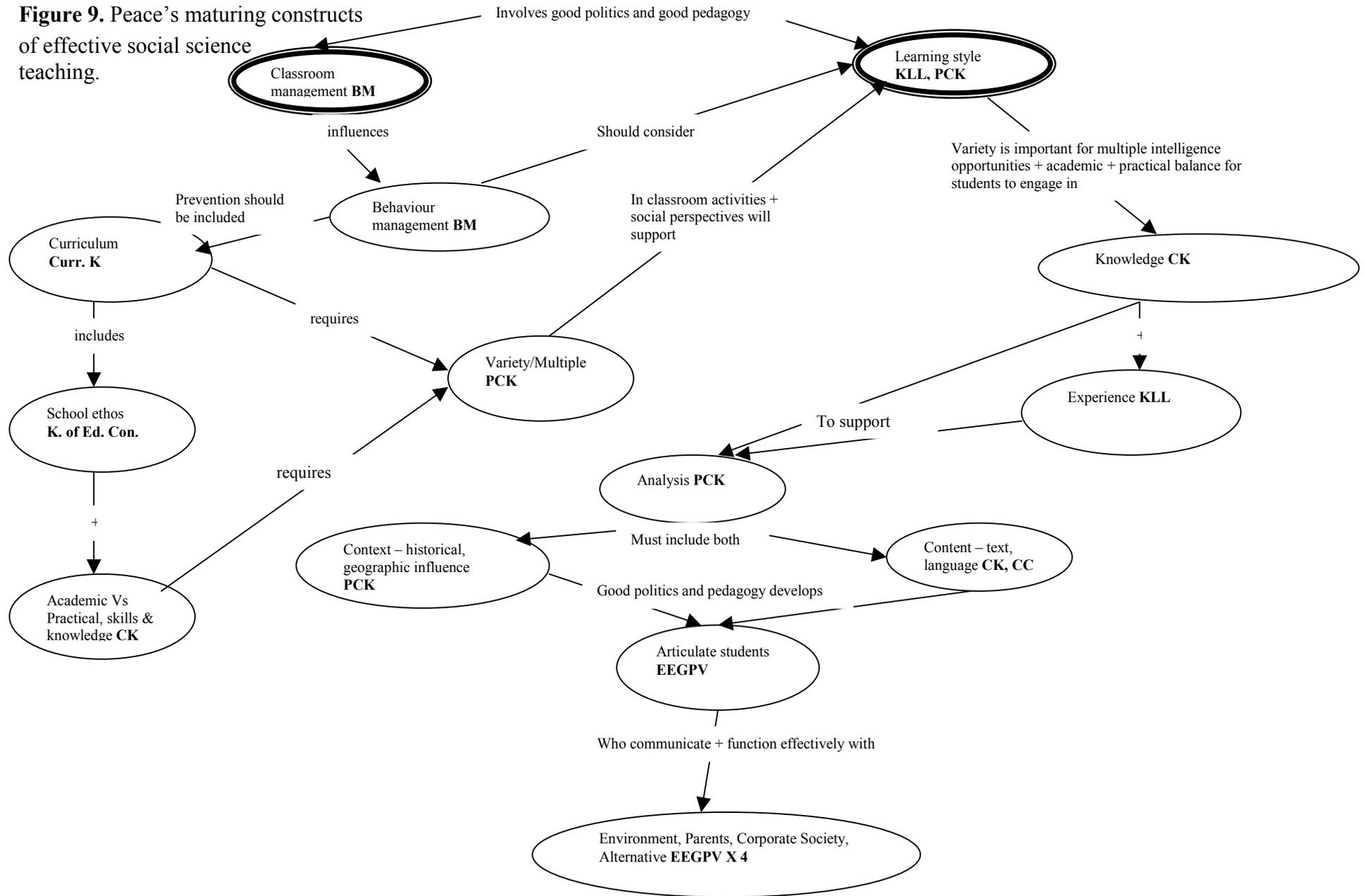
Peace’s conceptual organization shows an understanding of *pedagogical content knowledge* at both the micro and macro levels of her map. The concepts, ‘learning style’ (KLL, PCK), ‘variety/multiple’ (PCK), ‘context – historical, geographic influence’ (PCK) and ‘analysis’ (PCK) were identified as *pedagogical content knowledge* because the concepts represent a constructivist approach to teaching, that is, an understanding of students’ learning, contextual understanding, and the use of a variety of teaching activities the suit students from both academic and vocational backgrounds. The nomination of ‘content – text, language (CC)’, ‘knowledge’ (CK), and ‘classroom management’ (BM), indicated an understanding of *pedagogical content knowledge* at the macro level

The focus on Peace’s Think Aloud Protocol (TAP) was on the *knowledge of educational contexts, pedagogical content knowledge, general pedagogical knowledge* focusing on *behaviour management, curriculum knowledge, and content knowledge*. An understanding of *knowledge of educational contexts* was indicated in her statement about the responsibility teachers have in equipping students with an understanding of corporate society and the principles of democracy. Peace especially identified the nominated knowledge bases of *behaviour management, curriculum knowledge, and pedagogical content knowledge* as necessary for effective social science teaching because

*... what happens in a classroom... is split between your behaviour management and your curriculum delivery. But the two need to complement each other and they work best in variety. Umm...from your classroom management or how you set up your class and the dynamics in your class then you can start to consider the content what you’re teaching ...umm...and how you might best teach that.*

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**Figure 9.** Peace’s maturing constructs of effective social science teaching.



*So alternative learning styles... the best way to explore knowledge and to give kids experience with knowledge...because I think experience is the best way to learn. Umm...but probably the most important aspect of teaching social science is analysis and allowing the kids to really think through an issue and come up with their own ideas. The third thing I guess is the overarching reason that you would teach social science in the first place, and I think those things really need to be considered if you're going to be effective....so I have called them parents, the environment, corporate society and alternative society.*

Peace's commentaries of *content knowledge* regarding the importance of context indicated her understanding of *pedagogical content knowledge*. Peace stated that

*...I don't think that I could go through ancient history, politics, economics...ethics is something...umm...we've been taught this semester ...and I think of ways to incorporate it ...particularly into senior subjects ...umm... but more the principles of social science are about recognising patterns in society and in geography in the physical world as well as the social world...and the best way to do that is through analysis of the content and context ...for example the fact that ...umm...Galileo in the Renaissance time was the first man to work out that it was not the stars that moved but us...it was hundreds of years then before Albert Einstein actually...I guess... developed the concept of gravity. So the two concepts are not that far apart in terms of logic ...yet they took years to evolve, and that was because of the science of the time and of the theological influence on science in the medieval ages was as apposed to the influence in relatively modern times. So our understanding of concept and our knowledge is bound by our social context...so whenever you're teaching anything on social science ...it has to be put into a context.*

In terms of *content knowledge* delivery, Peace was alluding to the representational repertoires of teaching, that is, *pedagogical content knowledge* and, the context of that knowledge delivery. Both are inseparable. As she explains,

*...your underlying aim in social science is not to teach knowledge but to teach a process of knowledge, and that's the best way that I have come across to make it clear to students that there is a difference, just to clearly say to them that there is a difference between content and context but the two are linked...you can't look at one without the other...umm...like two sides of the yin-yang thing.*

She further clarified her discussion on the role of context and *content knowledge* and *pedagogical content knowledge* by also stating the importance of experience in

student learning, that is, the symbiotic relationship that also exists between knowledge and experience

*...because I think that again the two are intricately linked and one does not happen without the other. We can talk about Galileo's understanding of the cosmos and how that might have changed the world, but it'll have a lot more impact if we ...for example...could do it looking through a telescope. But there must some practical element to all our learning that helps us to cement that. That is a constructivist theory...that is my experience of learning. Everything I know because I remembered doing it, and I haven't discovered many other people who are different. It also incorporates all different learning styles if you can build in some experience kids get to reflect on in lots of different ways.*

However, Peace expressed some concern about her *pedagogical content knowledge*, a concern no doubt echoed by other novice teachers at this stage of their development as teachers:

*...one of my flaws as a teacher, and something I really want to be aware of ...umm...is that I'm probably a little bit too academic ...my family values...and so I never really had a lot of patience...I guess is the word...for people who are not as quick as I am, and I think that's something I will need to discipline and probably leads into the need for variety in multiple perspectives in the classroom. For me, that's going to be the only way to balance. My perspective is to make sure that I really represent other ones in a classroom. Umm...so I think being aware of that practical aspect of the social sciences and the fact that they do relate to real issues in the world that people are going to have to deal with ...is something that I will need to incorporate, and haven't found a way yet.*

As Peace pointed out, both *behaviour management* and *curriculum knowledge*, "... need to complement each other ...", or as she later stated, they "...sit together". Peace explained that

*...your curriculum should really be influenced by behaviour management which is why I've put it underneath behaviour management because behaviour management is both preventive and corrective...and the preventive stuff means incorporating into your curriculum interesting things for kids to do. Umm...and I guess so is the variety and multiple perspective stuff is really preventive kind of behaviour management. Umm...the corrective behaviour management is how you set up your dynamics in your classroom and how you*

*manage their behaviour as it happens rather than trying to prevent boredom and a lack of motivation that causes misbehaviour.*

Peace summed up her commentary by re-emphasising the importance of knowledge and experience, and by developing learners who are aware of the environment, conscious of the corporate world, and who can communicate across the generations.

She explained her vision of education in the following way

*...if you're balancing academic and practical things...and you're building in lots of ways to do it ...then hopefully what you're producing ...umm...will satisfy these things. So if my content is true and my classroom management is solid...then I will produce for a want of better words, students or young people who are conscious of the environment and our need for the environment, what we need to do to respect it, how their parents might currently see the world and how that might be different from ours, and maybe by putting that into context we can remove some of the "agro" between generations and develop communication ...I guess, but I would ultimately like to produce students that can communicate with their parents ...umm... and grandparents...I guess we need to recognise no matter how much I might disguise it...corporate society runs the globe and we're not going to lose liberal policies in the world, well at least in my lifetime, we need to produce people who are conscious of business principles and to understand the way that the economy works and...umm...principles of democracy and all those sorts of things, but I think...umm...that if I'm going to leave behind a kind of social footprint that I want to leave behind...I need to also make my students aware of the alternatives to that...*

### **Summary: Peace's developing thoughts on social science teaching**

The data elicited from Peace continues to focus on five of Shulman's categories: *knowledge of education contexts, pedagogical content knowledge, content knowledge, curriculum knowledge, and general pedagogical knowledge* focusing on *behaviour management*. The identified knowledge bases of *knowledge of educational contexts* on her concept map (Figure 9), however, show a new focus on students who are expected to be articulate and who can communicate and function effectively within the environment, parents and corporate society. Her Think Aloud Protocol (TAP)

commentaries state that since corporate society controls the globe, it is incumbent on teachers to equip learners with an understanding of the world of business, the economy, and the principles of democracy.

*Pedagogical content knowledge* was nominated in the elicited data and indeed, had emerged to be much clearer. The nomination of *behaviour management*, *classroom communication*, and *content knowledge* indicated an understanding of *pedagogical content knowledge* at the macro level, while the nomination of *pedagogical content knowledge* for ‘analysis’ and ‘learning style’, for example, indicated an understanding at the micro level. The concept map considered both *behaviour management* and varieties of learning experiences as variables that impact on the general concept of ‘learning style’, which in turn, leads to acquisition of knowledge by learners. This process, according to Peace, is conditional on teachers considering the multiple intelligences of learners, and by employing a balanced curriculum that incorporates both academic and practical skills. She stated in her TAP that the underlying aim of social science “... is not to teach knowledge but to teach a process of knowledge...”. However, she admitted that her delivery is “...probably a little bit too academic...” at this stage, and she needs to broaden her perspectives to encompass the practical aspects of education as well. Her TAP commentaries explained the importance of context, particularly in the teaching of history because the understanding of knowledge must be seen in its historical context. She further pointed out in her TAP that the principles of social science are best understood in recognising patterns in society “...and the best way to do that is through analysis of content and context...”.

Peace also identified experience as another important variable in the learner-centred, *pedagogical content knowledge* of teaching. She cited an example of students manipulating telescopes as a means of gaining greater insights and appreciating the

achievements of the early Renaissance astronomers like Galileo. As Peace noted in her TAP, a constructivist approach to teaching will be enhanced if experience is built in to learning because "...kids get to reflect on it in lots of different ways".

*Content knowledge* emerged from the data. Her concept map (Figure 9) shows that it is linked to 'learning style', that the type of knowledge students gain will be determined by the teaching methodologies the teacher employs based on their knowledge of students. Peace commented in her TAP about the link between content and context, and cited the use of Galileo's telescope as a way of drawing the two concepts together.

*Behaviour management* featured strongly in the data. The linking words, 'involves good politics and good pedagogy' that link 'classroom management' to the key concept on her concept map indicated her perceptiveness of the politico-contextual environment of the school setting – the way schools are governed and how they are in turn, held accountable by bureaucrats and by the wider community, including politicians. The 'good pedagogy' aspect of the linking words, indicated Peace's high regard for instruction in classroom management. Her TAP commentaries state the importance of establishing the dynamics of the classroom first, before proceeding with instruction. She divided up *behaviour management* into two parts; the corrective side that involves managing behaviour as it happens, while the preventative aspect provides "...interesting things kids...do..." that prevents boredom "...and a lack of motivation that causes misbehaviour".

When *curriculum knowledge* is identified from the data, it is directly linked by Peace to *behaviour management*, the school ethos, and the types of learning activities in the classroom. Peace stated in her TAP that "...your curriculum should be really influenced by behaviour management...", and "...complement each other...".

The conceptions Peace had of social science teaching at the end of Bachelor of Education year indicated a focus that was strongly directed on *pedagogical content knowledge* and *behaviour management*. She stressed the importance of teaching learners to recognise patterns in social science and to understand the relationship between content and context. She also stated the importance of experience in the constructivist process, and emphasised the balance of teaching methodologies that encompass both academic and practical skills. She regarded preventive behaviour management practices as more integrated with student learning and successful implementation of curriculum, while corrective behaviour management deals with the general dynamics of the classroom. Overall, Peace's philosophy of teaching is based on an amalgamation of constructivist and behaviourist approaches. Her personal views of her role is to develop learners as unique individuals who are articulate, value the family unit, and are capable of understanding various economic, business, and political systems.

### ***Peace's constructs of social science teaching on realization of independent practice***

Peace's concept map diagram after six months of inservice teaching indicated a hierarchy of concepts beginning with the nomination of 'school/staff' (K of Ed Con), 'planning' (TS), and, 'students' (KLL), that ultimately led to 'content' (EEGPV), 'critical thinkers' (EEGPV), 'relationships' (EEGPV), and 'empathy' (EEGPV) (See Figure 10). The four cross-links that link 'students' (KLL) with 'content' (CK) and 'processes' (PCK), 'variety' (PCK) with 'behaviour and expectations' (BM), 'teachers' (K of Ed Con) with 'units' (CK, TS), and 'teachers' (K of Ed Con) with 'resources: handouts, videos, notes' (Curr K), indicated an integration of knowledge

domains across the three hierarchies – more so than her previous concept constructions.

*Teaching strategies* was a focus of Peace's concept map. The nomination of 'Planning' (TS) is central for effective social science teaching since it is linked directly to the key concept, but planning is also dependent upon, 'school/staff' (K of Ed Con). The importance of *knowledge of educational contexts* was apparent in the nomination of concepts at both the general and subordinate concept levels. The linking words 'is determined by' suggest the school, teachers, and students are crucial for effective planning, and hence effective social science teaching. Catering for 'students' (KLL) was also pivotal in successful lesson planning. In fact, *knowledge of learners and learning* had consistently been nominated at the general concept level in Peace's three concept maps, an indication of its importance in her teaching. *Behaviour management*, on the other hand, was not the focus of her third map as it had been previously; her third map shows that it is embedded. The knowledge bases of *professional learning* and *community integration* were not identified on her third concept map as previously in her first concept map.

Her concept map diagram also shows that 'planning' (TS) was strongly influenced by 'processes' (PCK), which in turn is determined by 'variety' (PCK) of planning at the daily and unit levels. Other *pedagogical content knowledge* bases that were indirectly linked to 'variety' (PCK), were 'classroom discussion' (PCK) and 'learning styles – scaffolding for visual, auditory, movement' (PCK, KLL). The nomination of 'teaching strategies' (TS), 'units' (CK), and 'behaviour and expectations' (BM) indicated Peace's understanding of *pedagogical content knowledge* at the macro level.

The focus of Peace's Think Aloud Protocol (TAP) was on five of Shulman's categories: *knowledge of educational contexts*; *general pedagogical knowledge*

focusing on *behaviour management; knowledge of learners and learning; pedagogical content knowledge; and educational ends, goals, purposes and values.*

Evidence of her *knowledge of educational contexts* was reflected in her understanding of the politics of the school at the department level. For example, she stated that a unit plan would have helped her a lot but

*...our HOD is the third acting HOD in a row...an he really wants the job...the permanent position...so at the beginning of the year ...he went through...and threw everything out that was currently in this department...so he could restructure that department the way he wanted it...which means that every single unit...apart from the senior units...So we are writing units while we are trying to teach them...*

In general terms she said that the school policies and attitudes “...have a big influence on your planning ...”, and the systems in place at her school are “...very structured...there seems to be no grey areas ...”. She cites the example of assessment that is

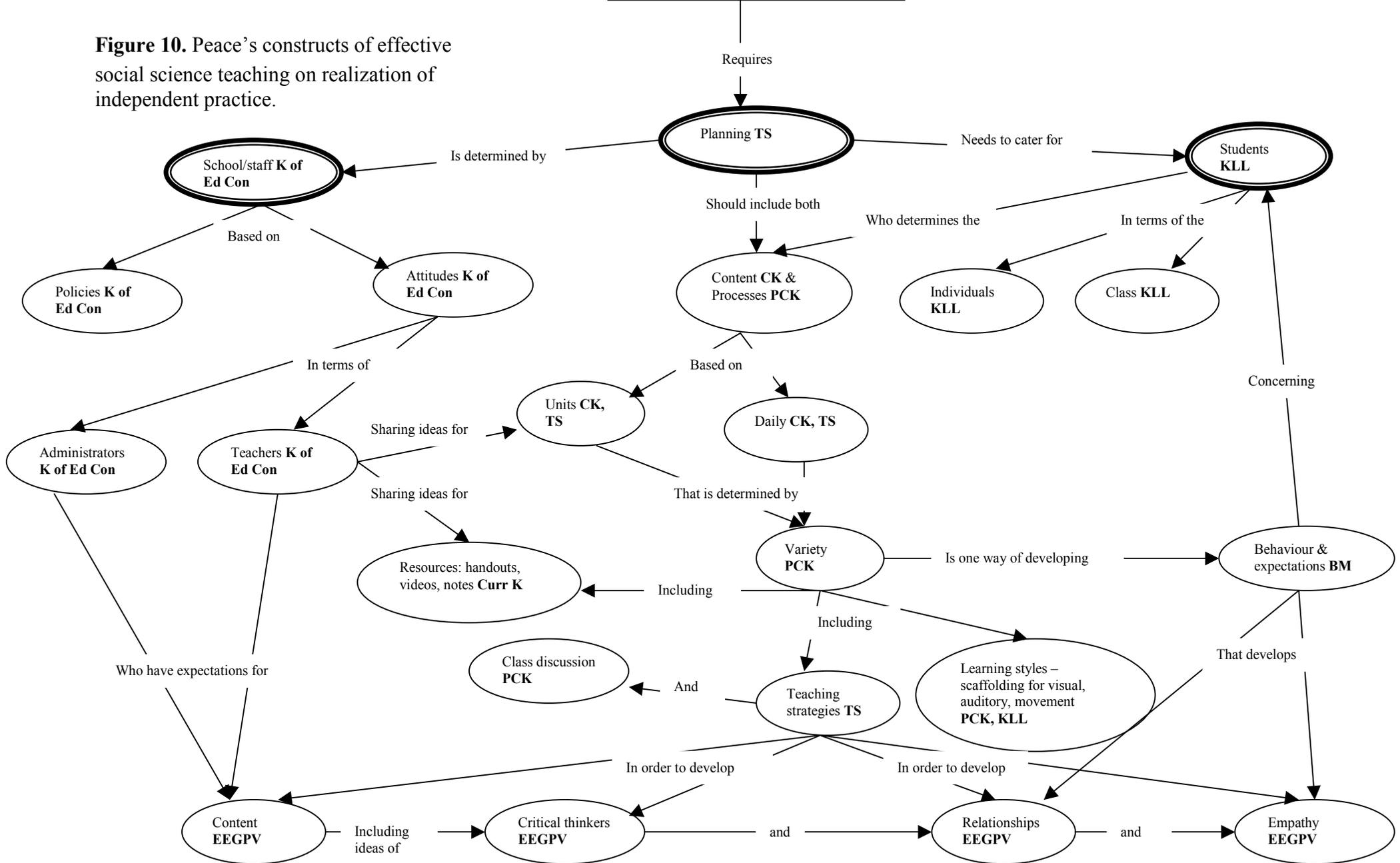
*...“Get in on the day...or you will fail” ...I don’t believe that is realistic...and that has caused me an incredible amount of personal heartache...and difficulty...because I try to do the best by my students...if you don’t get to a job interview on time because you have had a car accident...you ring up and say...“I’ve had a car accident” ...and there is some flexibility in everything in life...except this school...there is the really cut and dry attitude...and no room at all...for humanity...*

Peace also said that her position as a first year teacher often rendered her powerless in terms of making decisions for her students. She explained that

*I don’t feel... that I am free to...set up the rules in my classroom or to ...give students the best that I can ...in terms of adaptability...or flexibility in their lives... And so my planning... my experience of being able to ...what I consider...has been highly impacted by those things...for example...at the beginning of the semester...a teacher has to set all of the assignment dates ...but as a first year teacher...I just have not got the time...to be able to hand out the assignments... in time ...to be due by the due date...but I don’t have the independence to change that...So...on occasions my kids have suffered...because I’m learning the ropes...*

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**Figure 10.** Peace’s constructs of effective social science teaching on realization of independent practice.



Peace stated that the school's *behaviour management* policy is another instance where she has little opportunity to develop her own model in the classroom. She questioned the philosophy behind the Responsible Thinking Process (RTP) because

*...they are trying to set up with kids...that kids are responsible...for their own behaviour...in that they make choices about their own education...So the school concept is that if the child is misbehaving in the classroom... it's because they have made a conscious decision ...to **not** be involved in their education...I disagree...there is no way that a fourteen year old is capable of making a conscious decision ...about whether or not they want to be involved with their education ...They can say... "I'm bored with this..." they can give a teacher a hard time...but at no point does a student...ever...does a fourteen year old make a conscious decision...about their education ...they are here because they have to be...*

She does, however, acknowledge the benefits of the RTP process, especially in terms of providing consistent expectations to students throughout the school "...whether you are in maths...or science ...or drama...or history ... - so that is good thing ...".

Peace points out that the "The best thing about it... is that it provides support for weak teachers and supply teachers ...", especially for supply teachers who teach

*...what they are given... and its not within their control to make resources interesting...and to cater for different learning styles ...They can't do that...but they still have this backstop...to control their classroom...the kids all know that if you have a supply teacher...you don't go to the 'responsible thinking room'...you immediately go to the administration ...So ...it is a big stick...*

Despite the overwhelming presence of the school's *behaviour management* policy, she has tried to develop her own *behaviour management* that relies on the class dynamics by letting

*...kids manage their own behaviour ...In the first couple of weeks of the semester of the year...we talked about expectations...we talk about common sense ...we talk about what responsibility means...I try to remove the conflict of authority from the classroom...I try to get the kids to work in partnership with me...even though ...in reality I am the boss...*

Peace's *knowledge of learners and learning* reflects that of her *behaviour management* philosophy by looking at what students respond to, so

*...my class responds to group discussion...they respond to group work...They will take...but they will not be able to tell me what the notes said...they will be able to tell me the next day what we talked about...So knowing your students...both as a class...and as individuals ...is really important...I have different dynamics in every single one of my classes...but in all of them...there also has to be the dynamic ... that the group disciplines itself...you have to recognise individuals in the class...the one's that can't discipline themselves...are the one's that you break up...if you are going to have small group work.*

Her statements on various models of student learning such as Gardner's Multiple Intelligence (Gardner, 1983) and Bloom's Taxonomy (Bloom, 1953) as a means of gaining further understanding of students in her class indicated her use of *pedagogical content knowledge* in teaching. She said that students

*...learn in different ways...some learn by seeing things... some learn by doing it...you've got to see it...you've got to do it...you've got hear it...I try to incorporate that in my classroom...using colour on the board...using a mixture of handouts and written notes...using the board ...using the OHP...I get kids up and moving once every lesson...*

Peace stresses that what is going to be taught should be influenced by what students are "...lacking in ...". She gave an example where students were required to write a case study for their SOSE assignment, but three days before the submission date

*...a girl asked me... "How do we do case study...Miss?" ...No other students in the class knew as well...I had to throw my planning out the window...So...its really important to know what the students know...or don't know...*

Her understanding of *pedagogical content knowledge* was apparent in her comments on the processes as well as what students should know in effective social science teaching. As well as teaching her SOSE students how to construct a 'pie' chart, she had taught her Ancient History students how to construct "...a hypothesis...how to construct focus questions...and how to construct an argumentative essay ...". So

*...in a lot of ways...the processes... that you use ...are just as important as the content...because for me ...effective social science teaching...means opening up their minds...allowing critical thinking to occur...it is a skill they need to learn...*

Peace also spoke of having students do “brain gymnastics” as a way of introducing a creative task “...where they are physically moving their bodies...they are getting involved in learning ...”, and by asking questions “...so people can process those different ideas and decide whether they are right or not ...”. In this way, “...you are building knowledge...” on the basis of these class discussions in which there “...is that verbalizing of concepts...” that “...allows kids to explore their understanding of it ...”. Peace discussed the vital link of the daily plan to the unit of work and how both in terms of content and processes provide the “...thread of your teaching ...”.

Her experiences of “...getting scaffolding right at different levels ... for Grade 8s and Grade 11s ...” has, as Peace admits, “...been a big learning curve as a first year teacher ...” but also an indication of her growth in *pedagogical content knowledge*.

She explained that

*...I have nineteen years of classical education...I've travelled around the southern hemisphere ...done a little in the northern hemisphere...have a lot of life experience...and dealing with people who are older than me...and with more knowledge...and then I come back and work with people who are younger than me...and have less knowledge...how do I put this down step by step...has been a real challenge...it has been the hardest thing for me to learn... and yet something I recognise as something that is very important...*

In terms of *educational ends, goals, purposes and values*, Peace said that she wanted students who could engage in critical thinking, and displaying empathy by

*...getting kids...to recognise that ...difference...is not necessarily good or bad...to have better ways...of a result of empathy...of relating to each other...of recognising different skills...in people...and recognising those things in relationships is really important...I want kids to know a little bit ...of content...*

### ***Peace's knowledge in action on realization of independent practice***

Peace's video stimulated recall (VSR) was based on a lesson about culture in the Asia/Pacific region that she had conducted with her students in Year 9 Studies of Society and Environment (SOSE) earlier on the day. They were then expected to make links with multicultural Australia through an assignment, and to be able to write their own definition of culture. Her principal approach to teaching was learner-centred whereby the entire class of students worked as an unstructured group to elicit answers from each other and build on their knowledge base on the cultures of the Asia/Pacific region.

Peace stopped the videotape 27 times during the recall interview, and 45 categories of teachers' knowledge bases were identified from her responses (See Table 3).

**Table 3: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	4
-Teaching strategies	8
-Classroom communication	4
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	-
Knowledge of learners and learning	8
Educational ends, goals, purposes and values	6
Knowledge of educational contexts	2
Pedagogical content knowledge	12

An important aspect of Peace's knowledge of *educational ends, goals, purposes and values* of her teaching is to have a settling phase at the beginning of each lesson.

As she explained

*...I always take at least 5 minutes...I always have some social chat...at the very beginning of this film...I say... "Right ...let's just get the mystery out the way...this Paul...and he is here to film*

*me...and only me...so nobody else is allowed to talk” ... and they love that...because they know that is not true...So...I try to use humour to set them up for the lesson...*

Peace stated that purpose of the lesson was to collect data from other students for their assignments on the economies of Asia/Pacific region specifically in terms of culture and the environment

*...and what I wanted them to do today...was to make links to a region...to them that cultural influences ...will drift across an entire region...even in the Pacific Islands...which are tiny little islands...half the people there ...don't even know where Asia is...and yet they have similar cultural practices...and that Australia ...while we think of ourselves as Europeans...do have a lot of cultural practices...that makeup the Asia/Pacific region...What we did in the lesson today...was to make those cultural links...*

Another feature of her knowledge base of *educational ends, goals, purposes and values* was her practice of having students do homework that was not covered in class, and

*... this practice has been set up from the beginning of the year...they also know that the set up of the class...they finish the tasks of the week...they get Friday's lesson as a free lesson...but the first 10 minutes of the lesson is a review...I check the major concepts of the week.. and then the last 15 minutes they do what they want*

Whilst homework policies and Friday “free-time’ had become a routine procedure of her classroom teaching, her *pedagogical content knowledge* was spontaneous –to suit the occasion of the lesson. She stated that

*I have a basic plan in my head for every lesson...and not a single lesson goes to plan...my intuition...always take over as to how I can best focus the class...they just weren't focused...from the beginning ...So I changed it half way through but there is always sometime in the lesson where I panic...”How am I going to link these together? ...but the part I enjoy about teaching ...is the on the spot decision making...that you know you have the resources in front of you ...but how do you use them best at the time...so planning has to be flexible...*

Other aspects of Peace's *teaching strategies*, however, were less flexible, notably checking for understanding, that is, making sure that they know "...what you have asked them to do ...", because she had found that imprecise instructions to students will result in students asking... "What are we doing ...Miss?" She emphasised the importance of explaining what is wrong and rewarding what is right, and "...allow them to recognise that they have made an important contribution ...". Peace spoke of the desk organization of the classroom that formed into two 'U's '...because I wanted to break the lines...". She was keen to

*...find that something that opened up the classroom... and invited some more dynamics...allowed me move relatively freely... meant that I could have group work more easily ...because I could put them into different corners...or into different areas...but breaks the monotony and expectation that comes with lines...with rows of seats...So kids down the back are never really down the back...and the ones at the sides are never really lost...*

While group work in this lesson involved an unstructured, whole class approach, Peace had other ways in her *teaching strategies* repertoire to organise group work. For example, using a numbering system where students form groups based on different numbers, and coloured cards where groups are formed on the basis of sharing the same colours. Peace stressed the importance of monitoring the groups, both to "...check on what people are writing..." and making sure that they are "...not teaching each other the wrong things ...", and

*...and I think it's a good behaviour management tool...because the kids watch me coming towards them ...all of a sudden...they start paying attention...*

The other strategies Peace uses in her *behaviour management* policy focus primarily on the use of names, and waiting. However, there is a point where waiting for "...relative silence...can get past a certain point...like if have to stand there for a couple of minutes...", in which case

*...I turn around and write on the board the amount of time I have been waiting...and they know...that next lunchtime...they will stay in...unless they shut up...immediately...They then can work the time off if they need to...but I will generally try to pull them into order first ...and then it will be names...and then it will be the whole class... then that gives the other kids the chance to quieten down other people...and if they are not getting the message...then everybody cops it...And I find that works really well...because that gives them a chance to come back into focus...before going through the discipline procedures...*

While Peace acknowledged the need for a *behaviour management* policy to deal with disruptive students, she also recognised the need to include students who were excellent despite having social problems. She described Adam as

*... an incredibly intelligent boy...but also comes from a very difficult home life...consequently he has never really learnt normal social skills...doesn't know how to interact with people...doesn't know how to take his turn...Gets assignments checked ...like...30 times...everything has to be perfect...He reads amazingly...*

Her *knowledge of learners and learning* included another excellent student who had severe physical disabilities that made speech virtually impossible

*...and I think she gets frustrated...she would like to say more... she sees the rest of us talking...and I really only give her a chance to contribute...once or twice in the lesson...and that's because it takes ...so long...she has to type onto a board...and her carer will speak out what she says ...*

In general, Peace's *knowledge of learners and learning* portrayed a class that possessed a broad range of abilities, but the emphasis of her teaching was still on experiential learning because "...I find these kids learn better if they have a chance to do something ...and then talk about it ...".

In catering for different learning styles, Peace resorted to a variety of techniques such as using coloured chalk such as yellow and green because "...they stand out the most ...", especially to highlight information so "...kids can get that visual connection ...". She used other types of visuals such as handouts, OHTs, and board work to give variety "...to those things I do ...". She also spoke of "...getting

students physically up and moving ...of getting them to connect with information as well ...”. Her *pedagogical content knowledge* base was also evident in her statements about catering for different intelligences; using rhythm through clapping and tapping; encouraging students to use colour in their notebooks; using drama and role play; and having students draw pictures of ecological sustainability instead of writing down the definition.

Peace discussed the importance of ‘links’ in her *pedagogical content knowledge* base as a means to provide expectations from one lesson to the next. She also spoke of making links

*...all the way through your curriculum...one of the things that I will go back to...to balance the unit...we are looking at how culture...the environment...and the economy interlink...So what you see today was the culture...we are going back to the environment at the end of the week...and these two things would have linked through...and so ...making the connection for the kids...its important for them to understand that we are building knowledge...all the time...and every piece is part of a jig-saw puzzle...and we never finish that jig-saw puzzle...because we are always exploring ...and building the knowledge...So it important to link backwards...and hopefully link forward when we get the opportunity...*

Modelling was another tool in Peace’s representational repertoire of teaching. As she explained

*...sometimes I will do it first...so they get the idea of where they are going...Sometimes...I flip it around the other way...and ask them to do something...and what they have trouble with...becomes the lesson...and you talk about why that might be difficult...or why that might be important...So...it depends on the point I’m trying to make...but today...because I wanted them to share information...it was easiest to model these ideas first...*

She also used group work as a means of knowledge building, such as ‘think pair share’ in order “...to build their knowledge by group talk...” so that students make connections

*...and it's important that each of your tasks builds towards a point...that the lesson has a point...and you build towards that*

*point...even if you lose the focus in your class...it makes it easier to bring them back to track.*

Her *pedagogical content knowledge* base also emphasised students getting involved in class discussions and being "...allowed to give examples of their own experience ...". Additionally, class discussions gave Peace the opportunity to use students' suggestions to build up their knowledge, and she stated that there was no need to go into

*...excessive amount of detail ... to make the point about the difference between the Australian concepts and the Asian concepts...all I want to do is plant the seeds of critical thought...to start them thinking about what it might be...*

Peace gave an example of successful scaffolding when students had to create a definition of culture from the information they had gleaned from the group activities.

As Peace explained

*...of all the people I asked...only one of them said... "I've just written what's on the board...Miss"...So that was a great success for me...because they had used the information they had gained... and the scaffold to create to create their own understanding... and that was what I wanted...but I recognise for those odd ones something formal on the board...for those who don't need it...they move along well...others will need the scaffold...that has been a huge learning curve as well...*

### **Summary: Peace's realization as a social science teacher**

The two sets of data elicited from Peace after three months of inservice teaching indicated that her focus on effective social science teaching emphasised four of Shulman's categories: *pedagogical content knowledge*; *educational ends, goals, purposes and values*; *knowledge of learners and learning*; and, *general pedagogical knowledge* focusing on *behaviour management*. Her concept map (Figure 10) showed that *pedagogical content knowledge* concept of 'variety' was key to her planning in effective social science teaching. Commentaries from her Think Aloud Protocol

(TAP) stated the importance of classroom discussions as a way of verbalizing concepts. Her video stimulated recall (VSR) comments supported the strategy of class discussions since it allowed students to draw on their personal experiences.

Further evidence of *pedagogical content knowledge* was identified in the two data sets. Her concept map diagram (Figure 10) nominated the concept of ‘processes’ as a *pedagogical content knowledge* base because it provides the kinds of skills that are necessary to engage in knowledge building, and in the planning of social science lessons. Peace stated in her TAP that the process in social science teaching is a way of opening up students’ minds and to allow “...critical thinking to occur...it is a skill they all need to learn...”. She commented on her VSR that it crucial for students to understand the links between lessons, and the overall link in a unit of work that resembles a jig-saw puzzle in which students are constantly building on in their acquisition of knowledge. Peace also stressed the importance of modelling in the scaffolding process and collaborative learning.

*Educational ends, goals, purposes and values* featured in the two data sets. Her concept map (Figure 10) identified ‘content’, ‘critical thinkers’, ‘relationships’, and ‘empathy’ as core outcomes in her educational ends, goals, purposes and values knowledge base. Commentaries from her TAP indicated that instilling empathic understandings in students helps to create tolerance and the recognition of individual differences in people creates better relationships. She commented in her VSR about the importance of a settling phase at the commencement of a lesson, and of establishing routines in terms of homework and free time during the week.

*Knowledge of learners and learning* emerged from the two data sets. Her concept map identified *knowledge of learners and learning* as a key consideration in the planning process both in terms of students as individuals and as a class. Her TAP

commentaries stressed the importance of understanding the dynamics of a class and of individual students as a means of conducting effective group work activities. She stated in her VSR that even though her class had a broad range of abilities the focus of her teaching was still on experiential learning.

*Behaviour management* was nominated in the two data sets. Her concept map identified the nature of students such as their skills in ‘relationships’ and ‘empathy’ as pivotal in determining the type behaviour management strategies in class. But the level of effective behaviour management in class was also dependent on the ‘variety’ of ‘processes’ and ‘content’ in the lesson planning. Commentaries from her TAP indicated her desire to develop her own behaviour management policies, despite the overwhelming presence of the school based ‘responsible thinking process’. Her VSR indicated that discipline procedures were to be used as a last resort in order to bring students “...back into focus ...”.

Peace’s conceptions of social science teaching at this stage indicate a strong focus on a learner-centred approach to teaching where students primarily work in collaboration to build their knowledge bases. An important component of this process is to have students see the link in lessons and units of work so they make connections to what has been learnt and to what will be learnt in terms of both content knowledge and processes. She spoke of the importance of knowing her students both in the cognitive and affective domain in order to properly represent knowledge for understanding. She said that an effective behaviour management policy in her class depended largely on the individual negotiation of expectations between teacher and students, as a micro cosmos of the broader school behaviour management policy. Overall, Peace’s philosophy of teaching was based on the principle of democracy

where students were encouraged to learn in a supportive environment that stressed peer respect, open mindedness, and critical thinking.

### ***Discussion: Charting Peace's development***

Peace's conceptions of effective social science teaching show that there are both change and consistency throughout the three data collection phases. Data elicited from her initial existence as a social science teacher indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *general pedagogical knowledge* focusing on *behaviour management*; *knowledge of educational contexts*; and *knowledge of learners and learning*. Data elicited from Peace's developing thoughts on social science teaching indicated a focus on five of Shulman's categories: *pedagogical content knowledge*, *content knowledge*, *curriculum knowledge*, *general pedagogical knowledge* focusing on *behaviour management*, and *knowledge of educational contexts*, while data elicited from her realization as a social science teacher indicated a further change of focus to four of Shulman's categories: *pedagogical content knowledge*; *general pedagogical knowledge* focusing on *behaviour management*; *knowledge of learners and learning*; and, *knowledge of educational ends, goals, purposes and values*.

*Educational ends, goals, purposes and values* represented a change in her focus of knowledge bases of teaching. Peace identified 'content', 'critical thinkers', 'relationships', and 'empathy' as core outcomes on her concept map. She spoke of having students acquire knowledge, to be critical thinkers in her TAP; and commentaries from her VSR indicated the importance of developing a sense of empathy, and the importance of establishing routines in students' school lives. *Knowledge of learners and learning* represented a change in her conceptions of teaching, although it was the focus of her initial existence as a social science teacher.

Her concept map showed that it was nominated at both the general and subordinate concept levels. Statements from her TAP and VSR indicated that it was important to consider the individual student in terms of their experiential learning in the planning process, and to understand the dynamics of the class when doing group work activities. The nomination of *educational ends, goals, purposes and values*, and *knowledge of learners and learning* at the realization of practice was perhaps an indication that developing a sense of direction in her teaching and establishing a knowledge base of learners were of greater importance than during her preservice period of teaching.

*Behaviour management* was consistent in her conceptual structure of teaching in the three data collection phases. Data elicited from her initial experience as a social science teacher indicated a strong focus on the teacher establishing the guidelines in behaviour management, of a common sense approach in dealing with students, of integrating *behaviour management* within the learning process, and the use of team leaders as a means of reinforcing group behaviour. Data elicited from her developing thoughts on social science teaching indicated the importance of having both corrective and preventative strategies in *behaviour management*, and of establishing the right dynamics in class before instruction can begin. At the stage of independent teaching Peace shows that effective *behaviour management* was depended upon planning and preparation based on variety, content, and processes, and discipline measures were the last resort in *behaviour management*. She also spoke of the challenges of establishing her *behaviour management* policy when she was also obliged to implement the school's "responsible thinking process" in class.

*Pedagogical content knowledge* was a consistent component of her conceptual structure of social science teaching throughout the three data collection phases. Her

first concept map (Figure 8) showed that *pedagogical content knowledge* was present at the macro level of her map, and was closely interrelated with conceptual knowledge within the three hierarchies beginning with the general concepts of *behaviour management, content knowledge, curriculum knowledge* and *knowledge of learners and learning*. *Pedagogical content knowledge* was also linked to *knowledge of educational contexts, teaching strategies, and classroom communication* within the hierarchies. These conceptual understandings are supported in Peace's commentaries from her TAP and VSR. In Peace's second concept map (Figure 9) *pedagogical content knowledge* continued to be present at the macro level, and it was also nominated in both hierarchies, and a component of *content knowledge, classroom communication, behaviour management, curriculum knowledge, and knowledge learners and learning*. Commentaries from her TAP emphasise Peace's particular recognition of the role of *pedagogical content knowledge* in the process and experience of *content knowledge*. Peace's third concept map (Figure 10) showed that *pedagogical content knowledge* was identified at the macro level, and a component of *teaching strategies, content knowledge, behaviour management, and knowledge of learners and learning*. Commentaries from her TAP support an interpretation of effective *pedagogical content knowledge* as a consequence of matching processes and skills with her *knowledge of learners and learners*. Peace made this interpretation of pedagogical content knowledge clear during her VSR when she explained the importance of having students see the big picture in their learning, knowing about her learners and learning, engaging in social constructivist activities such as hypothesis testing, teaching students to write argumentative essays, and making spontaneous decision making during class.

At the initial stages of her experience as a social science teacher, Peace identified ‘flexibility of delivery’, ‘flexibility of planning’, ‘creativity and imagination in developing learning activities’, and ‘recognition of bias’ on her concept map (Figure 8) as *pedagogical content knowledge* links to other aspects of social science teaching. Peace used the analogy of rules of audience behaviour in the theatre in her TAP as a means giving a broad understanding of rules in behaviour management in the classroom; she spoke of students in terms of thinkers; and of making planning interesting. Peace stated in her VSR of using modelling as a way of building students’ knowledge to help them understand the links in lessons past, current and in the future.

Peace’s developing thoughts on social science teaching showed that she considered ‘learning style’, ‘variety/multiple’, ‘context – historical, geographical influence’, and ‘analysis’ on her concept map (Figure 9), as links to other aspects of social science teaching. Peace spoke of the importance of understanding concepts in terms of social context, the relationship between knowledge and experience, and of knowing the practical as well as the academic in social science teaching.

Peace’s *pedagogical content knowledge* on realization of independent teaching practice indicated a greater input into other aspects of social science teaching than at previous data collection points. Whilst the concepts of ‘variety’, ‘scaffolding for visual, auditory, movement’, show a consistency with concepts from her previous maps, her identification of ‘classroom discussion’ shows a greater depth of understanding of effective social science teaching (Figure 10). Commentaries from her TAP indicated a greater awareness of the knowledge levels between students and herself; an understanding that students learn in different ways; the use of brain gymnastics as a means of knowledge building; developing the scaffolding techniques to suit students at different grade levels; and, having students understand the links

between daily lessons and units of work. Peace stated in her VSR that she used intuition to make on the spot decisions about how to link ideas and how best to use resources during a lesson. She also spoke of using clapping, drama, role play, and drawing instead of writing, to cater for different intelligences; of modelling ideas or having students identify problems which then become the basis of a lesson; using students' experiences as the basis for class discussions; using group work to build students' knowledge; having students understand the links between lessons in order to build knowledge as a process in a jigsaw puzzle; and, using scaffolding techniques to help students write their own definitions of culture. Overall, Peace knowledge base of teaching shows growth and sophistication based on her understanding of the complex dynamics of classrooms; her classroom presence; and her desire to empower students through experiential learning, civic and social literacy.

## ANTONIO

Antonio completed his secondary schooling at a suburban state high school where he studied Ancient History in Years 11 and 12. He liked the subject because it allowed him to explore the cultures, the ideas, and the themes of ancient societies. He especially enjoyed the comparative study unit where students had the flexibility to work in groups and present findings in "...an imaginative and original way". The teacher was flexible in her teaching strategies and encouraged class discussion. "She was friendly and treated us like mature students".

### ***Antonio's initial thoughts on social science teaching***

Antonio's response to the 'focus questions' reflected the teaching methodologies of his Ancient History teacher – "a good balance of teacher-directed and learner-centred approaches", although he now has a better understanding of the complexities of teaching. He also believed that students "... must **want** to be taught ...", and that "...teaching as well as learning should be fun". He stated that the knowledge, skills, values and practices learnt by students are important so that they "...become lifelong learners in a multicultural community as well as in a global society".

He said that students are likely to find social science enjoyable if there is the "...right relationship with the class..." and if the topic is relevant to their lives.

Antonio wanted to be a teacher because he believed that that he could help students develop both their cognitive and affective skills. As he explained

*I believe that I can help young people, regardless of **who they are** to become effective participants in today's society. I want to help guide students into their futures as it was done for me.*

Antonio enrolled in a Bachelor of Education program at a Queensland university, majoring in Studies of Society and Environment (SOSE) and Drama. His final

professional practice teaching was at a suburban, coeducational high school in Queensland where he taught a Year 9 SOSE class that was videotaped for stimulated recall interview. He received a Suitability Rating of ‘1’ from Education Queensland.

He was appointed to a coeducational, country state high school at the beginning of the following year where he taught Years 8, 9, and 10 SOSE, and Years 8, 9, and 10 English. Antonio taught a year 10 SOSE class that was videotaped for video stimulated recall.

### ***Antonio’s initial constructs of social science teaching***

Antonio’s concept map diagram shows a hierarchy of concepts, beginning with the four most general concepts of ‘knowledge of syllabus’ (Curr K), ‘teaching strategies’ (TS), ‘applicability of teaching aids’ (CK), and ‘able to define topics clearly’ (CK), leading to a set of common outcome concepts of ‘lifelong learner’ (EEGPV), ‘appreciation of diversity and respect’ (EEGPV), and becoming ‘informed and active participants in society’ (EEGPV). Although concepts are linked mostly in “item stream” mode, two cross-links show that some thought was also directed to integrating knowledge bases into other knowledge bases of other hierarchies (Figure 11). The location of the concepts and their logical relationships with each other, show that Antonio had a good grasp of the principles of social science teaching. For example, the concepts of ‘individual needs and differences’ (KLL) and ‘teaching strategies’ (TS) show the importance of tailoring one’s teaching to the individual needs of students.

His map indicated a broad distribution of knowledge bases, with the most prominent of these being *content knowledge*, and *educational ends, goals, purposes and values*. The identification of the general concepts, ‘applicability of teaching aids’ (CK) and ‘able to define topics clearly’ (CK), and the associated subordinate concepts

that relate to knowing domain specific knowledge, and instilling in students a passion for learning, indicated the importance of *content knowledge* in Antonio's concept map. His *educational ends, goals, purposes and values* encompass both cognitive and affective domains of learning, such as 'critical thinkers' (EEGPV) and 'becoming informed and active participants in society' (EEGPV).

*Pedagogical content knowledge* was also a focus of Antonio's concept map. The identification of 'teaching strategies' (TS), 'teacher/student relationship' (CC), 'class guidelines and expectations for both students and teachers' (BM), and 'domain specific knowledge' (CK), indicated his understanding of *pedagogical content knowledge* at the macro level. *Pedagogical content knowledge* was nominated to 'inquiry based approach', 'higher order thinking skills', 'self-directed learning', and 'student-centred teaching and directed balance' at the micro level because these concepts reflect the constructivist approach to teaching in the social science syllabi. The nomination of 'when, how, what to assess and monitor student progress' (PCK) represents *pedagogical content knowledge* that is *enhanced* because Antonio's thinking is moving to another level where his *pedagogical content knowledge* not only entails learner-centred approaches to teaching but a broad picture of student learning.

The focus of Antonio's Think Aloud Protocol (TAP) was on *pedagogical content knowledge, behaviour management, and content knowledge*. The culmination of or Antonio's desired outcomes for learners, reflect the valued attributes of a lifelong learner that are espoused in the Studies of Society and Environment Syllabus (QSA/QCSS, 2000). These include an



*...appreciation of diversity ...be it cultural...economic... umm... geographic ...umm...disability...ability...whatever it may be... umm ...be able to appreciate...and at least respect...even though they might not agree with it... umm...at least respect it ...and...you know...it's part of life ...so be it...Umm...that should be ... students to achieve...the outcomes of a lifelong learner...that encompasses a lot...well...in a sense...high school ...that their education is over...but there are...umm...skills that are...that have been learnt...um...you know...that will remain...with them ...umm ...you know...interpretation...analysis...umm...making informed judgements...umm...to become an active participant in society...*

The cognitive skills Antonio alludes to, that is, ‘interpretation’, ‘analysis’, and ‘making informed judgements’, come about as a result of what he calls a balance between student-centred and teacher-directed learning, that is, the

*...sort of...teaching strategies...might be...can't just give them all the information...( ) ( )...be all transmitted...but then...you just can't let them do...everything...umm...without proper guidance...*

This balanced approach to classroom teaching, that is, *pedagogical content knowledge*, according to Antonio, should then lead to higher order thinking skills,

*...like analysis...interpretation...process skills...umm...like research ... self-directed learning...umm...so that what I want from my students to leave...having some sort of...sense of social justice...*

Another example of Antonio’s *pedagogical content knowledge* practices related to the connection between empathy and relevance:

*...I think it was a disaster in a coal mine...like the hill collapsed... and the landslide wiped out a primary school...umm...and to make them empathise with that...we made them actually...umm ... a simulation of ...getting up ...and giving lives ... in role...making them sort... of walk over...react in specific ways...you getting up at 6am ...and working...in what your friends ...died from ...poisonous fumes in the mines...and stuff like that...And that activity ... in particular ...worked very well ... umm...because they kind of realised that... we really are lucky today...aren't we?...*

In terms of *behaviour management*, Antonio stated that strategies should be dependent on the age of the student, the type of class, but most importantly the

relationships between teacher and student should be consistent and unambiguous. As he explained

*...class guidelines...not rules...and expectations ...For both students and teacher ...which goes both ways...umm...I ...expect students to ...to listen when someone is speaking...respect from all of you ... which is the same as me... they will expect me ... and I will tell them that...to respect peoples... you know...these are the sorts of things that are established in the first week...of the class...Okay...teacher/student relationship ... which will depend on the age group...okay...it's got to be different with every class...that obvious...you've got to have different relationships with the grade 12s than with the grade 8s...umm...and that's got to obviously change if you've got a class...that you've had from grade 8 to grade ...obviously you would build a five year long relationship with that...particular class...I suppose you could say...what I want from my students...umm...you know the line...yeah...umm...the line has to be clear..."I'm the teacher...you are the students"... but at the same time...I don't want to be the ..."Hitler teacher"... okay...it's developmental...it starts off...umm...of the first week of class...just like breaking the ice a bit...but also setting up ...umm...like my classroom's limitations..."You can do this"... set them the grounds...it would be kind of negotiated ...if a student breaks the rule ...then...I'm the one that made the rule...so therefore...you know ...you take that victimization away from..."the teacher is picking on me" ... sort of thing...*

However, he also explained the difficulties of implementing his own *behaviour management* policies, and no doubt a dilemma facing all teacher education students (Bennet & Carre, 1993) during their professional practice teaching:

*...it's already been established ... because I'm coming into someone else's you know... sort of ... world ...umm... they have been working with the teacher ...for a fair period of time...years...or since grade 8... there is already a set of...you know ... the kids are already used ...to the way she teaches...So...therefore ...I've got to come in ...and maybe control one or two little sneaky things ...but as a whole...I think I have to ...you know use... that sort of strategies...umm...which why I think Pracs are very false... in that respect...that you can't get a real idea... of what strategies work... until you actually try them out ...So... my opinion of Prac... you come in halfway... we are actually going backwards... We've learnt what to do...but what about the first two months into our career? How do we initiate negotiation? How do we initiate discussion of class guidelines? How do we establish what I with students? ... What are we going to learn? ...all that sort of stuff...*

He saw the value of professional practice teaching in terms of the experience it offers in "... planning programs... and teaching to ... individual needs... and some behavioural issues... ", and "...the amount of content knowledge I'm getting on issues that I've never actually...really... focused on at university ...or in high school...".

In terms of *content knowledge*, Antonio stated that effective Social Science teachers must have,

*... passion...and initiative ...is knowing ...and admitting that ...if I don't know something ...well...let's go and learn it...not so much admit to students that you don't know...umm ...admit to yourself that you have a lack of knowledge ...taking that initiative to go...to go...and not just use a book...you know ... like a SOSE book ...you know..."Here's a handout...guys...just fill it out" ...you need to go ...and get a little... you know... all that nitty gritty ...domain specific knowledge...background knowledge...that anecdotal... little stories ...that give interest...to the students...*

The passion a teacher has for the topic should flow onto students as well. Antonio explained that

*...you...lead by example ...find that intrinsic...that relevance ...in respect to the student... umm...find that... umm... umm...make them aware ...and appreciate the relevance of the topic...authentic tasks...*

### **Antonio's initial knowledge in action and reflection**

Antonio's video stimulated recall was based on a lesson he taught to his Year 8 Studies of Society and Environment students about evacuation procedures in the local area. He used both direct instruction and scaffolding, and a variety of resources including whiteboard, maps, and 'butcher's' paper, throughout the 40 minute lesson.

Antonio stopped the videotape 27 times during the recall interview, and 34 categories of teacher's knowledge bases were identified from his responses (See Table 4).

**Table 4: Breakdown of knowledge bases**

Knowledge base	No
General pedagogical knowledge	
-Behaviour management	9
-Teaching strategies	7
-Classroom communication	3
-Personal beliefs	-
Content knowledge	3
Curriculum knowledge	-
Knowledge of learners and learning	5
Knowledge of educational contexts	1
Educational ends, goals, purposes and values	3
Pedagogical content knowledge	3

Antonio identified the contextual challenges of professional practice teaching (Bennet & Carre, 1993). He explained that

*... the whole way this class is set up and the way this Evacuation has been set up...is not what I want... how I want to teach at all... because I obviously come into someone else's territory ... you know ...umm... I have had to adapt to their particular teaching style, with the way they treat the kids ... behaviour modification and all that stuff... and ...umm... I agree with them but it's ...I don't know. Because it's not my class, I don't feel that...you know ...sort of I have the power to really say what I want to say...do what I want to do ...and how to teach and what I teach... I don't know the students well enough ...to make, you know I made some wrong assumptions ...about their learning abilities, and what they know and what is their understanding...*

The lack of Antonio's *knowledge of learners and learning* in terms of their *content knowledge* on the fundamentals of mapping, was evident in his following comments:

*I actually wanted them to do that exercise ...umm...which they didn't do well at all...I asked them to describe the area... okay ...what streets are joining in...is there a river nearby... but then it again takes pretty much a whole lesson to identify all little spots ...I've had to go backwards and backwards and backwards, because I assumed ( ) ( ) went in thinking that they had some prior knowledge, but they don't actually have it! They just didn't learn it ...umm...so that was a massive obstacle, which half the students in the class could not ...you know cope with it.*

Nevertheless, Antonio used his *pedagogical content knowledge* to develop their skills “...progressively...” and to be “...more complex...” by giving them the coordinates to find a particular location, and vice-versa. Then

*...I started to do map reading skills, like you've got the substation... let's follow the substation ...the electrical lines ... to find where the other two are. Umm...bridges...we follow the river and there's your bridge . Umm...which students picked up on. Some students were feeding off each other. So, in that respect...they are having an idea of the workings of the group work ... cooperative...*

In terms of the logistics of group work (Cole and Chan, 1994), however, Antonio commented that

*...I would actually...umm... spend a lot more time before ( ) a lesson like this ... with a group like this ...you know a really strong group... cooperative work. To actually set the roles for each of the students ...The ... umm...problem in group work is that while you are attending one group, you neglect seven other groups ( ) ( ) because in that front there ( ) I got one group that is already finished, and “Hallo, hallo...”, Natasha is saying to me...” ...We've already finished the task. And if I don't address them...then they are going to get louder and louder...and then I've got Michael here kicking ...the girl. So, straight away, the minute you turn your back, you neglect six other groups... twenty other students who are saying, “Why isn't he looking at us?” And again...that's another skill in group work ...which again, taking into consideration ...is a year level thing. Grade 8s ...they don't have a lesson...in groups ...and they think, teacher isn't looking...let's muck up. But older groups will take their own initiative to work. One of the strategies to combat that...turning your back on them... strategies when you're writing stuff on the board. The best way is to have an OHT projected onto the blackboard and you or the teacher writes on the OHT ...on the sheet...on the actual machine and project what you want straight onto the board... so that you are facing them ...at the same time you are writing stuff on the board... in a sense, so that really controls ...you know ...sort of their behaviour when you turn your back...*

Antonio's *behaviour management* strategies involved a combination of 'interventionism' (Groundwater-Smith et al., 2001), 'behaviour modification' (Skinner, 1971), and 'choice theory' (Glasser, 1998c) to deal with other forms of disruptive behaviour. He explained that

*One thing that does work is the “one, two, three special”, which works great. If they are naughty or not that loud and they are not really listening...like then. I’ve learned...”Okay...one, listen to me...two, ( ) on desks, and three...everyone...looking at me. So that worked... What I did then was ...( ) ( )used to ... if people are talking, just pause...just stay as quiet as you can and ...yeah ...just let them sort of realize ...look at them ...just a sign toward them...and get their peers to look at you and be quiet...in another lesson... the other day, I had them before lunch...I held them all back ..I let two groups out who worked well...and held the others back a little longer ...and then let the others out. That seemed to work well. So, by the end I had two groups who did not work well, who I got to actually rearrange the classroom back to its normal shape... So, it’s a good strategy, because the good people...can be let out...normal. And for those...it’s your actions that left you behind... and you do the housecleaning.*

In summary, Antonio stated that

*If it were my class , I would spend two, three odd weeks on a task like this ...umm...in which we would start from scratch...this and that...this is how you identify things on the map...symbols, coordinates...umm...stuff that is very, very foundation of map reading...work you way up so in the very few last lessons, we employ all that stuff that was done ...to create an evacuation plan ...for example...I would change it by extending that particular task... um...as well. This class would need to be taught how to work in groups ... some rules ...some morals. Umm...set expectations up...okay...no magazines, no extra books, no novels, no notes, no little diagrams ... nothing. You’re on task, and everybody would know that.*

### **Summary: Antonio’s initial experience as a social science teacher**

The two data types elicited from Antonio at the initial stage of his conceptions of social science teaching, indicated a focus on three of Shulman’s categories:

*pedagogical content knowledge, content knowledge, and general pedagogical*

*knowledge focusing on behaviour management.* His concept map identified both

cognitive and affective outcomes as core outcomes from these focus knowledge bases.

Commentaries from his Think Aloud Protocol (TAP) stated the importance of learner appreciation to diversity “... and at least respect ...even though they might not agree

with it... at least respect it". His video stimulated recall (VSR) stressed the important goal of getting students to regard the resource centre as a place of research.

*Pedagogical content knowledge* featured in the two data sets. It was nominated at both the macro and micro levels of his concept map, that is, the nominated knowledge bases of *content knowledge*, *teaching strategies*, *classroom communication*, *behaviour management* at the macro level, and 'student-centred teaching & directed balance', 'inquiry-based approach', and 'higher order thinking skills' at the micro level. The linking words, 'involves' that link 'student-centred teaching & directed balance' and 'inquiry-based approach' indicates a strong dependency of the key concept on the two *pedagogical content knowledge* bases, which in turn, provides the 'necessary skills' for students to engage in higher order thinking and importantly, self-directed learning. 'When, how, what to assess and monitor student progress' was nominated for *pedagogical content knowledge* at an *enhanced* stage because it represents a bigger picture of student learning. He stated in his TAP that there needed to be a balance between teacher instruction and what students could do because '... you can't let them do ...everything ... without proper guidance...'. This balanced approach, according to Antonio, should then lead to higher order thinking and self-direct learning. Commentaries from his VSR indicated that he used guidance as a way of showing students how to use coordinates in mapping. He also noted that students used a social constructivist approach to construct their own meanings of knowledge.

*Content knowledge* emerged in the two data sets. His concept map showed that the linking words of 'must be' that linked the general concept of 'able to define topics clearly' to the key concept, indicated the strong dependent relationship of the key concept on *content knowledge*. However, knowledge of the topic, according to Antonio, is not enough because his subordinate concept within the same hierarchy

nominated “passion” for the topic as a crucial element, as well as the teacher having the initiative to maintain currency in content knowledge. As the other branched concept suggests, it is also incumbent on the teacher to foster learner awareness and understanding of the topics being taught. He stated in his TAP that effective social science teachers should have “... all that nitty-gritty ...background knowledge ...that anecdotal little stories ... that give interest ...to the students”. This lack of background knowledge was highlighted in his VSR commentaries where students in his class lacked the fundamentals of mapping, and “...that was a massive obstacle, which half the students in class could not ...you know...cope with it”.

*Behaviour management* featured in the two data sets. His concept map identified effective ‘teacher/student relationships’ as pivotal in minimising behavioural problems, especially in terms of the teacher understanding the individual needs of learners. The age of students, according to Antonio, will determine the nature of the class guidelines and expectations being negotiated. Commentaries from his TAP reiterated his philosophy of clear guidelines by negotiating the rules between teacher and students, so if students transgress the commonly agreed rules, for example, they must accept the consequences. In other words, because students were part of the decision-making process “... you take the victimization away from...’the teacher is picking on me” ...sort of thing’. His VSR commentaries indicated that he had developed simple but effective behaviour management techniques based on choice theory and behaviour modification.

Antonio’s initial conceptions of social science teaching (May 2002) indicated a focus on constructivist approaches to teaching, based on student-centred learning in order to promote higher order thinking and self-directed learning in students. He stated that teacher’s *content knowledge* should move beyond the syllabi and textbooks

to include topics that are of interest and relevant in students' lives. The key to effective behaviour management is based on teacher/student relationships that use negotiation as a means of setting the classroom guidelines. Overall, Antonio displays a strong sense of democracy and social justice where students are valued as having the attributes of lifelong learners.

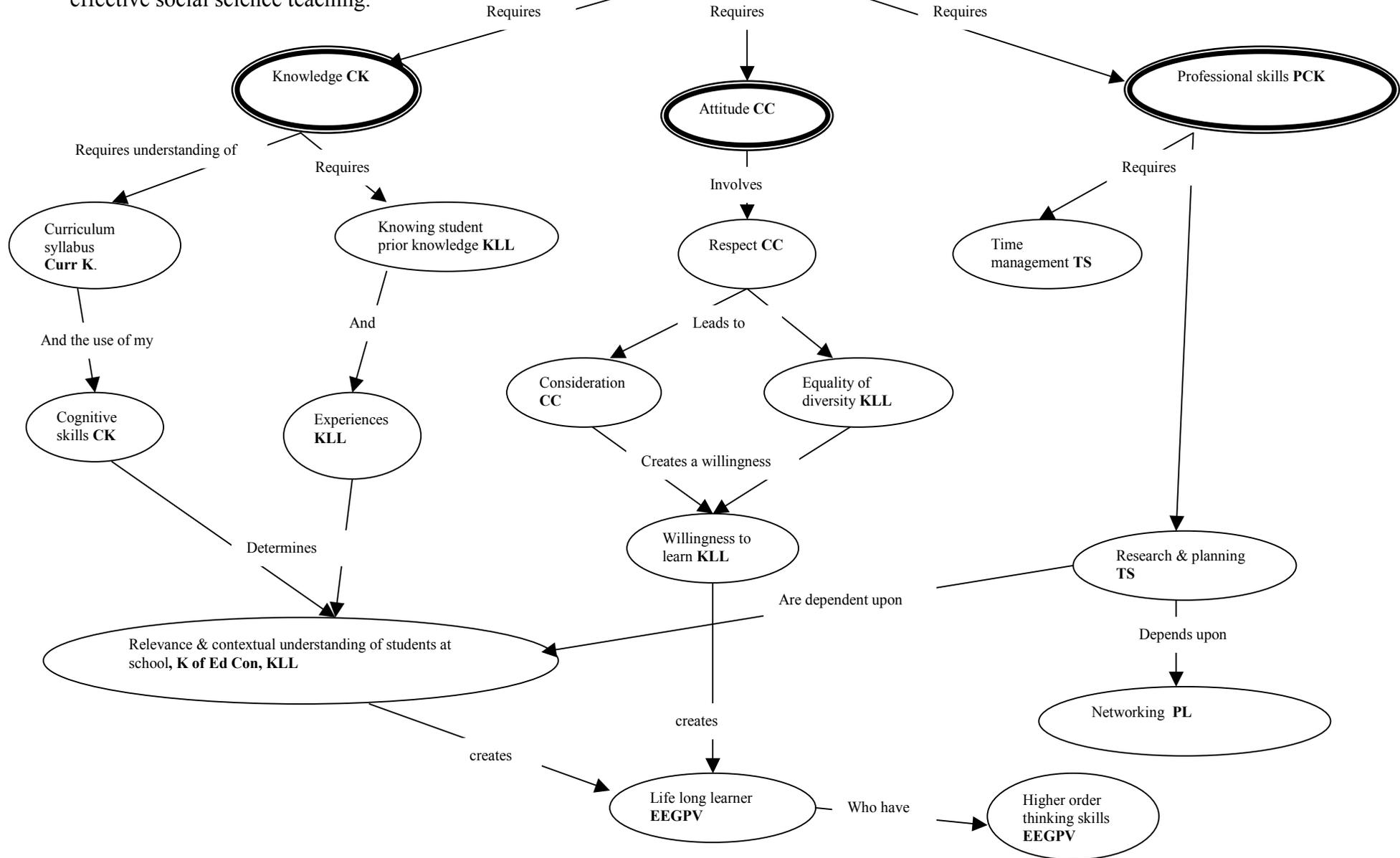
### ***Antonio's maturing constructs of social science teaching***

The six months time lapse shows that Antonio's map construction contained the same structural aspects of his first concept map. However, his second concept map indicated a refinement of most aspects of its structure (See Figure 12), particularly in relationships, branches, and cross-links, indicating a concept map of less complexity than his first.

Knowledge bases continued to be identified over a broad range of categories, but with some variation in the prominence of knowledge of bases. *Content knowledge* continued to be a focus of his concept map. The linking word, 'requires' that links 'knowledge' (CK) to the key concept reinforces the importance of content knowledge in Antonio's teaching. The identification of *classroom communication* at both the general and subordinate levels of his map indicates an additional construct to his concept map. The nomination of *knowledge of learners and learning* concepts within both the 'knowledge' (CK) and 'attitude' (CC), indicate that the delivery of content and establishing effective relationships cannot be done without knowing students. Antonio was keen to see interpersonal skills play a greater role in the emotional as well as cognitive needs of students. In fact, the hierarchy beginning with the general concept of 'attitude', is devoted to the emotional aspects of the individual student.

**EFFECTIVE SOCIAL SCIENCE TEACHING**

**Figure 12.** Antonio’s maturing constructs of effective social science teaching.



The identification of ‘attitude’ (CC), ‘research and planning’ (TS), ‘networking’ (PL), and ‘knowledge’ (CK), indicated an understanding of *pedagogical content knowledge* at the macro level. ‘Cognitive skills’ (PCK) was nominated for *pedagogical content knowledge* because it infers a constructivist process that teachers must use in inquiry based teaching in the social science syllabi, while the nomination of ‘professional skills’ (PCK) indicates *pedagogical content knowledge* that is *enhanced* because it presents a broad picture of student learning.

The identification of *professional learning* to ‘networking’ indicated that Antonio was beginning to think of classroom teaching in terms of membership of professional associations and other school based programs that inform Antonio’s development of his knowledge of teaching (Figure 14). As for Peace, Antonio's concept of *Professional knowledge* is an additional knowledge base that extends outside of Shulman’s categories of PCK because ‘networking’ (PL) was an indication of Antonio’s thinking that had moved beyond the classroom to acquire knowledge in order to bring back to the classroom.

The focus of Antonio’s second Think Aloud Protocol (TAP) was on *pedagogical content knowledge, classroom communication, content knowledge, and knowledge of learners and learning*. Antonio’s commentaries about life long learning indicated his understanding of the importance of this attribute within himself, and his desire to instil this sense of direction in his students that is also in accordance with the statements made in the Studies of Society and Environment Syllabus (QSA/QCSS, 2000),

*The life long learner, I think it ( ) both at the end and at the start, because I need to be a life long learner...umm... which I believe I am...you know I have got these skills...will allow me to know whatever comes along I can just adapt it to it and not just*

*make a blunt decision but you know how to make an informed decision ...and I think you know creating students that can do that in the future...umm...you know is very important. So I think ...umm...well I've got a head start now ...I think it's a matter... yes ...bringing that to the end through ...umm...my teaching to create life long learners...*

Helping students reach this goal requires effective *classroom communication*.

Antonio also said that

*...you've also got to have lot of attitude ...attitude not just for professionalism but also just being a human being towards other human beings ...You get that from ...umm...a major part I think is a natural in built thing, especially with me I think it's a reflection of your attitudes and your reasons, your motives for wanting to be a teacher...I think respect is the main thing ...umm...through respect ...you know...you get consideration...you get equality...equality of diversity...so that ...goes into the whole equity statements from disabilities...umm...gender...umm...socio-economic ...every student regardless of who they are, what they...umm...you know...requires my respect...um...the best opportunity to...umm...to learn regardless of any limitations ...attitudes like that when I show them...then they'll see that...umm...then they'll reciprocate those feelings, those attitudes ... it creates a willingness to learn through respect, consideration and equality*

Antonio also argued strongly for personal commitment because this is what makes the difference in teaching. He said that

*...when it comes to certain topics that are required by certain school programs to teach in Soc are just ...you know...bland and really put the kids off...you know...off learning...you know... make it relevant to the students...I do care and this is great stuff that you're learning...it is important to learn things about the world you live in. So if you want to make a difference...then this is it man...here's your chance.*

In this respect, possessing scholarship in the content disciplines (Shulman, 1987) is essential, and if the teacher is unfamiliar with issues relating to curriculum, then he/she must first engage in what Shulman calls the “comprehension” phase of pedagogical reasoning. Antonio stated that

*...if I don't know one hundred percent of what I'm teaching ...then I shouldn't be teaching ...I should go out and research it first, make sure I know what I'm talking about...don't just go to one book and*

*you know...take what it says as gospel...read widely ...you know...sort of get all the points of view...like a balanced view of...this is the events and the people who made the world what it is today.*

However, the teacher also needs to have *knowledge of learners and learning*, both in affective and cognitive, in order to effectively represent that *content knowledge*, that is, *pedagogical content knowledge*. Antonio explained the importance of having a knowledge of students, citing his experience during his professional practice teaching

*...knowing the students, it's just not knowledge of the content that you're teaching, but also the knowledge of what the students that you're ...the context of where you're in, you know ... sort of how much prior knowledge they've got, how much they need...I think that's very important because if you get it wrong...you will not go anywhere... like what happened to me last semester. I thought I knew but then it turned out that their prior knowledge was not what I thought...They thought they were dumb because you know I chose something that they didn't know anything about...*

Antonio's *pedagogical content knowledge* practices were apparent in his use of relevance in topics. He explained that

*off the top of my head – if it's a predominantly female class ... umm...you know just looking at...umm... the Roman Empire, we might look at the Roman Empire through the eyes of women ... umm...for example I mean its a very sort of general and vague clichéd ...approach ...find that stimulus and intrinsic ...umm...you know, "Yeah we want to learn because we like what we're reading ...it's interesting...it's fun".Umm...so find that right approach ...that relevance that links the content to the context...you know some issues in Soc...you can approach differently with different groups...like Year 8 and the Year 12. You might approach the Industrial Revolution ...with a slightly different edge to it...*

At this stage of his teaching, Antonio had begun to establish the link between teacher education at university and professional teaching practice at schools, and how the context of the classroom helps him develop and refine content and pedagogy into what he calls 'professional skills'. As he pointed out, professionalism

*...comes from actual practice, which is university ..umm...you know...sort of doing prac, planning, research, time management, all*

*that stuff that you know you're aware of but you never really connect it to professionalism until you're actually in the classroom and go, "Oh they are important things to master" I think that the ... place where they all come from is actually experiencing it. I mean the best way to learn is by doing...I mean two years ago when I was doing my first prac I had no idea...I was in a complete stumble...umm...I had the research kind of there...umm...pretty solid...but the planning and time management was absolute chaos ...Umm... so the skills did come from through university but I think that they've got to become more solid once I'm out there...*

His content knowledge would also come from

*...networking...umm...with other teachers. I'm seeing how you feed off them, use them as sounding boards for your ideas, ...you can build but also looking at journals, making myself a member of the history association ...you know stuff like that ...so it broadens my certain knowledge bracket but also...umm...you know within the school I've got that ...umm...you know...collegial relationship between me and other teachers...yeah we can...feed off each other and develop lessons and units and programs and curriculum...you know...*

### **Summary: Antonio's developing thoughts on social science teaching**

Data elicited from Antonio at the conclusion of his Bachelor of Education studies (October 2002) indicated a focus on four of Shulman's categories: *general pedagogical knowledge* focusing on *classroom communication, knowledge of learners and learning, content knowledge*, and *pedagogical content knowledge*. The identification of *classroom communication* and *knowledge of learners and learning*, represented a shift in Antonio's thinking about effective social science teaching. However, his core outcomes of 'lifelong learner' on his concept map shows continuity, even though there is a cognitive emphasis on 'higher order thinking skills'. He stated in his TAP that his experience as a lifelong learner should provide the impetus to teach lifelong learning skills in his students.

*Classroom communication* was strongly represented in the data. The linking word, 'requires' that links the general concept of 'attitude' to the key concept on his map

indicated the strong dependency of the key concept on 'attitude'. A further linking word, 'respect', is the key criterion for a teacher's attitude, which according to Antonio, encompasses such elements as 'consideration' and 'quality in diversity' that motivate students to learn. As he stated in his TAP, "...you've got to have a lot of attitude ...", which he explained in terms of one's motives to teach. The right attitude, then, involves what Antonio called 'respect' for "...every student regardless of who they are...require my respect...then they'll reciprocate those feelings...", which in turn, creates a positive environment for students to learn.

*Content knowledge* emerged in the data. His concept map showed that the powerful linking words of 'requires' that linked the general concept of 'knowledge' to the key concept, indicated the strong dependency of effective social science teaching on content knowledge. This form of knowledge, according to Antonio, includes knowledge of content in particular, as well as knowledge that relates to curriculum, and knowledge of learners, which determines relevance and contextual understanding of students to in order to create lifelong learners. Content knowledge was also nominated as part of a multiple of nominations of knowledge bases in three concepts, because knowledge is essential to 'professional skills', 'networking', and 'relevance & contextual understanding of students at school'. His TAP stated the importance of knowledge of content in terms of a basic moral premise of the teaching profession, that is, "...if I don't know one hundred percent what I'm teaching ... then I shouldn't be teaching ...". The topic, then, should be thoroughly researched so "...I know what I'm talking about ...". His TAP commentaries also identified 'networking' through school community associations, teachers' organizations, and subscribing to journals, as another way of broadening one's content knowledge.

*Pedagogical content knowledge* featured in the data. The nominated concepts for *behaviour management*, *teaching strategies*, *classroom communication* and *content knowledge* satisfied the criteria of pedagogical content knowledge at the macro level, while, *pedagogical content knowledge* was nominated to ‘cognitive skills’ at the micro level. He defined ‘professional skills’ in his TAP as all those aspects of teaching that one prepares for at university, “...but you never really connect it to professionalism until you’re in the classroom...the best way to learn is by doing ...”.

*Knowledge of learners and learning* was nominated as a critical knowledge base by Antonio. It was nominated in concepts in all three hierarchies, and it identified such important features as: knowing students’ prior knowledge and experiences; and, knowing the diverse nature of students as a precursor for student motivation. Linking words, such as ‘requires’, ‘depends upon’, ‘determines’, and ‘creates’ give further weight to knowing students for effective social science teaching to occur. As he explained in his TAP, knowledge of content must be supported by knowledge of learners since one must also know “...how much prior knowledge they’ve got...” because “...if you get it wrong...you will not go anywhere ...”. This statement was in relation to his misconceptions of students’ knowledge during his final professional practice teaching program. The result was that students “...thought they were dumb...because I chose something they didn’t know anything about...”.

Antonio’s conceptions of social science teaching at the end of his preservice year indicated a strong focus on teacher attitude as a means of developing students’ motivation to learn. *Knowledge of learners and learning* was of key importance since knowledge of students’ prior knowledge and interests, allows the teacher to tailor learning experiences. He stressed the importance of teachers as action researchers and being active members of learning communities. Commentaries about *pedagogical*

*content knowledge* were implied in *professional learning*, and were less robustly implicated in his initial conceptions of social science teaching. Overall, Antonio displays a strong sense of social justice and equity. He is motivated by a desire to meet the needs of a diverse range of students by providing them with a full range of opportunities to show what they can do.

### ***Antonio's constructs of social science teaching on realization of independent practice***

Antonio's concept map diagram after six months of independent practice indicated a hierarchy of concepts beginning with the nominated knowledge bases of 'behaviour management' (BM), 'knowledge and understanding' (CK), 'teaching practices' (TS), 'relationships' (CC), 'communication' (CC), and, 'outside life' (EEGPV), all that lead to a variety of cognitive and affective nominated *educational ends, goals, purposes and values* knowledge bases (See Figure 13). The identification of 'outside life' (EEGPV) and the associated concepts in that hierarchy in Antonio's third map (Figure 13) represents a departure from his previous maps (Figures 11 and 12). The inclusion of 'outside life' is an indication of the pressures experienced in his first six months of teaching, and hence a desire to bring some order into his life by explicitly separating work and private life. *Content knowledge* was consistently nominated at the general concept level in his three concept map diagrams, thus indicating the importance he placed on disciplinary knowledge in the teaching and learning process. *Classroom communication* was a strong focus of his second and third maps (Figures 12 and 13) – an indication of the importance he placed on interpersonal skills and communication in teaching and learning. Apart from one cross-link that linked 'sense of humour'(CC) to 'honesty'(CC), 'patience'(CC), 'perseverance'(CC) and 'friendliness'(CC), all

other concepts in the other hierarchies are in item stream mode, thus indicating a lack of explicit integration of knowledge domains.

The concepts of ‘flexible’, ‘student-centred & teacher-directed’ and ‘skills/ K (knowledge) & U (understanding)’ were nominated for *pedagogical content knowledge* because flexibility in teaching and learning that incorporates a variety of skills are essential components of constructivism in the social science syllabi. Antonio also identified the importance of flexibility in teaching and learning in his first concept map (Figure 11) that also included concepts related to inquiry based learning and higher order thinking, unlike his second map (Figure 12) where *pedagogical content knowledge* was only implied with the concept of ‘professional learning’. The identification of ‘consistent’ (BM), ‘planning (TS)’, ‘sense of humour’ (CC), and ‘deep content knowledge’ (CK), indicated Antonio’s understanding of *pedagogical content knowledge* at the macro level.

The focus of Antonio’s Think Aloud Protocol (TAP) was on *educational ends, goals, purposes and values; content knowledge; classroom communication; behaviour management; and, pedagogical content knowledge*. Antonio stated in his *educational ends, goals, purposes and values* knowledge base that having a balance between school and “...the outside life...” was his biggest challenge so far. He said that he had spent so much time on schoolwork

*...that it's been taking over my...you know...social and private life...  
umm...so ...you know ...it's make things a bit tense ... you  
know...leave work at work...as they say...but ...that's the one thing  
that uni doesn't prepare you for...At uni you finish uni...you go  
home ...and that's it...day over...*

Despite these pressures, Antonio was conscious of students having the requisite content, skills in analysis, and skills in decision –making involving not only



“...knowing what...but it's knowing how...” He said that it was also about

*...letting them know about assessment...saying to them...  
“Well...look you guys...you’ve got an exam coming up” ...like right  
from the word go of the unit...you say... “Okay...your exam will be  
this...so you will be learning this...and you’ll be doing these  
activities...and you’ll be learning these skills...And they respond  
really well to that...you know... “Oh...he actually getting us ready  
for the exam ...Yeah...cool...*

He also said in his *educational ends, goals, purposes and values* knowledge base of teaching that he wanted to portray an image of a teacher who cared about his students and was keen for them to reach their goals. He said that

*...just actually let them know why you are there...and why they are  
there...and I think that honesty is...umm...to show them that...you  
really authentically...and which I do...honestly say to them... “Well  
...I’m here because...” I want you to do something greater than  
just...you know...go to Grade 10 or Grade 12...and go... “Great...  
I’ve finished school now...” and stay in a dead end job ...or  
somewhere that you don’t want to be...*

However, he said that “...you need patience...umm...and you need the perseverance too...” because there was little evidence from students that his role as a teacher was appreciated and that there is

*...fruition to my seeds that I’ve planted...and at the moment...you  
know... a lot of the times...I’m not seeing it...and if I am...it’s a very  
faint light...so you need to be able to... come home and say these  
kids don’t care...but I do...and then do the next lesson ...and stay up  
till midnight...and that’s been that hardest thing to do...*

Despite these concerns, Antonio stressed the importance of being “...emotionally in control...” and “...not to fall into that spiral ...” but maintain a form of *classroom communication* that

*...at least show them that you are in control...even though on the  
inside...I mean...I’ve gone to the staff room...and pulled my books  
out...and punched the cabinet...it sounds like angst ...because I  
need to vent this immense energy of pain these kids are giving  
me...just because...literally ...an insanely hard class...I’ve been  
dealt a pretty raw deal with them...Most of them are pretty good  
kids...they’re just hard to teach...*

Antonio said that it was equally important to accept criticism and take jokes even if they sometimes bordered on sarcasm, but so far he had not been on the receiving end of "...a malicious stab ...". He related an incident when he was showing the class how to do a funny clown sequence with a chair and one student commented

*... "Oh Sir...you're such a fool...oh...oh...but in good way" ... "Oh yeah...and then you'll fail...and then we'll see who's the fool" ...I didn't obviously say that ...but being able to take criticism...I mean ... "It's okay Sir...you know...we're all human" ...and I went ... "Oh well...it's a joke that I started" ...You know...if you've started a joke and it somehow turns on you ...if some kid comes up with a little ...umm...a twist on your joke and somehow turns it on you...then you've got to take it and laugh...*

Nevertheless, he pointed to the importance of having a *behaviour management* policy that is based on consistency because

*...if you're not...they'll walk over you...they know that ... "Oh...you know he let me let me get away with it that time...then not that time ...then I've just got to get him on his good day ...and he'll let me off again" ...kind of stuff...If you do it to one...you've got to do it for all...*

He also spoke of being realistic in following through with disciplinary actions, especially when giving out lengthy detentions that students may have to do during the lunch hour, because "...I am going to lose all my lunch hours and preparation time because I've got to keep an eye on him in detention ...". Another aspect of Antonio's *behaviour management* strategies is to inform students of his expectations

*...you know...what I expect from them...what they expect of me...and what they're here for...I said to them...this school has four principles that they go on...safety...respect...learning ...support...I mean I did the whole discussion...you know... "What is safety in the classroom?" ...They say... "You don't throw..." ...and then they came up with the ideas as well... "You don't throw pens...you don't throw chairs...you don't swing off fans ..." a bit of fun...and then I actually put little posters on the wall...saying ... "This is what we've agreed upon" ...in a sense...*

Another big challenge for Antonio has been keeping abreast with *content knowledge* of topics where he had little knowledge and understanding. He

acknowledged that "...you need to know your deep *content knowledge*...and if you don't have that...you need to...umm...research it ...". He admitted that in Coastal Systems

*...the unit was prepared by another teacher...who then handed the program to all teachers teaching that subject...Umm...so I didn't have to actually plan that unit...I just had to teach it...but I've got to go and learn the day before I teach it ...or the weekend...because it's just knowing the terms and functions of coastal systems...*

He said that he has made the inevitable mistakes in *content knowledge*, and the best way to deal with that was to admit "...that you're wrong ...". His spelling mistakes for example, incurred some friendly criticism from students so he started

*...doing a little jar with jelly frogs...and every time anyone picks up a mistake that I've made...then they get a frog...just like that ... "You picked me up ...well done!" ...the joke being that the first time it happened...I said... "Well guys...I will make mistakes...I don't have stamp on my forehead saying ...you know... encyclopaedia or walking dictionary...So...I will make mistakes... and if I do...then you know...let's deal with it and move on"...and so every time I make mistakes...there's one kid who goes... "Oh...its okay Sir...we all make mistakes...we're all human"...*

In terms of his *pedagogical content knowledge*, Antonio stated that there must be flexibility in your "...teaching methods...teaching activities ...". For example, in student-centred teaching Antonio often used a brainstorming activity at the start of a unit

*...you know...we're doing coastal systems... "If I say to you 'coastal systems'...what are you thinking about?" ...and they come up with stuff...umm...the weather... "If I said to you the word ... 'weather' ...what are the first ten things that pop into your head?" ... umm ...just to get their interest...I try to use as much student centred ...just because I think it's a better way...*

Another example of his use of *pedagogical content knowledge* in teaching was to have students work in groups, the leaders of which were required to draw sketches of aspects of coastal process on the blackboard. Antonio's role was that of facilitator – as

a scaffolder while students were at the blackboard. Other students as well, showed their expertise to their peers by modelling their drawings on the blackboard.

### ***Antonio's knowledge in action and reflection on realization of independent practice***

Antonio's video stimulated recall interview was based on a revision lesson about coastal systems he had taught to students of Year 10 Studies of Society and Environment (SOSE) earlier on the day. Students were required to analyse and evaluate the action of a variety processes on coastal systems. Antonio's approach to teaching was primarily learner-centred, using a variety of resources including worksheets and a blackboard.

Antonio stopped the videotape 27 times during recall interview, and 33 categories of knowledge based were categorized from his responses (See Table 5).

**Table 5: Breakdown of knowledge bases**

Knowledge base	No
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	-
-Classroom communication	2
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	1
Knowledge of learners and learning	7
Educational ends, goals, purposes and values	11
Knowledge of educational contexts	-
Pedagogical content knowledge	8

Antonio stated in his *educational ends, goals, purposes and values* knowledge base that the teacher should always link what students are doing "...to the learning outcomes ...". He would typically tell students that

*... "You are doing this because...it's going to help you develop complex thinking ...skills of analysis...evaluation...prediction... You are doing this because...you are going to know this process to apply*

*them...in your exam” ... So...always give them a purpose for doing it...*

He stressed that students should use the correct terminology, especially the technical language of geography because it helps students to know what “...they are talking about ...”. Peer-teaching was further evidence of Antonio’s knowledge of educational ends, goals, purposes and values. He said that

*...the students can listen to them a bit...and they fill in the new one...umm...and compare the right answers they’ve got...and if it’s the same...they know...well...“I’ve done well” ...or ... “I was wrong” ...So...it’s helping them evaluate their work.....as well as their own content and understanding...*

Peer teaching included students working from the blackboard. The reason behind this was twofold; first he “...wanted to walk around ...and make sure everybody is getting the stuff they need ...”; and, second to

*...get one of them up to the front...and it’s doing a lot of things...it’s letting those that know their stuff...to get up and kind of show off ... “I do know it” ...and also...let the ones that don’t know...be taught by their friends...*

Antonio’s discussion of the weathering processes on ‘stacks’ indicated that he had some *content knowledge* of the topic. He explained that the process of “...wear and tear...was not just overnight ...”. In fact

*...it’s a very important factor in the erosion process...it’s a continual process...might take a year...10 years...100 years for it to actually...start to look like what we are talking about...*

However, he admitted that he had no deep *content knowledge* of this topic and found the processes and content just as challenging as the students. He said that

*...it’s hard for me to do it...because I hardly know ...I’ve learnt this stuff in the past four weeks...so it’s been a lot ...as much learning for me ...as has been for them...So...I’ve had to put into practice...pretty much what I’m asking them to put into practice...*

Nevertheless, he said that his apparent lack of drawing skills that had become a source of amusement in class, was an aspect of his *classroom communication* that he was able to build upon. He said that

*...There is an ongoing joke about me and my artistic abilities...I started the joke ...and they are continuing it...So...every time they bring it up ...its not rude...and I'll let them have a spat at me...and they know that it is respectful humour...it's all positive...*

There were also examples of his use of *pedagogical content knowledge* in teaching to convey knowledge in an understandable way to students. For example, he used visual representation and explanation to show the movement of waves by using a piece of long rope

*...and actually do a little whip motion on the table...see the little bump on the rope kind of move...down the rope...and the class to discuss that the rope is moving...*

He used the door frame as an example to explain the structure of an 'arch' because

*...just like a door...you can see through it...you've got the walls on either side...you've got the roof on top...and you've got to walk under it ...or through it...like an arch...but I can swim through...you can row through...*

He drew upon their life experiences in the local area to explain and show students what a 'stack' looked like, such as 'the big chimney' in Mt Isa, or 'the stack' as it is sometimes referred to. He said that

*...If you use an analogy like that... they can see...they look out the window...and they can see the chimney ...so literally it is in their world that you are linking ...so if you can draw upon real life examples...that they can actually touch and see...That works well for them...*

Students were having difficulties understanding the phenomenon of 'long shore drift', that is, the relation between the movement of sediment and wave direction. So he used humour in his *pedagogical content knowledge* base by creating a story about a pebble named 'Joe'

*...and he gets picked up by the water...and gets pushed down the beach ...and from there I create this big melodrama about...why Joe moved down...because Josephine cheated on a sand pebble... blah ... blah...So ...now...when I say... 'long shore drift' ...they say ... "Yep ...Joe" ...getting in a car ...he runs out of fuel...which is why he goes back down...and gets more fuel...and then another waves hits it...and so forth...So now ...they've got this little ...Joe ...in a car...and that's what welded them... You should have heard the story in the end...it was like a big ten minute tale about how Joe had this great injustice done to him...and ...yeah...but it worked...they now know what long shore drift is...*

He used his *pedagogical content knowledge* base to have students engage in peer teaching, that is, having them model their sketches on the blackboard to other students in the class, thereby building on their knowledge base of coastal landforms. He spoke of stopping the class to recap knowledge, "...and if somebody doesn't know...then I will ask someone else to help...it's always about helping someone else...". The verbal explanation, and the written descriptions alongside the sketches on the blackboard, meant that Antonio was "...accommodating all learning styles...it's helping all students to focus on their strengths...on the written...the diagram...or oral...".

In terms of *knowledge of learners and learning*, Antonio said that in general the class was made up of "...pretty good students ...", although there were a couple of them who did little work in class. He said that "...one won't stop drawing... and one won't pick up his pen ...". He spoke of the general reticence of boys to participate in activities that require reporting to the class, so he was surprised "...that Regan got up..." but as a general rule "...none of the guys would get up ...".

Although Antonio was pleased with the presentation of the drawings on the blackboard, their ability to write a complementary explanation of the diagrams was a concern, especially

*...on how many words they use ...how to get to the point...and when it comes to actually expressing their thoughts to the class...and I know what they are saying...because I can put it all together...but where other students don't know...the explanation that they give are*

*kind of confusing...which is why I will always restate what they have said...or write it on the board...clarify it...Yeah its all good until that bit...*

His *knowledge of learners and learning* also extended to individual students. He spoke of one student whose

*...biggest problem is her self esteem...and her perception of her intelligence...you know.....first term...it was ... “I’m dumb...I’m stupid...I can’t do this...I’m a failure” ...you know... “Even my parents tell me I’m dumb...” I would say... “No...no... that’s not true...If you try that’s what I’m here to do...to help you pass...I can’t give you a pill ...or a special code to make yourself smart ...I can give you the skills to make yourself smarter...*

Antonio spoke of this student’s attempts to add something to her drawing “...which is near to perfect, but was inclined to jump ahead of herself and lose the rest of the class so

*...I’ve got to tell her...you know... “That’s not where we are up to...You have to sit down ...You are right...but...we are not up to that point yet” ...and she takes that very negatively... “Oh you think I’m dumb” ... “No you are not dumb...You are not wrong...but you are ahead of yourself...You are ahead of what we are doing ...so just be patient...and when we get to it...then you can come up and tell the class”...*

But there were other occasions when this same student contributed significantly to class discussions, especially when she questioned the weathering process of the ‘arch’. He said that

*...she brings out some bizarre comments here and there... I think they are actually pretty good to discuss...I’m sure that what’s she’s thinking...others are thinking as well...So even though ...her thoughts don’t seem to make sense...she is like the voice of the people...and through her I can clarify a lot of things...I’m glad she brought it up...*

Antonio also spoke of the *behaviour management* challenges and the non-punitive strategies he used to eliminate or minimise behavioural problems. He described one boy as “...one of the quiet disrupters... You know... he will sit quiet...mute talk to someone ...”. Isolation had failed so Antonio considered sitting the student with the

girls because nothing else "...is really working ...". He also spoke of the importance of not conducting behaviour management measures that point out students to the class so "...you are not alienating them ...". He said that

*...there is some stuff the whole class doesn't have to hear ...like the girl that just walked in then...with her bag...I have just quietly ...behind her back ...said...you know... "Make sure that bag goes outside" ...or... "Why are you late?" ... just ...soft...spoken to the person...no one else has to hear it...and they respond a lot better to that...*

### **Summary: Antonio's realization as a social science teacher**

The two sets of data elicited from Antonio show that the focus of his teaching was on four of Shulman's categories: *content knowledge; educational ends, goals, purposes and values; pedagogical content knowledge; and general pedagogical knowledge* focusing on *classroom communication and behaviour management*. His concept map showed that the teacher should aim to possess deep *content knowledge* and to acknowledge that misconceptions from a teacher's point of view are inevitable part of the teaching process. He stated in his Think Aloud Protocol (TAP) that he had little *content knowledge* of some topics but felt it was important to admit to students that he was not the font of all knowledge. Commentaries from his video stimulated recall (VSR) indicated that his *content knowledge* in some topics of Studies of Society and Environment (SOSE) was based on just four weeks of intense study.

*Educational ends, goals, purposes and values* featured strongly in the two data sets. His concept map indicated a range of cognitive and affective concepts such as 'objectives', 'lifelong learning', 'outside life', and 'to be courteous' showing that the *educational ends, goals, purposes and values* knowledge base was crucial in his teaching. He said in his TAP that maintaining a balanced life between school and his private life was a big challenge. He wanted student students to develop both *content*

*knowledge* and higher order thinking skills, as well as having them set goals that went beyond just completing their secondary schooling. Statements from his VSR indicated a desire to keep students informed of the link between the learning outcomes and what is being learnt in class. He spoke of the importance of students acquiring a knowledge base of geographical terminology because an understanding of the technical language would give them a deeper understanding of geography.

*Pedagogical content knowledge* also featured strongly in the two data sets. His concept map showed that *pedagogical content knowledge* was nominated to the key features of teaching practices that are ‘flexible’ and ‘student-centred and teacher directed’, because it was through these concepts that lifelong learning, skills and knowledge and understanding would be realized. The nomination of *classroom communication, behaviour management, teaching strategies, and content knowledge*, indicated his understanding of *pedagogical content knowledge* was at the macro level of the concept map. He stated in his TAP that flexibility of teaching methods, that included brainstorming, scaffolding, and group work, encouraged students to construct their own knowledge. He said in his VSR that he used visual representation, analogies, verbal and written explanation, and humour to represent knowledge in understandable ways.

*Classroom communication* converged in the two data types. His concept map indicated that both ‘communication’ and ‘relationships’ were key aspects in the affective domain of teaching, that is, effective teaching involved having both written and oral communication, a sense of humour, emotional stability, courtesy, honesty, patience, perseverance and friendliness. He said in his TAP, that it was important to maintain an appearance of emotional control even though the teacher may be feeling anxious about the circumstances in class. This included weathering criticism from

students, and seeing the funny side of jokes. Commentaries from his VSR showed that friendly criticism of his sketching ability of aspects of geographical landscapes actually provided the opportunity to build on his rapport with students.

*Behaviour management* featured in the two data sets. His concept map showed that effective behaviour management was dependent on knowing the characteristics of the individual student, and implementing a consistent program that involved regular profiling of students. He stated in his TAP that a lack of consistency in behaviour management would result in uncertainty amongst students. He spoke of setting realistic and actionable goals in disciplinary matters, as well as allowing students to have input into his expectations of classroom rules. He said in his VSR that alienation was a distinct possibility if students were not dealt with in a caring and considerate way.

Antonio's conceptions of effective social science teaching after six months at his new school indicated a focus on constructivism in which students were encouraged to set goals that went beyond their lives at school. He believed that this could be done by ensuring that they were regularly informed of the big picture in their learning, especially in terms of the learning outcomes. He said it was important for students not to view teachers as the harbingers of knowledge, to admit to mistakes, and to accept criticism. He also said that the key to establishing a rapport with students was to have composure, a sense of humour, and be approachable. He spoke of the challenges of behaviour management but was also keen to have a program that was non-punitive, non-alienating, and one that was based on respect. Overall, Antonio's conceptions of teaching is one that was based on democracy that sought to instil the values of student leadership in collaborative learning, and to imbibe a sense of purpose in students' lives, in a supportive and caring environment.

### ***Discussion: charting Antonio's development***

Antonio's conceptions of effective social science teaching after the final data collection in May 2003 show both change and consistency. Data elicited from his initial experience as a social science teacher indicated a focus on three of Shulman's categories: *content knowledge*; *pedagogical content knowledge*; and, *general pedagogical knowledge* focusing on *behaviour management*. Data elicited from Antonio's developing thoughts on social science teaching showed a focus on four of Shuman's categories: *content knowledge*; *pedagogical content knowledge*; *general pedagogical knowledge* with a focus on *classroom communication*; and, *knowledge of learners and learning*. Antonio's independent teaching practice showed a focus on five of Shulman's categories: *content knowledge*; *pedagogical content knowledge*; *educational ends, goals, purposes and values*; and, *general pedagogical knowledge* focusing on *behaviour management* and *classroom communication*

*Educational ends, goals, purposes and values* represented a change in his conceptions of teaching. His concern for 'outside life' and 'objectives' were concepts common to both his concept map (Figure 13) and TAP, while comments from his VSR indicated a need for students to become literate in geographical terminology. *Classroom communication* was the focus his knowledge in his developing thoughts on social science teaching and at independent practice. He spoke of having the right attitude in order to generate respect, to establish a working relationship with students, and to be emotional stable. *Behaviour management* was the focus knowledge base at Antonio's initial experience of social science teaching and at independent practice, and reflected similar sentiments concerning good teacher/student relationships, the importance of negotiation in deciding rules, maintaining consistency, and setting realistic goals.

*Content knowledge* was a consistent in Antonio's conceptual structure. His concept map (Figure 11) showed that *content knowledge* was nominated at both the general and subordinate concept levels. He stated in his TAP that it was important to have passion, background knowledge, the little anecdotal stories, while in his VSR he spoke of the lack of students' content knowledge and the obstacle this presented in his lesson. Antonio's concept map (Figure 12) continued to show that *content knowledge* was identified at both the general and subordinate concept levels, while comments from his TAP indicated importance of research in keeping abreast with topics, and of networking as a means of broadening one's knowledge of content. His concept map (Figure 13) showed that *content knowledge* continued to be identified at the general and subordinate concept levels. He stated in his TAP and VSR that he had only a superficial knowledge of content in some of his teaching areas, but it was still important to develop a deeper understanding of the topic, and to admit to students that he did not know everything.

*Pedagogical content knowledge* was also a consistent component of Antonio's conceptual structure. His first concept map (Figure 11) showed that *pedagogical content knowledge* was present at the macro level, and was a component of *teaching strategies*, and *educational ends, goals, purposes and values*. In fact *pedagogical content knowledge* was strongly identified within the *teaching strategies* hierarchy, and a component to *curriculum knowledge, knowledge of learners and learning, behaviour management, classroom communication, and educational ends, goals, purposes and values*. *Pedagogical content knowledge* was present in both his TAP and VSR in terms of the thinking skills he sought to develop in students. His second concept map (Figure 12) showed that *pedagogical content knowledge* was present at the macro level, and was nominated to a general concept that was a component of

*professional learning, teaching strategies, curriculum knowledge, and knowledge of educational contexts.* He spoke of the importance of learning to teach in authentic situations. His third concept map (Figure 13) showed that *pedagogical content knowledge* was present at the macro level, and was a component of *teaching strategies* hierarchy that included concepts nominated for *knowledge of learners and learning, curriculum knowledge, and educational ends, goals, purposes and values.* Both his TAP and VSR referred to a variety of constructivist approaches, including guidance and representational strategies as ways of stimulating learning.

Antonio's *pedagogical content knowledge* at his initial experience as a social science teacher indicated that he considered 'inquiry based approach' to teaching, promoting 'higher order thinking skills', developing 'process, skills – informed research – decisions, self-directed learning', and creating 'student-centred teaching and directed balance' (Figure 11) as links to other aspects of social science teaching. He reiterated the importance of balance between student centred and teacher directed learning in his TAP because, according to Antonio, it provides the platform for higher order thinking skills, and the importance of establishing the connection between empathy and relevance. He stated in his VSR that he progressively developed students' skills during a mapping exercise.

Antonio's *pedagogical content knowledge* at the stage of his developing thoughts on social science teaching showed that he considered 'professional skills' and 'cognitive skills' as links to other components of social science (Figure 12). He stated in his TAP that professional skills in teaching comes about by practice in the classroom and not from studying at university, and the importance of establishing relevancy in topics.

Antonio's *pedagogical content knowledge* base on realization of independent teaching practice indicated a greater contribution to social science teaching than on previous occasions. He identified 'skills/K (knowledge) and U (understanding)', 'flexible', and 'student-centred and teacher directed' as concepts that link into other components of social science teaching (Figure 13). The latter concept was a reflection of the continued importance of this aspect in Antonio's conceptual structure of teaching. Antonio spoke of the importance of flexibility in his teaching methods in his TAP, such as commencing a lesson by brainstorming an issue, and by having students work in groups. He emphasised his facilitating role in class by providing opportunities for students to engage in peer teaching. Commentaries from his VSR indicated a broad use of *pedagogical content knowledge* in his teaching practice. Antonio explained how he used visual representation such as the whip like motion of a length of rope, to illustrate the action of waves in 'long shore drift'. Humorous storytelling was an alternate way of explaining the principle behind long shore drift. Antonio used analogies such as the frame of a doorway to demonstrate the geographical phenomenon of the 'arch', and a chimney just outside the school grounds to explain the makeup of a 'stack'. Antonio described peer teaching by having students model their drawings in class while he explained the significance of the drawings. Overall, Antonio's knowledge base of teaching indicated growth that was based on having a passion for subject matter, a sense of humour, a preparedness to engage students in learning by tailoring and adapting knowledge and by promoting student leadership.

## **EMILY**

Emily completed her secondary education in the state system where she studied social science in grade 8, history through Years 9 – 10, and ancient history in Years 11 and 12. She loved the content of ancient history but found both the learning experiences and her teacher dull. Her teacher was a traditionalist whose primary teaching strategy focused on students copying copious notes from the blackboard and from the prescribed textbook. Emily found that there was greater opportunity for discussion in her junior history classes, particularly in debating issues relating to current affairs.

### ***Emily's initial thoughts on social science teaching***

Emily's response to the initial focus questions indicated that her philosophy of teaching was to ensure that all students were provided with authentic learning experiences, that is, linking content to students' lives, that are learner-centred, inquiry based which allow students to actively construct knowledge by a variety of problem solving strategies, such as critical analysis, active investigation, and creative thinking. Teaching should also encourage social constructivist activities where students construct knowledge together vis-à-vis group work or through teacher and student interaction. Emily wanted to be a teacher because she felt she could contribute to students' potential as active participants in society, especially as lifelong learners.

Emily enrolled into the Bachelor of Education program as a graduate entry (2 years), after completing a Bachelor of Arts at a Queensland university, majoring in history. Her major curriculum areas were Studies of Society and Environment (SOSE) and English. She spent her final professional practice teaching at a suburban, coeducational high school where she taught both English and SOSE. A lesson to a

class of Year 10 SOSE students was videotaped for a stimulated recall interview. She received a Suitability Rating of ‘1’, the highest, from Education Queensland.

Emily was appointed to a coeducational, country high school at the beginning of the school year in 2003, where she taught Year 8 Social Science, Year 10 English, Year 10 History, Year 12 Tourism, and Year 11 Ancient History, and a ‘Caledonia’ Year 9 Care class. Emily taught the Year 10 History class that was later used for her stimulated recall interview.

### ***Emily’s initial constructs of social science teaching***

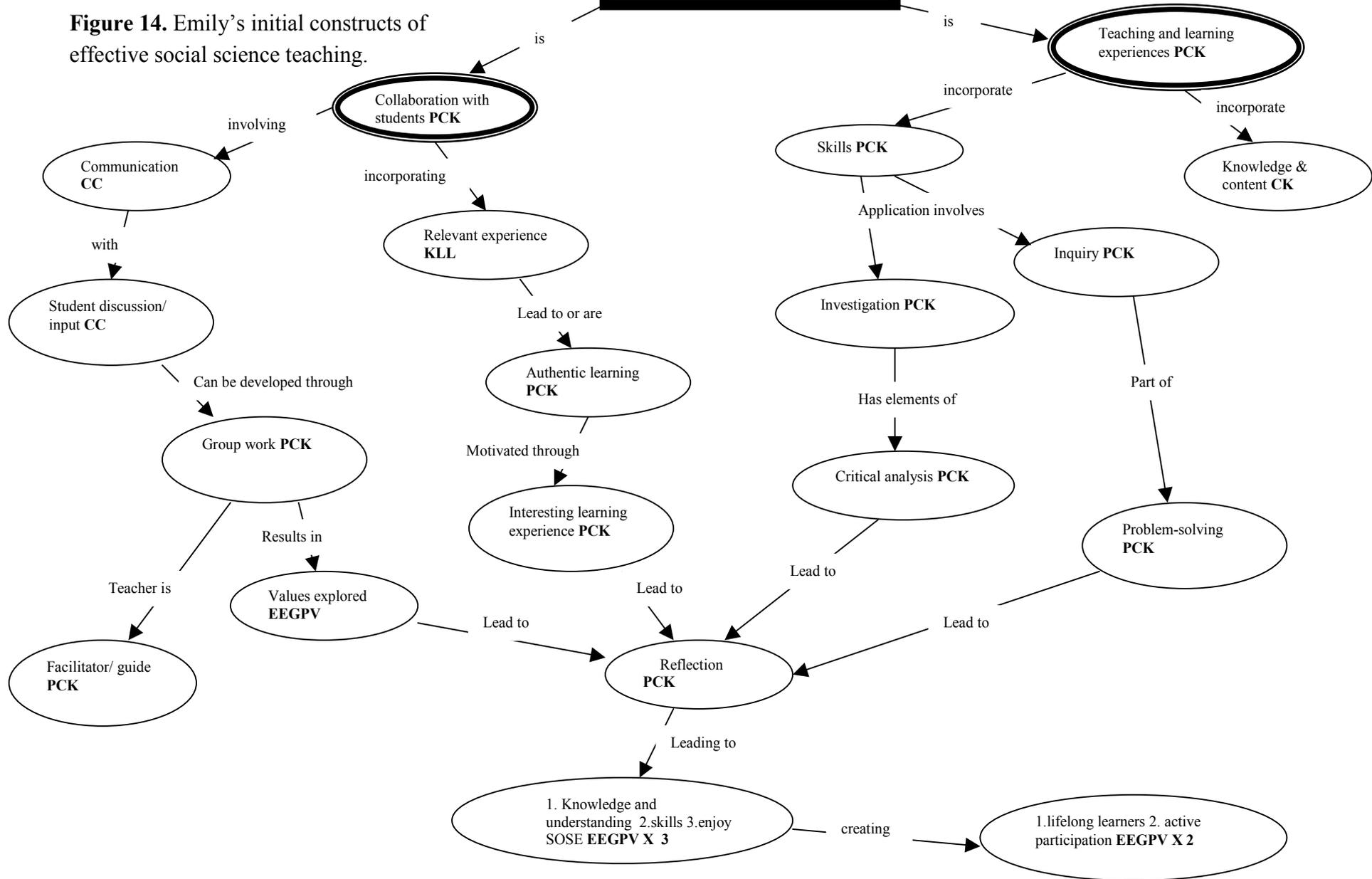
Emily’s concept map construction showed a hierarchy of concepts starting from the nominated knowledge bases of ‘collaboration with students’ (PCK) and ‘teaching and learning experiences’ (PCK), that lead through to the nominated knowledge base of ‘reflection’(PCK), that ultimately results in the nominated knowledge bases of ‘knowledge and understanding’(EEGPV), ‘skills’(EEGPV), ‘enjoy SOSE’(EEGPV); ‘lifelong learner’(EEGPV), and ‘active participation’(EEGPV)(See Figure 14). These concepts are logically linked by arrows and by words in ‘item stream’ mode, that is to say, there are no cross-links and hence, a lack of explicit integration of knowledge bases across the hierarchies.

Her map showed that there was a strong focus on *educational ends, goals, purposes and values*. *Educational ends, goals, purposes and values* were nominated to range of concepts that included both cognitive (‘knowledge and understanding’) and affective (‘enjoy SOSE’) domains.

*Pedagogical content knowledge* was most strongly focused on her map. Her hierarchies were divided up into two parts: ‘teaching and learning experiences’ (PCK) that deal mainly with the inquiry processes; and, ‘collaboration with students’ (PCK) that related more to the needs of students in group work and different learning

**EFFECTIVE SOCIAL SCIENCE TEACHING**

**Figure 14.** Emily’s initial constructs of effective social science teaching.



experiences. *Pedagogical content knowledge* was nominated to ‘facilitator/guide’, ‘authentic learning’, ‘inquiry’, ‘skills’, ‘investigation’, ‘critical analysis’, ‘interesting learning experiences’, and ‘problem solving’ because these concepts reflect an environment of constructivism that is a key part of inquiry based learning in the social science syllabi. Emily showed that she had an understanding of *pedagogical content knowledge* at the macro level with the nomination of ‘communication’ (CC), ‘knowledge and content’ (CK), and ‘group work’ (TS).

The focus of Emily’s Think Aloud Protocol (TAP) was on *pedagogical content knowledge, knowledge of learners and learning, on classroom communication, educational ends, goals, purposes and values, and content knowledge*. Her understanding of *pedagogical content knowledge* is reflected in her dual theme of students as learners, and the teacher education student as a learner. This dual nature is illustrated in Emily’s powerful statement on ‘reflection’,

*...I think it’s a constant thing...definitely at the end of a unit...  
...but I think more importantly ...that you are constantly on...  
you know ...each progress...of each lesson ...maybe you are  
reflecting as the lesson is going on...thinking...now did that  
student really understand what I was saying...So...I suppose  
you are constantly reflecting ...And I think in being ...reflecting  
...you are conscious as well...you are conscious of what you are  
doing ...and being conscious ...hopefully makes you a better...  
teacher...and a better social science teacher...*

In terms of *knowledge of learners and learning*, ‘reflection’ plays a pivotal role.

Emily explained

*...that’s what gets them to think about knowledge...and  
understanding ...that’s what gets them thinking about their  
skills...and hopefully gets them...realizing...well enjoy...  
or having enjoyed the experience...out of reflection...*

Her understanding of *pedagogical content knowledge* was shown in her comments on ‘collaboration with students’ - an essential element in the development of constructivist approach to teaching,

*...cooperation...between student and teacher is important...  
in the social sciences ..like getting students involved in a  
discussion...together in group work... in collaborating ...  
I guess...you are having to communicate...getting their  
input ...facilitating the discussion...*

A number of key words emerge from Emily's statement. First, there is her understanding of *classroom communication*, which Emily defined as, "...the ability to communicate with students and vice-versa...students communicating with their peers and their teachers...". As Groundwater-Smith, Cusworth and Dobbins (2001) note, the role of the teacher is crucial in establishing a fair and just environment where the emphasis is placed "on the quality of interactions..." (p.182), between students and teacher and students. Historical knowledge will not be generated without this central ingredient (Husbands, 2001).

*Pedagogical content knowledge* was apparent in her discussion of group work. Emily noted the importance of 'group work' as a means of, "...getting focused on a particular issue...without the teacher having to give the directions all the time...". Hence, Emily's anticipated role as a teacher is one who facilitates or guides in "...developing experiences and promoting ideas...".

Finally, successful 'collaboration with students' involves 'relevant experience' or 'authentic learning', or in Emily's words, "...you are making something that is relevant to students...that gets students ...hopefully motivated...for the interest in the learning experiences ...taking place...". Knowing what is relevant means having knowledge of learners and learning – in both a cognitive and emotional sense, and this requires the teacher to adapt activities and representations to meet the needs of particular learners (Shulman, 1987).

Emily stressed the governing role of 'teaching and learning experiences' by stating that since teachers are the ones

*... developing a lesson...or a unit of work...they would ... need to think about...what sort of skills...they would need to draw upon ...what sort of ... learning experiences they are going to get the students to do...*

Importantly, Emily stated the importance of *pedagogical content knowledge* in terms of skills,

*...skills for the teacher...definitely...and skills for students ...Yeah...because they need to know these skills themselves... to be able to get the students to follow them...*

Emily's commented about her *content knowledge* and highlighted both the importance of knowing the disciplinary knowledge and her effort to understand it from a student's point of view. As she explains,

*I have to teach a unit on...umm... Australia's political and legal systems...and I don't know a lot about that at all...So...for me... I have to go through and put myself in the shoes of the students... So I have to go back and learn all that knowledge and content... So...you are doing everything the students do before they do it... That's how I see teaching...For me to be an effective teacher... I have to go back ...and learn it all...Do exactly what the students do...*

Emily's discussion of the value of the processes of learning, that is, *pedagogical content knowledge* in creating the kinds of *educational ends, goals, purposes and values* knowledge bases in both the cognitive and affective domains. She explained that

*I think it should be more of the processes you go through... because...you know ...they are the ones that create the sort of outcomes ...enjoying SOSE...lifelong learning...active participants... Umm...you might have the knowledge and understanding...You might even have the skills...but if you don't enjoy the experience...and if you don't enjoy understanding how those skills can be used...then...there is no point in learning them...*

'Interesting learning experiences' along with the 'values explored', and 'skills' and 'knowledge and content' leads to

*...reflecting ...about what they have learnt...and that leads to a deeper understanding...of knowledge... and skills...and hopefully*

*their level of enjoyment ...you are wanting them to enjoy SOSE ... to enjoy the experiences ...in their learning process...and whatever they do...outside school...*

### **Emily's initial knowledge in action and reflection**

Emily's video stimulated recall was based on a lesson she had taught to her Year 10 Studies of Society and Environment class about the structure of the Australian parliamentary system. Her teaching strategies involved a combination of transmission and expert scaffolding, using a variety of resources, ranging from the whiteboard, an overhead projector, class textbooks, and a video.

Emily stopped the videotape 18 times during the recall interview, and 28 categories of teacher's knowledge bases were identified in her responses (See Table 5).

**Table 6: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	2
-Teaching strategies	11
-Classroom communication	1
-Personal beliefs	
Content knowledge	1
Curriculum knowledge	-
Knowledge of learners and learning	4
Educational ends, goals, purposes and values	3
Knowledge of educational contexts	-
Pedagogical content knowledge	6

A feature of Emily's *teaching strategies* was her determination to give clear instructions to her students. Emily explained that

*...I was really conscious of making sure the kids knew the double was to be structured...because if they don't ...sort of know what's happening in the double...umm...they ask questions half way through the class ...like ...umm..."Are we breaking? Are we watching a video?" ...or something like that...So...umm...yeah ...I was conscious ...of giving them instructions at the start of the lesson. So, I was glad I did that...when getting the...students' attention...umm...I feel you have to really have clear instructions...if you want their attention...you have to make it clear ...*

Clear instructions were a technique she observed her mentor teacher using to great effect, "... even with her 11s ...". As well, Emily's professional practice teaching subjects at the university campus contained readings which suggest strategies such as: volume, emphasis, tone, enunciation, accent, firmness, and use of pauses and silences (Groundwater-Smith, Cusworth & Dobbins, 2001).

The major thrust of Emily's *teaching strategies* was on preparing students for the term exam, "So, to make sure they had...the information...because it was important for their exam...umm...we filled in the table as a class ...". However, she expressed some concern over this *content knowledge* driven exercise,

*I was conscious of...the time as well... I knew there was so much to get through...all the activities and everything in a set time frame I also noticed that I talked fairly fast. I know that's a common fault of mine, anyway, but I think that it was also because I was conscious of ...covering the content...in a shortish amount of time...*

Emily clearly recognised the shortcomings of this type of recitational approach:

*...it's certainly not the sort of teaching I would be...recommending ...umm...to do on a daily basis ...mainly because it was so content based...and because you should be teaching them processes and skills ...and knowledge...sure ...but not teaching to an exam...*

There was also pressure from her mentor teacher, "my supervising teacher ...did state ...umm...last week that I needed to start teaching to an exam...because there was so much they needed to learn ...". Despite these concerns, Emily concluded that, "It was a good lesson...in one sense because I know they got the content. I know they got the knowledge".

The questioning techniques used in her *teaching strategies*, however, used by Emily did not always reflect this transmissive approach to teaching because

*I was trying to get students to participate in the activity, because I just didn't want it to be me that was providing the exercise, so... umm...I used questioning to get them ...umm...give me some of the answers ...*

In this case, Emily was partly trying to encourage students to actively participate in the communication process. According to Cole and Chan (1987), “appropriate questions also help to increase the scope and quality of these personal interactions” (p.115). Emily’s second lot of questions reflected her understanding of *pedagogical content knowledge* since they were designed to encourage a range of activities, from recall of factual information to higher order thinking taxonomies such as analysis, synthesis and evaluation. Emily

*... had some focus questions for them to think about...what information they had to find...in fact the focus questions were probably a really a good idea because it got them ...umm...yeah ...focusing on what information they needed to find.*

Emily’s final set of questions was used as part of her *behaviour management* strategies (Cole & Chan, 1987:115), that is, the questions were used to encourage acceptable behaviour or exercise control over students’ conduct. Emily explained that

*...there is two boys ( ) ( ) I try to keep an eye on most lessons because whenever they sit together...there’s usually trouble...I ( ) ( ) questions towards a few of them... just to make sure they are paying attention...and that they are staying focused in the conversation...*

In general, however, Emily felt that

*...they were extremely well behaved...considering... there was so much content and so much...umm...information for them to...comprehend...and to get down...which they did extremely well...*

It is these very same boys that Emily used as a kind of litmus test to determine the success of the lesson:

*...it was good to see them commenting on it...when asking them questions ...but I know that the boys...especially in the corner...they are always a good indication of how the lesson is going. They were well behaved...*

She further demonstrated her *knowledge of learners and learning* by commenting on some students' inability to volunteer to answer questions. Emily found that

*...with this class...umm...you have... yeah... state the obvious...mainly because I think that... sometimes the students do need to ...be restated the obvious and also because...yeah...we do have a multicultural class... so their understandings of our levels of government ...is non-existent...*

She also demonstrated her *knowledge of learners and learning* by adapting activities to meet their needs (Shulman, 1987). Emily commented that

*...a lot of them are visual learners...and that they learn better when there's a diagram and there's videos ( ) ( ) ...umm ...they don't like reading a lot. A lot of them can't read actually... there's quite a few of them...are very poor readers... Umm... and I knew it would be a chance then ...not to be writing ...they would be drawing...*

Emily indicated her understanding of *pedagogical content knowledge* in her use of concept maps as one way of representing her knowledge to those visual learners, "...to give them a visual image of how ...parliament worked...and how the court system worked within that". Further evidence of *pedagogical content knowledge* in the concept mapping exercise was demonstrated by having students connect ideas with an earlier lesson, as Emily explains,

*So, I was trying to get them to ...think about what they learnt last week as well...at the start of the concept map...and then further their knowledge by continuing the concept map for them...And after doing that part of the concept map...I wanted them to continue working on it individually in their SOSE books...*

She also used the concept map as a tool in her *educational ends, goals, purposes and values* knowledge base to verify the ideas about Australia's parliamentary system, because,

*...when we started the unit...a couple of lessons into it...I got them to define the difference between parliament and government ...and a lot of them had trouble with that ...and*

*which I don't blame them ...it's a fairly difficult concept to grasp ...so the concept map was also designed to make sure that verified that for them...*

In order to encourage students to develop their skills of comprehension and analysis, Emily had students read from their class texts, and answer the questions onto their concept maps. Emily used anecdotal evidence on the premier of Queensland and his use of a popular radio station as a way, for example, as a way of making matters of parliament more relevant to students. Emily's examples of *pedagogical content knowledge* represent a variety of what Shulman (1987) calls the powerful illustrations, examples, explanations, and demonstrations.

### ***Summary: Emily's initial experience as a social science teacher***

The two data types elicited from Emily in May 2002, indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *educational ends, goals, purposes and values*; *content knowledge*; and, *knowledge of learners and learning*. Her *pedagogical content knowledge* base of teaching shows that there was an emphasis on constructivism. Her concept map indicated that concepts nominated in both hierarchies regard the teacher as a facilitator who provides interesting and investigative learning experiences. Commentaries from her Think Aloud Protocol (TAP) identified the importance of teaching strategies that involve students having input into classroom discussions. Her video stimulated recall (VSR) cited the use of anecdotal evidence as a means of giving students a reference point in the act of storytelling.

The two data sets were strongly focused on *pedagogical content knowledge*. In fact, *pedagogical content knowledge* was most strongly focused on Emily's concept map, with evidence of it at both the macro and micro levels. Subordinate concepts, such as

‘inquiry’, ‘problem solving’, ‘skills’, ‘group work’, ‘investigation’, and ‘critical analysis’ under the general concept of ‘teaching and learning experiences’, indicated the cognitive emphasis she put on student learning, while ‘authentic learning’ and ‘interesting learning experiences’ had an affective focus. *Pedagogical content knowledge* was also present the macro level with the nomination of concepts for *classroom communication, content knowledge, and teaching strategies*.

Emily stated in her TAP that ‘reflection’ served the crucial role of the teacher constantly reviewing progress, not just at the end of the lesson or unit of work, but “...as the lesson is going on ...”. She also considered the act of reflecting as pivotal in student learning because that is “... what gets them to think about knowledge...and understanding”. Emily’s statement that reflection should take place at the end of a lesson and at the conclusion of a unit of work, or during a lesson, reflects the work of Schon (1987), who argued for more artistry in teaching by encouraging “reflection on action” and “reflection in action” among teachers. ‘Reflection’ is one of the Social Studies-History Standards required by the National Board For Professional Teaching Standards (1998). Statements in the Studies of Society and Environment (QCSS, 2000) underlie the importance of reflection in student learning: reflecting is one of the essential social and environmental inquiry processes of SOSE (p.3); and, being a reflective and self-directed learner is a valued attribute of a lifelong learner (p.5). Comments about ‘authentic learning’ from her TAP, further support the importance in making learning relevant to students’ experiences. Emily also spoke of the importance of group work because students are not only engaged in constructing their own knowledge (Brooks & Brooks, 1993), they are also experiencing the democratic discourse of open inquiry, which according to Hahn (1994) will incline them toward active citizenship. She said that it was important for teachers to have skills so they

could impart them onto students. As Thornton (2001) notes, skills concern the ability to perform particular tasks, ranging from routine tasks to critical thinking activities, such as the attributes of a lifelong learner as identified in the Studies of Society and Environment Syllabus (QSA/QCSS, 2000). These include, active investigator, complex thinker, creative person, effective communicator, and the cross-curricular skills of literacy and numeracy. Emily's VSR identified the use of concept maps in class as having served the dual purpose of helping students connect ideas from the previous lesson, as well as appealing to the visual learners in class.

*Content knowledge* was a focus of both data sets. The nomination of 'knowledge of content' (CK) – an immediate subordinate concept to 'teaching and learning experience' (PCK) indicated the decisive role of content knowledge in pedagogical content knowledge. She stated that the importance of content knowledge in her TAP was also having to know it from the students' point of view, that is, "...I have to go through and put myself in the shoes of the students ...". Commentaries from her VSR also showed that while students may be engaged in a variety of learning strategies, acquisition of knowledge is always the core outcome, although she expressed concern about the pressures from her supervising teacher's desire for content oriented lessons.

*Educational ends, goals purposes and values* emerged in the two data sets. Her concept map indicated that she regarded the affective outcomes, such as 'enjoy SOSE' as just as important as the cognitive based outcomes of 'knowledge and understanding'. She stated in her TAP that if students do not enjoy Studies of Society of Society and Environment (SOSE) then there is little point in learning the skills and acquiring a knowledge and understanding. Commentaries from her VSR indicated that that value of concept mapping was to give students a means of verifying information.

*Knowledge of learners and learning* featured in the two data sets. Her concept map indicated that ‘authentic learning’ and ‘collaboration with students’ were based on understanding of students’ ‘relevant experience’. Emily stated in her TAP that a driving force behind her teaching was to have students reflect about their knowledge, understanding and skills. Commentaries from her VSR state the importance of adapting activities to meet students’ needs.

Emily’s conceptions of social science teaching in May 2002 indicate a strong focus in learner-centred teaching. She identified ‘reflection’ as a key process for both teachers and students. Her comments on content knowledge not only indicated the vital importance of subject matter knowledge in social science teaching, but also knowing it in ways for student understanding. She spoke of the importance of having students enjoy studying SOSE. Emily spoke of the importance of having student reflect on their learning. Overall, Emily displays a strong sense of democracy in her classroom based on a learner-centred approach to teaching where all students are regarded as having unique abilities capable of higher order thinking and reflectivity in a caring and tolerant environment.

### ***Emily’s maturing constructs of social science teaching***

Six months later, Emily’s second concept map construction showed a simplification of ‘subordinate concepts’, ‘relationships’ and ‘hierarchy levels’, which was also reflected in the limited development of knowledge bases (see Figures 14 and 15). Two cross-links link the previously mentioned ‘knowledge and understanding’ to segments of knowledge bases of ‘collaborative learning’ (PCK) and ‘Organization, time management’ (TS) in the other two hierarchies, thereby giving this knowledge base a central role in her map construction. This integration of knowledge bases across the

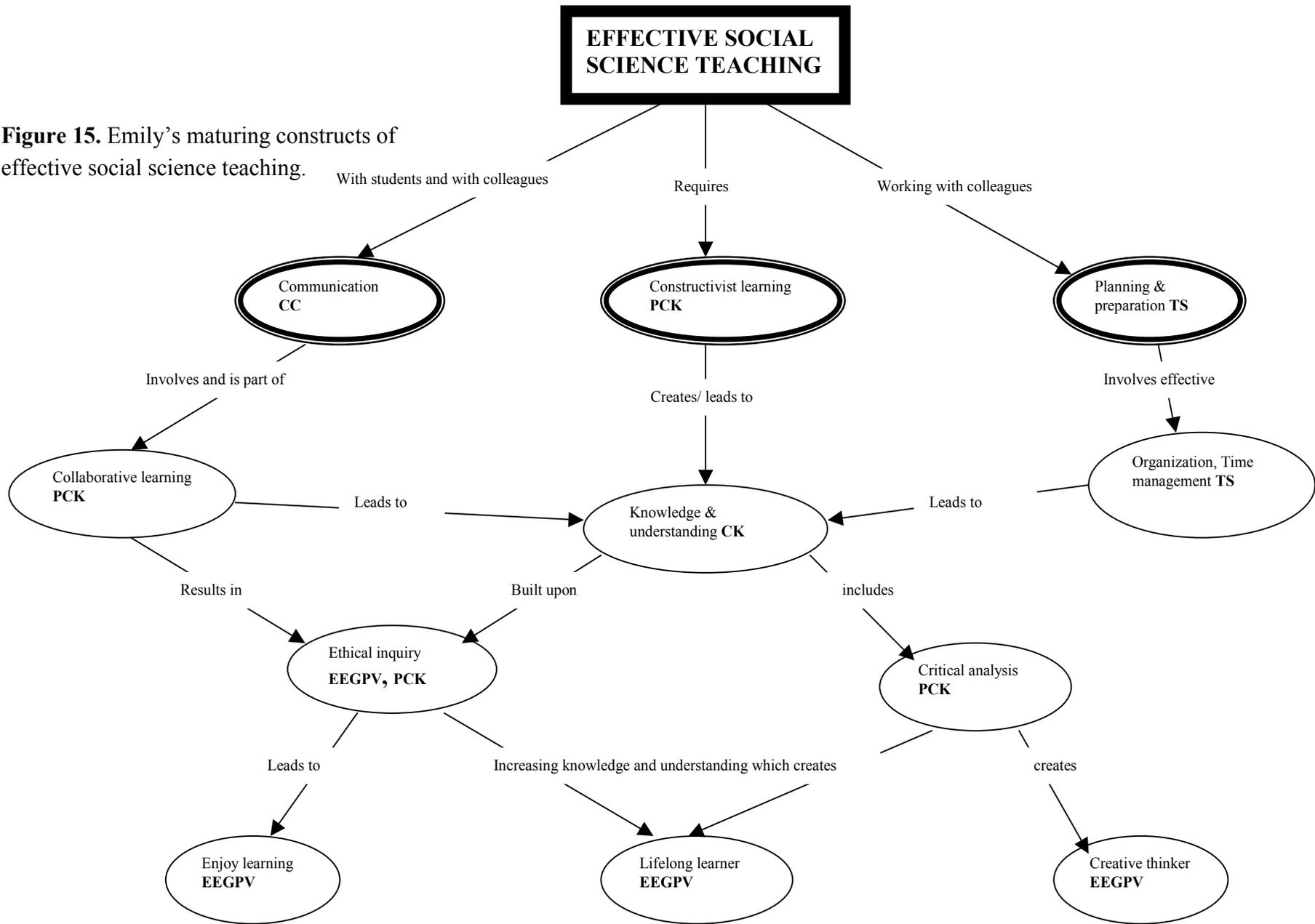
hierarchies suggested a growing professional awareness that was not present in her first map.

‘Despite the lack of structural development, her map still showed her understanding of *pedagogical content knowledge*, with the identification of ‘communication’ (CC), ‘planning and preparation’ (TS), and ‘knowledge and understanding’ (CK).

‘Communication’ (CC) was no longer an embedded concept as it was in her first map (Figure 16) and ‘collaborative learning’ (PCK) was now directly subordinate to ‘communication’, unlike her first map where ‘communication’ was subordinate to ‘collaboration with students’ (PCK). The presence of both concepts in her second map indicated a continued focus in this area of her teaching. *Pedagogical content knowledge* bases were nominated to ‘critical analysis’, ‘collaborative learning’, and ‘constructivist learning’ because the concepts are components of inquiry based teaching in the social science syllabi. The continued nomination of ‘critical analysis’ (PCK) indicated Emily’s focus in this area of inquiry-based learning, while the identification of ‘ethical inquiry’ (PCK) on her second map added another dimension to her inquiry approach to teaching. ‘Knowledge and understanding’ played a major role in her map, as it was the link that resulted from ‘constructivist learning’, ‘communication’ and ‘planning and preparation’, that ultimately results in her three nominated knowledge bases of *educational ends, goals, purposes and values* for ‘enjoy learning’, lifelong learner’, ‘creative thinker’.

The focus of Emily’s Think Aloud Protocol (TAP) was on *educational ends, goals, purposes and values; teaching strategies; classroom communication; pedagogical*

**Figure 15.** Emily’s maturing constructs of effective social science teaching.



*content knowledge; knowledge of learners and learning; and, content knowledge.* Her nominated *educational ends, goals, purposes and values* bases reflect those that are expressed in the Studies of Society and Environment Syllabus (QSA/QCSS, 2000), that is,

*...you are creating...a creative thinker I suppose...Someone who can think about things on different levels...not just sort of tunnel vision sort of thing...umm...and someone that ...well life long learning hopefully they will enjoy learning...Yeah I want them obviously to enjoy their learning...definitely, yeah.*

But in reality she is circumspect because,

*.... I know that from teaching that it's not always the case...obviously you know you might only get one or two if that...you know that students that really get involved and you know...you can see them really enjoying the learning and at the end of it they really...you know they come up and say, "That was great...I really liked that, Miss" ...sort of... while it doesn't happen all the time... hopefully you're planting seeds at least...for them to think,*

Nevertheless, Emily regards effective *classroom communication* as the basis for student learning. Emily said that

*communication is really important with students, getting a good communication base is really important ... communication with teaching colleagues, with people...umm...If you have good communication skills happening ... then you're going to build a better rapport with the students and hopefully things like knowledge, understanding and collaborative learning will be more...kids will want to do those things more if they have a good communication base with you...umm. And obviously you might have all the knowledge in the world and all the understanding in the world but if you can't communicate that to students then that's not really good...*

Emily commented on the importance of transforming knowledge to suit the individual student, that is, her use *pedagogical content knowledge*. Emily stated that

*...if you do have ...you know...knowledge and understanding that you need to get across ...or have to incorporate into your classes ... then communicating that in a way that fits those particular students. Like the Year10 Social Science I had...while I was disappointed with the way that my teaching style was... it was very traditional ...they were normally quite unruly and so in having to cater for*

*them you have to change the teaching styles a bit...whereas if they were a class that were fairly ...umm...cooperative from the start ...you know ...the communication and style of teaching that I might use would be different...obviously.*

Catering for students' learning needs or having a *knowledge of learners and learning*, then, should provide for what the Studies of Society and Environment Syllabus (QSA/QCSS, 2000) refers to as student "...enterprise, resourcefulness and initiative to problems...." (pp.4-5). Emily explained that

*...while it's important ...and you certainly need students to have a good general knowledge and understanding base...I think that especially with Soc. you have the opportunity for them to learn so much more than just the unit they're learning about at that time...Like the actual way they learn...them being conscious of the way they learn...umm...like that's why I think ethical inquiry and critical analysis are fantastic because that got them thinking how they learn best and what methods they like to learn ...whether that... they might now have been really conscious of that but I know that just on a very general level the feedback I got from kids was like "...Miss ...can we have another debate?" You know...they wanted to do more at the ends of the unit. And I think the kids got more out of that because they were conscious of their learning in a very productive way. They're constructing their own knowledge and they're conscious of how they are learning.*

She also discussed her role as a teacher in terms of *educational ends, goals, purposes and values* knowledge base of teaching. Emily explained the critical role of ethical inquiry as a way

*...to challenge their beliefs... you could put together a debate in the classroom ...a debate...or set up a scenario...give them a scenario and then... ethically they have to sort of ...umm...think about the values and beliefs that they hold...and why they hold those and where they came from...and get them thinking, inquiring about their own ethics and morals and values and things like that.*

Emily discussed her *content knowledge* as a process of acquisition over time, and that pedagogical skills and ethical approaches to student learning at this stage of her teaching are more important. As she explains

*...I think that it's probably not as important as I thought because...umm... I think knowledge is certainly something you can*

*learn to acquire ...I think it's something you can build upon ... whereas I think if you have a good basis for...umm... teaching methodologies like constructivist teaching ...umm...incorporating ethical inquiry into classroom learning ...I think that probably has a lot more benefit. Plus...I think if you know everything... and the kids think that you know everything ...then they're not going to be as inclined to get involved in the learning. You know ...if you ...and there's many a time in the class...I didn't know the answers...the kids would have...but that turned out to be more productive in learning together ...than me just giving the answers or saying, "Well...this is probably the case here".*

The success of Emily's *pedagogical content knowledge* of teaching and her knowledge of the *educational ends, goals, purposes and values* of social science teaching reflected the general principles of planning and preparation in *teaching strategies* espoused by Cole and Chan (1994), that is, "determining what to teach, planning how to teach, and finding means to facilitate learning" (p101). As Emily explains,

*...planning and preparation...umm... that is an important one ...it wasn't until I got sort of thinking more about it ...I think social science teaching in particular ...there is a lot planning and preparing because...umm...you're wanting to get across information to kids that is interesting, ...so you are wanting to communicate...umm... you know...knowledge and understanding in an interesting way...and because Soc. is such a big scope for doing great things...umm...like I went to find videos of ...you know...Mabo and things like that ...I know what the lesson was on now...it was on politics and law which is a really dry unit... So I was extra conscious sure that my planning and my preparation was really good so that the students found it more interesting and that they were involved in the learning...*

### **Summary: Emily's developing thoughts on social science teaching**

The data elicited from Emily at the conclusion of her Bachelor of Education studies indicated a focus on four of Shulman's categories: *educational ends, goals, purposes and values*; *general pedagogical knowledge* focusing on *teaching strategies* and *classroom communication*; *pedagogical content knowledge*, and *content knowledge*. Emily's concept map indicated that 'creative thinkers', 'lifelong learner', and 'enjoy

learning' were the expected *educational ends, goals, purposes and values* knowledge bases of effective social science teaching of her constructivist theme. Commentaries from her TAP, however, added a precautionary note that outcomes may not always be reached at the end of each lesson, but "... hopefully you're planting the seeds at least... for them to think".

*Pedagogical content knowledge* featured in the data. *Pedagogical content knowledge* was nominated to the concepts of *content knowledge, classroom communication, and teaching strategies* at the macro level, while 'critical analysis', 'collaborative learning', 'ethical inquiry', and 'constructivist learning' were nominated for *pedagogical content knowledge* because of their role in inquiry based learning. The linking words, 'requires', that link the key concept to the general concept of 'constructivist teaching' indicate the importance Emily places on this approach to teaching, while the language of the other two linking words that link the key concept to the other general concepts are not as mandatory. As she noted in her TAP commentary, constructivist approaches to teaching are about "...creating...a creative thinker... someone who can think about things on different levels ...". She also stated that very essence of *pedagogical content knowledge*, that is, that the knowledge a teacher possesses should be communicated in a way "...that fits those particular students". As her concept map indicated, the *pedagogical content knowledge* bases of 'ethical inquiry' and 'critical analysis' were the essential links in the propositional network that linked them to 'knowledge and understanding' on one hand, and the outcomes on the other. Her TAP commentaries state the importance of how students learn as a way for "...them being conscious of the way they learn ...", and that 'ethical inquiry' and 'critical analysis' "...are fantastic because that got them thinking how they learn best ...".

*Content knowledge* was a focus of the data. Her concept map identified ‘knowledge and understanding’ as a desirable knowledge for students, and its role on the map is pivotal. It is the result of ‘communication’, ‘constructivist teaching’, and ‘planning and preparation’ one hand, and ‘critical analysis’ and ‘ethical inquiry’ on the other. She stated in her TAP, it is ‘knowledge and understanding’ “...you need to get across ...”. She also pointed out in her TAP that teachers' developing a knowledge of subject matter is a “...process of acquisition over time ...”, and what is more important is having a knowledge of teaching methodologies, like constructivism, that “...has a lot more benefit...” She also argued that if students “...think that you know everything...then they’re not going to be as inclined to get involved in the learning”.

*Classroom communication* featured in the data. ‘Communication’ on her concept map was an essential part of ‘collaborative learning’. Her TAP commentaries considered effective communication as the basis for student learning because “...If you have good communication...then you are going to build a better rapport with students ...”, which would then provide the motivation for students to learn collaboratively and acquire knowledge.

The *teaching strategies* of ‘planning and preparation’ was identified as a teaching strategy on her map, and the linking words, ‘working with colleagues’ that linked it with the key concept, indicated that ‘planning and preparation’ was a collaborative effort between her peers and herself, that involves both organization and time management. She explained in her TAP that planning and preparation in social science is especially important because, “...you’re wanting to get across information to kids that is interesting...”

Emily’s conceptions of social science teaching at the end of her preservice year studies indicated that her teaching still possessed a constructivist focus. Her

statements stressed the vital roles of ‘ethical inquiry’ and ‘critical analysis’ in the constructivist process. She regards student knowledge and understanding as a direct outcome of teaching and learning, and considered teachers’ knowledge of pedagogies, such as teaching strategies as more important than knowledge of discipline.

Communication remained an important aspect of her teaching, as did planning and preparation - in collaboration with her peers. Overall, Emily displays a strong philosophy of democracy in her teaching based on a constructivist approach to learning that considers the attributes of lifelong learning the key to the development of a knowledgeable and creative learner in an atmosphere of fun.

### ***Emily’s constructs of social science teaching on realization of independent practice***

After six months of inservice teaching, Emily’s third concept map construction indicated a division of three hierarchies that were in “item stream” mode, starting with the nominated knowledge bases of ‘planning and preparation’ (TS), ‘behaviour management’ (BM), and ‘teaching and learning strategies’ (PCK), that ultimately led to her core *educational ends, goals, purposes and values* knowledge bases of ‘enjoy learning’, ‘interactive learning’, ‘experiences’, ‘metacognition’, and ‘lifelong learners’ (See Figure 16).

There was a broad range of identified knowledge bases with the most prominent nominations coming from *behaviour management*; and *educational ends, goals, purposes and vales*. Unlike her first two concept maps (Figures 14 and 15), *behaviour management* played a significant role in teaching and learning. According to Emily’s concept map, effective *behaviour management* entails creating the positive learning environment that allows students to engage in cooperative learning, such as ‘PMI, T/P/S (PCK).

The identification of ‘learning content’ (CK), ‘questioning’ (TS), and ‘setting routines’ (BM), indicated that Emily had an understanding of *pedagogical content knowledge* at the macro level of her map. A greater number of concepts were nominated for *pedagogical content knowledge* that not only include previously nominated concepts such as ‘critical analysis’ (PCK) and ‘inquiry’ (PCK) but previously unmentioned ones that may reflect a better understanding as a result of her inservice teaching such as ‘discussion groups, (PCK) ‘De Bono’s Six Hats’, (PCK), ‘PMI, T/P/S activities’ (PCK), ‘using sources’ (PCK), and ‘negotiation of topics’ (PCK).

The focus of Emily’s Think Aloud Protocol (TAP) was on *teaching strategies; behaviour management; knowledge of learners and learning; pedagogical content knowledge; and, educational ends, goals, purposes and values*. Whilst Emily noted that her *teaching strategies* of ‘planning and preparation’ was the most important aspect of teaching because “...you incorporate really good teaching and learning strategies ... to get the kids engaged ...”, she also pointed to the challenges of planning and preparation. She said that

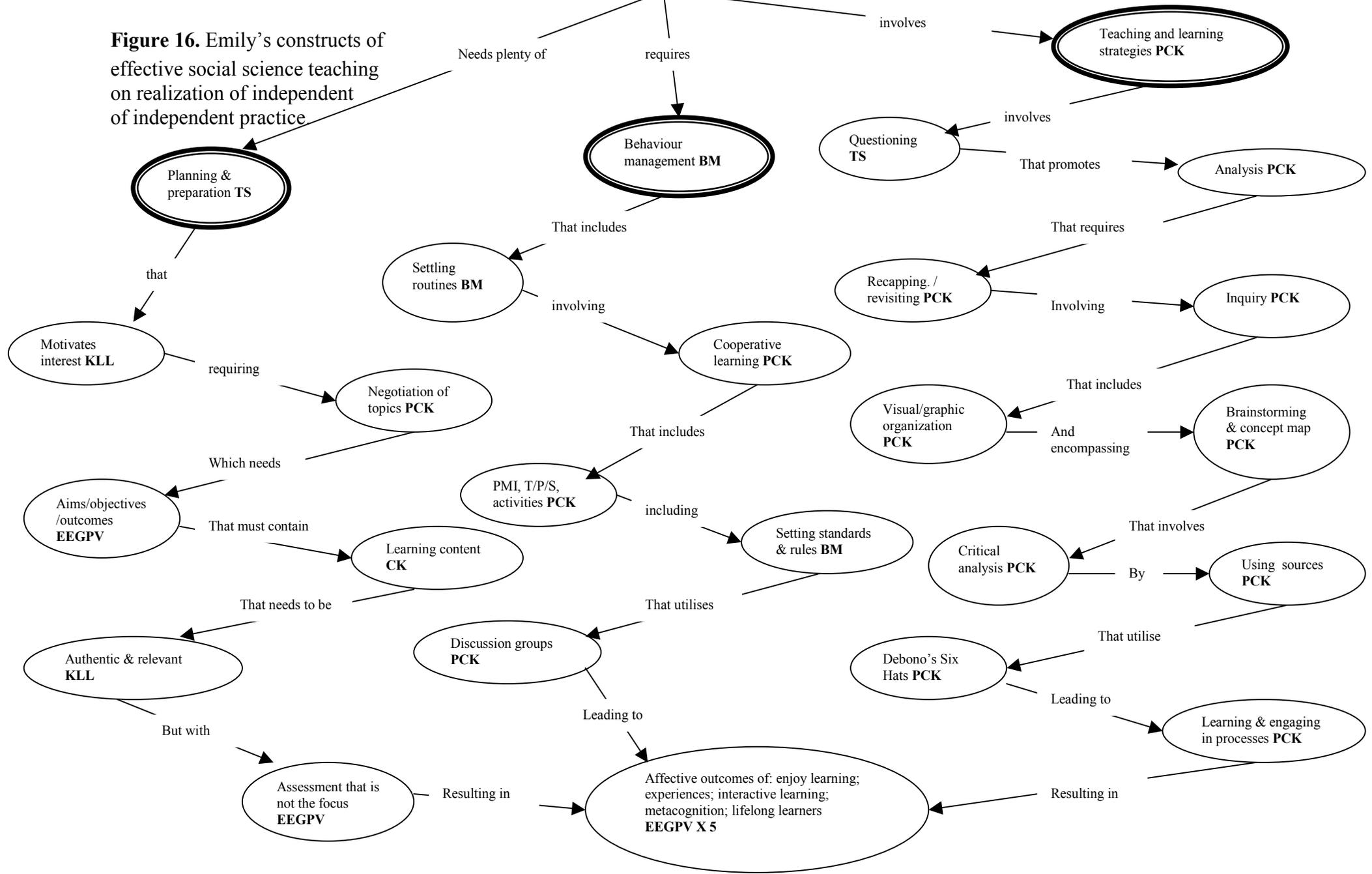
*...I feel like I have been kind of thrown into the deep end...a little bit...I feel there is a lot more than I...ever thought there would be...which is a shame because sometimes I wish I could have more time concentrating ...on enjoying my lessons in class...*

Nevertheless, she was philosophical that the “...theoretical stuff is now being used more practically ...”, and that good teaching and learning, including effective *behaviour management* will result in the desired learning outcomes.

Emily discussed effective *behaviour management* in terms of having settling routines, quick quizzes like ‘plus minus interesting’ (PMI), and cooperative learning such as ‘think pair share’ (TPS) because “...it’s a good way for them to do the

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**Figure 16.** Emily’s constructs of effective social science teaching on realization of independent of independent practice



learning...as well as manage their behaviour ...”. She said that rules were negotiated between the students and herself to make “the deal”, but the consequences were non-negotiable although “...I sort of talked about them...and said ... ‘Do you think that’s fair?’ ”.

The process of negotiation was also a key element in establishing her *knowledge of learners and learners*, by determining their levels of interest “...before you even start to inquire about a topic ...” by asking them ..."Would you like to learn about such and such... I suppose that’s me letting the kids know that I consider...their interests”. The relevance of a topic was another importance facet of Emily’s *knowledge of learners and learning*; sometimes students may not see the immediate relevance of a topic, so

*...I will point it out...so that ...in making it relevant...they can see the reason...for why they need to know it...For example ...the posters on the back wall...basically this was motivating their interest levels...conflict and peace...and the students themselves decided that it would be good to do the Middle East...mainly because it is so topical at the moment...in motivating their interest levels...we got them to do in groups ...some posters...just to get them interested in the topic...in making it relevant...*

Her *pedagogical content knowledge* base of teaching was evident in her statement of students “doing the learning”, and seeking to make the topic authentic and relevant “...at the outset of the topic ...”. Emily said that

*...I will constantly recap or revisit...how something is authentic ...even if we are learning about ...the ancient Hebrews...I still make that ...bring some sort of relevance back to...why we need to know... to help us understand what is happening in the world today...*

Emily used a variety of strategies in her *pedagogical content knowledge* base of teaching in developing students’ skills in critical analysis, for example. She explained that

*...Most of my classes know how to use De Bono's Thinking Hats...so if we have a concept or issue we want to analyse...I'll just go ... "Okay we will get into our groups" ...and analyse...sometimes I will not use six ...I will use just four...*

She said students also liked to work in pairs and engage in another strategy called 'plus minus interesting' (PMI) that entails studying an issue

*...and then we might list the positives...or the good things about the issue...and then we will...at another column next to it...look at the negatives...or the minuses of that same issue...and then anything else that might be interesting that has come out of the conversation ...so we graphically organise it into three columns...we interpret the information...*

Another instance of Emily's *pedagogical content knowledge* base of teaching was her use of the inquiry approach to teaching by first

*...posing questions to students ...getting them to start thinking about the topic from the start also involves inquiring into the topic...so it could be a depth study where they inquire for the whole period of that unit...or they could simply inquire into a concept...they are discussing in class ...document studies ...primary and secondary sources...in ancient and modern history...*

Emily's *educational ends, goals, purposes and values* knowledge base included statements on cognitive and affective domains. She spoke of the need to constantly think about the outcomes in terms that "...you are still aiming to get something across ...get them to understand ...", about content as well as process. She hoped that students could engage in shared experiences and

*...so it's just not me standing up in front of the class they are doing the learning...being actively engaged...hopefully ...they enjoy it...hopefully they know how to learn...that is metacognitive...I suppose that is kind of my focus...and in doing that...then hopefully they will become lifelong learners...*

Although assessment was an unavoidable and necessary aspect of the syllabus, she said that it was not the main part of the unit

*...but whenever the topic does come up I try to make it very obvious that it is not ...what we are aiming towards...we are aiming towards the learning strategies ...enjoying the learning experience...what we*

*can take away with us from this unit ...rather than...a grade or a mark on a piece of paper...*

### **Emily's knowledge in action and reflection on realization of independent practice**

Emily's video stimulated recall interview was based on a lesson with her Year 10 History students about religious conflict in the Middle East. Students were to apply their understanding of the cyclical role of history to the present day conflict between Judaism and Islam in Israel and the Middle East. Emily used a combination of teacher-directed and learner-centred approaches to her teaching, using a combination of resources such as the whiteboard and overhead projector.

Emily stopped the videotape 21 times during the recall interview, and 37 categories of knowledge bases were nominated from the responses (See Table 7).

**Table 7: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	7
-Classroom communication	-
-Personal beliefs	-
Content knowledge	2
Curriculum knowledge	2
Knowledge of learners and learning	9
Educational ends, goals, purposes and values	6
Knowledge of educational contexts	1
Pedagogical content knowledge	7

Emily stated in her *educational ends, goals, purposes and values* knowledge base that at the beginning of a lesson she outlines the theme or outcomes

*...so it is not just me who knows what the lesson is going to be about...but it's also the students who can focus on the lesson will be about...looking at the power of religion ...so students know where they are heading...*

She spoke of having students write down four specific points as a means of reinforcing what students had learnt in previous lessons and what they are about to

learn, and to help those students who "...had missed those classes ...". Emily said that she usually writes words on the board "...because a lot of the kids have trouble spelling these names..." and because they had not mastered the correct spelling of a number of words at the beginning of the unit. Other evidence of her *educational ends, goals, purposes and values* knowledge base concerned the "frenetic" pace of her lesson, and that

*...next lesson for this class...which is tomorrow morning...I will make a conscious decision to slow the pace and my speech down...slow the activities down...and focus on the kids doing the work...*

Emily justified the pace of her *teaching strategies* on the scheduled reduced lesson time because of the parent/teacher evening, that was to commence immediately after school, and because of the noise in the adjacent classroom. The "quick quiz" at the beginning of the lesson, however, is a routine practice of *teaching strategies* because it is a means of settling down students, especially if it's last period of the school day. Another feature of her *teaching strategies* was to move around the classroom because she wanted all students to participate in the class discussion. Emily said that she moved across the classroom as a way of "...keeping the conversation going ...".

Positioning oneself in different parts of the room is also a good *behaviour management* tool, although she spoke of one student who sat at the front of the class who is "...a bit of a silly person ...". His presence in the classroom provided a delicate challenge to Emily *behaviour management* strategies because he

*...has a fairly close relationship with someone in administration...I try not to direct my attention to him...because that is why I think he mucks around...because he thinks he can...but at the same time...I am conscious of not letting him get away with that...So...usually at the end of a lesson...I keep him behind...or...I try to focus on the good things that he does do...I don't think I treat him differently in the class...but maybe I do...subconsciously...because I don't lean on him as much as I should...But the few times I have leaned on*

*him...he says... "You are just picking on me just because..."...So...yeah...it's a hard one...*

Apart from this dilemma, Emily described her history class as "...my little pet class...because they are so into what we are learning ...". Her understanding of them in terms of *knowledge of learners and learning* extended to both the cognitive and affective domains. She said that

*...they really enjoy content...but they also really enjoy the classroom learning activity...they like history...so they are a really good class...because they are very attentive...and very diligent...*

However, Emily said that because students have a heavy subject load, they sometimes "...forget what lesson they are in ...", and others will "...need the real obvious guidance..." to help them focus on the topic at hand. Emily cited an example during the "quick quiz" where

*...with one of the questions...I knew that it was something we covered last lesson...so I actually allowed some students to go back and look at the notes from last lesson...just to revisit the stuff...I know it was probably giving the answer away...*

She was conscious of those students who always put their hands up to respond to questions "...which is good..." but she also acknowledged that they tended to dominate the class at the expense of quieter students, especially those who sat up the back. She said that "...I will now focus my attention towards them a little bit more...".

Emily also pointed out that the class is a vocal one "...and I love having discussions with them ...". Class discussions were an important part of her *pedagogical content knowledge* of teaching. She explained that discussions

*...are really good for students ...because they are hearing other students' points of view...they don't ever debate about it yet...they have not got to that level yet...but hopefully in this unit we can structure discussions in more of a sense of a debate ...but at last other students in the class who do not have their own ideas ...can hear other students' points of view...and that might influence their*

*opinion...and I said from the very start of the year...and I still reinforce this ...that any opinion ...is a valued opinion...*

There was further evidence of her use of *pedagogical content knowledge* in her graphic way of organizing information for student understanding of historical processes. For example, she explained how the cycle of history repeated itself by having students

*...fill in 'history repeating' ...so we drew arrows and looked at where this had previously come from ...and how new leaders were coming...history was repeating itself ...*

She also discussed the nature of history in terms of a circle, and how she wanted students to understand the three elements of history, especially ancient history

*...because in understanding history ...the history of the Arabs and the Jews...this could then lead to the understanding of the connections these particular people felt towards their land...and then its looking at why these people have this connection with the land...that brings us into the conflict that has been created today...in the Middle East...*

Emily also used concept maps as a way of graphically organizing information on the whiteboard, and explained the network of information "...because obviously you have just not visual learners ...but auditory learners ...". She used group work as a means for cooperative learning in which students analysed the issues surrounding the Middle Eastern conflict. Emily spoke of teaching students how to 'nut-shell', that is, to summarise a written text by using sub-headings and dot points.

### **Summary: Emily's realization as a social science teacher**

The two data types elicited from Emily show that the focus of her teaching was on four of Shulman's categories: *pedagogical content knowledge; knowledge of learners and learning; educational ends, goals, purposes and values; and, general pedagogical knowledge focusing on teaching strategies and behaviour management.* Her concept map diagram indicated that *pedagogical content knowledge* had been

nominated to subordinate concepts in the three hierarchies, and that it was most strongly nominated within the cognitive oriented ‘teaching and learning strategies’ hierarchy. The nominated concepts of *teaching strategies*, *behaviour management*, and *content knowledge* indicated Emily’s understanding of *pedagogical content knowledge* at the macro level. Commentaries from her Think Aloud Protocol (TAP) showed that ‘critical analysis’ was a key process in learning, especially in the activities such as ‘plus minus interesting’ and Do Bono’s Six Thinking Hats. She stated in her video stimulated recall (VSR) that she wanted students to understand such concepts as ‘the cycle of history’, and ‘history repeating itself’.

*Pedagogical content knowledge*, in fact, featured strongly in the two sets of data. Her concept map indicated that ‘discussion groups’ was another key aspect in developing student critical thinking. She stated in her TAP that discussions could be used during a depth study unit or in topics of much shorter duration, such as one lesson. She said in her VSR that discussions “...are good for students...” and will help them to marshal arguments in debating.

*Knowledge of learners and learning* featured in the two sets of data. Her concept indicated that the concepts of ‘motivates interests’ and ‘authentic and relevant’ were key considerations during the planning and preparation phase of the lesson. She said in her TAP that a teacher should determine the levels of interest before students inquire into a topic. Commentaries from her VSR indicated the pleasure she gained from working with this group of history students, but also a concern for their heavy subject loads, and a desire for all learners to participate in class discussions.

*Educational ends, goals, purposes and values* were identified in the two sets of data. Her concept map indicated both cognitive and affective outcomes such as the ‘aims/objectives/outcomes’ in planning and preparation, ‘lifelong learners’, and

‘enjoy learning’. Her TAP comments stated the need for the teacher to constantly think about outcomes to make sure that students are acquiring the content as well as the skills in history. She stated in her VSR that she always kept the students informed of the theme or outcomes of the unit in progress.

*Teaching strategies* emerged from the two types of data. Emily’s concept map diagram showed that ‘planning and preparation’ was nominated for teaching strategies, and according to the linking words, ‘needs plenty of’, planning and preparation is crucial for effective social science teaching. She said in her TAP that ‘planning and preparation’ was most important but also a time consuming process. Commentaries from her VSR showed that the “quick quiz” was the routine way of settling down students at the start of a lesson.

*Behaviour management* featured in the two types of data. Her concept indicated that behaviour management was one of three general concepts that ultimately contributed to the set of core outcomes, and that it was integral in the thinking activities of ‘discussion groups’, ‘plus minus interest (PMI)’, and ‘think pair share (TPS)’. She commented in her TAP that was a good way to have students learning as well as manage their behaviour. Emily said in her VSR that most students responded to her behaviour management strategies.

Emily’s conceptions of teaching after six months of social science teaching indicated a strong focus on constructivist approaches to teaching. She spoke of the importance of negotiation, motivating students’ interests, and relevance, which underpinned constructivism. She said that a key to having students on task and motivated was to keep them informed about the goals and aims of work they are undertaking. Emily acknowledged the benefits of planning and preparation despite the

demands it placed on her in school life. She felt that she had established effective behaviour management strategies even though she had experienced some challenges. Overall, Emily's teaching was grounded in the principles of democracy in which students were encouraged to engage in inquiry-based learning, in collaboration with their peers.

### ***Discussion: charting Emily's development***

Emily's conceptions of effective social science teaching at the third stage of the data collection show both change and consistency. Data elicited at her initial experience as a social science teacher indicated a focus on four of Shulman's categories: *pedagogical content knowledge; educational ends, goals, purposes and values; content knowledge*, and *knowledge of learners and learning*. Emily's developing thoughts on social science teaching showed a focus on four of Shulman's categories: *pedagogical content knowledge; content knowledge; educational ends, goals, purposes and values*; and *general pedagogical knowledge* focusing on *classroom communication* and *teaching strategies*. Emily's realization of independent teaching practice indicated a focus on four of Shulman's categories: *pedagogical content knowledge; general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies; knowledge of learners and learning*; and, *educational ends, goals, purposes and values*.

*Behaviour management* represented a change in her conceptual structure. It featured at both the general and subordinate concept levels of her map (Figure 16) – in stark contrast to her previous maps where *behaviour management* was not identified at all. Emily's map (Figure 16) depicts *behaviour management* as playing a constructivist role in the learning process based on cooperative learning, through settling routines and discussion groups. Emily stated in her TAP that the various

learning activities such as ‘plus, minus, interesting (PMI)’ have the dual effect of helping students and manage their behaviour at the same time. Commentaries from her VSR indicated that her regular patrolling during class time was a useful *behaviour management* strategy.

*Educational ends, goals, purposes and values* were consistently identified at the three data collection points, and showed that she was keen for students to enjoy themselves in Studies of Society and Environment (SOSE), to engage in critical thinking activities, and to keep students informed of their learning outcomes. ‘Enjoy learning SOSE’ was a consistent theme throughout her concept maps, as was ‘lifelong learning’. Emily’s TAP in her initial experience of social science teaching reiterated the concern for students to enjoy SOSE, while her VSR noted the value of using concept mapping as a instructional tool. Emily stated in her TAP on her developing thoughts on teaching that ethical inquiry was a sound way of challenging students’ beliefs. Commentaries from her TAP and VSR on her realization of independent practice indicated a desire to develop the skills of history and to keep students informed about the theme of a unit in progress.

*Teaching strategies* was a consistent focus of her conceptual structure on her developing thoughts on social science teaching and realization on independent practice. Her concept maps (Figures 15 and 16) indicated that *teaching strategies* was nominated to the general concepts of ‘planning and preparation’. Her TAPs noted the importance of planning and preparation, especially when she had her own classes, while comments from her VSR indicated the importance of a variety of questioning techniques, and of quick quizzes as a way of settling the class.

*Knowledge of learners and learning* also represented a refocus in her conceptions on her teaching. Emily’s concept map (Figure 14) at the stage of her initial experience

of teaching social science showed the importance of focusing on relevant experience of students in the teaching and learning process, while her commentaries from her VSR stated that teachers should be adaptive to suit students' learning preferences. Her TAP emphasised the development of the reflective learner. Emily's concept map (Figure 16) and TAP on realization of independent practice showed the importance of the teacher motivating students to learn, while comments from her VSR indicated her enjoyment of working with this class of students.

*Pedagogical content knowledge* was a component of her conceptual structure throughout the three data collections. Her concept map (Figure 14) at the stage of her initial experience of social science teaching showed that *pedagogical content knowledge* was nominated at the macro level of her map, as well as at the general and subordinate levels. In fact *pedagogical content knowledge* was strongly represented in her map, reflecting its affective role in *classroom communication* and *knowledge of learners and learning* on one hand, and its cognitive role in *content knowledge* on the other hand. *Pedagogical content knowledge* was a focus of her TAP where she spoke of its role in the *process* of learning, the importance of collaboration, and to make topics understandable to students. Comments from her VSR reflected the desire to engage in a process of teaching. *Pedagogical content knowledge* continued to be a strong component of her conceptual structure at the stage of her developing thoughts on social science teaching where it was part of the key concept and *content knowledge*, resulting in both affective and cognitive outcomes (Figure 15).

*Pedagogical content knowledge* was present at the macro level of her map.

Commentaries from her TAP indicated the importance of having a *knowledge of learners and learning* in order to successfully transform knowledge in interesting ways. Emily's third concept map (Figure 16) upon her realization of independent

teaching showed that *pedagogical content knowledge* continued to be a strong component of her conceptual structure in both constructivist and social constructivist areas. *Pedagogical content knowledge* was present in the three hierarchies, and was a component of *knowledge of learners and learning, teaching strategies, educational ends, goals, purposes and values, behaviour management, teaching strategies, educational ends, goals, purposes and values*, as well as being present at the macro level of her map. Emily's TAP continued to focus on skills development in students' learning. Commentaries from her VSR indicated the importance skills development, application of social constructivist activities especially in terms of students understanding the cycle of history.

*Pedagogical content knowledge* was a strong focus in her initial stages of her experience as a social science teacher. Her concept map (Figure 14) showed that 'collaboration with students', 'teaching and learning experience', 'facilitator/guide', 'authentic learning', 'inquiry', 'skills', 'investigation', 'critical analysis', 'interesting learning experiences', and 'problem solving' as *pedagogical content knowledge* links to other aspects of social science teaching. As noted earlier, *pedagogical content knowledge* was identified to a broad range of concepts reflecting both cognitive and affective learning, across the hierarchies. Commentaries from Emily's TAP indicated her desire to incorporate collaborative learning practices, to ensure that students understood the processes of learning as well as knowing content, of the teacher knowing the skills of investigation, and making topics relevant to students' interests and experiences. Emily stated in her VSR that it was important to ask students a range of questions that included both factual and higher order thinking skills. Emily also spoke of using concept mapping as a way of helping the visual learners in class, but also as a technique for students to make connections between lessons.

Emily's developing thoughts on social science teaching showed a continuing emphasis on 'collaborative learning' and 'critical analysis' as well as 'constructivist learning' and 'ethical inquiry'. She stated in her TAP that it was important to include ethical inquiry in students' learning because they can think about how to best learn, and the importance of transforming knowledge to suit the individual student.

Emily's *pedagogical content knowledge* on realization of independent teaching practice indicated a greater input into other aspects of social science teaching than previously. Apart from the continuing focus on 'critical analysis' and 'investigation', her concept map (Figure 16) showed an emphasis on explicit thinking activities such as 'PMI, T/P/S activities', 'brainstorming and concept mapping', 'De Bono's Six Thinking Hats', and 'discussion groups'. Commentaries from her TAP emphasised her concern for students to develop skills of analysis through the PMI and De Bono activities, having the students "do the learning", by posing questions to students to stimulate their focus on inquiry, and by making topics authentic and relevant.

Statements from her VSR indicated her continued focus on encouraging class discussions, and on "nutshelling" as a way of helping students organise information. Emily also spoke about the importance of graphically organise information on the blackboard to cater for the visual learners. Overall, Emily's knowledge base of teaching indicated development especially in terms of the broad range constructivist approaches in her teaching; her use of behaviour management techniques in constructivism; and, to make the study social sciences enjoyable for her students and herself.

## ISABELLA

Isabella attended a state high school in Queensland where she studied Social Science from Years 8 –10, and Years 11 and 12 Geography. She enjoyed Geography because it gave her an insight into the role of people vis-a-vis the environment and in general terms, the complex web of life. She loved going on field trips and “... doing hands on stuff ...”. Her Geography teacher was well respected by students because of her deep knowledge of the subject.

### ***Isabella initial thoughts on social science teaching***

Isabella’s response to the initial focus questions indicated a belief in teaching that is about preparing young people to become socially critical and responsible adults, who have an independent mind, rather than the current emphasis on preparing “...students for employment or university”. She felt that students would be attracted to social science if teachers revealed their own passion for the subject, and dealt with “...real-world issues that are relevant to them as the future decision-makers on this earth”.

Isabella wanted to be teacher because

*I like children; it is a challenging but rewarding job; it’s a career; you get good holidays; I love Geography and I’m hoping it might rub off on them; I think it’s important that children grow into responsible, independent, active citizens and I feel I have a role to play in that; I like teaching and one day I’ll be very good at it.*

Isabella enrolled in Bachelor of Education as a graduate entry (2 years), after completing a Bachelor of Science in Environmental Studies, majoring in ecology and environmental planning. She loved the environmental planning aspect of the degree because it helped develop her ideas about environmental sustainable development. Her curriculum subjects during her teacher education were Studies of Society and Environment (SOSE) and Science. She spent her final professional practice teaching

at a large, coeducational, suburban state high school. She received a Suitability Rating of '1', the highest, from Education Queensland.

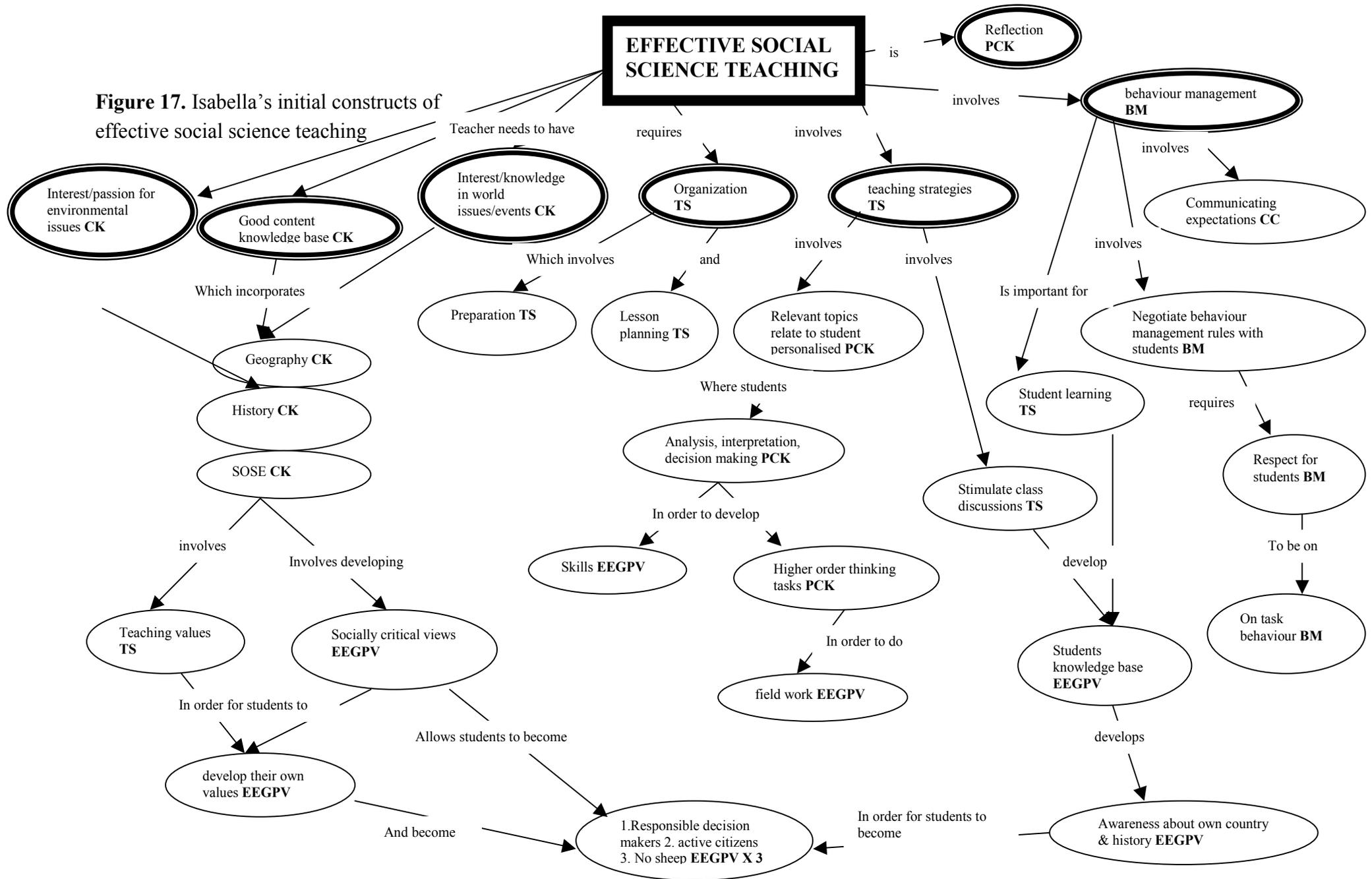
Isabella was appointed to a coeducational, suburban state high school where she taught three Year 8 Science classes and two Year 10 Mathematics classes. Isabella expressed disappointment at not being able to teach in her second chosen area. She taught a lesson to a class Year 8 Science students that was videotaped for a stimulated recall interview.

### ***Isabella's initial constructs of social science teaching***

Isabella's map structure showed a hierarchy of concepts, beginning with the knowledge bases of 'interest/passion for environmental issues' (CK), 'good content knowledge base' (CK), and interest/knowledge in world issues/events' (CK); 'teaching strategies (TS)'; and, 'behaviour management' (BM), all of which lead through to their respective subordinate concepts to the identified knowledge bases of *educational ends, goals, purposes and values* of 'socially critical views', 'develop their own values', 'responsible decision makers', 'active citizens', 'no sheep', 'skills', 'field work', 'students' knowledge base', and 'awareness about own country and history' (See Figure 17). The concepts are connected by linking arrows and by words, to form logical relationships, and the two cross-links indicate that Isabella has put some thought into integrating knowledge bases from different hierarchies.

Isabella's map indicated that 'good content knowledge base' (CK), 'interest/passion for environmental issues' (CK) and 'interest/knowledge in world issues/events' (CK) were integral components of Isabella's teaching, all of which were incorporated to make up Geography, History and Studies of Society and Environment. *Behaviour management* was also a focus in her concept map, the success of which is based on 'communicating expectations' (CC), and negotiation of rules. Effective *behaviour*

**Figure 17.** Isabella's initial constructs of effective social science teaching



*management* also leads to environment of learning where students will develop an awareness of their own country.

The identified concepts of ‘good content knowledge base’ (CK), ‘teaching strategies’(TS), ‘behaviour management’(BM), and ‘communicating expectations’(CC), indicated Isabella’s understanding of *pedagogical content knowledge* at the macro level of her map. ‘Relevant topics relate to student – personalised’, ‘higher order thinking’, ‘analysis, interpretation, decision making’ and, ‘reflection’ were nominated for *pedagogical content knowledge* because these concepts indicate a constructivist approach to teaching that takes into account students’ learning strategies, their ability to think critically, and the capacity of teachers to reflect on their practice.

The focus of Isabella’s Think Aloud Protocol (TAP) was on *educational ends, goals, purposes and values, pedagogical content knowledge; content knowledge; and general pedagogical knowledge* focusing on *teaching strategies* and *behaviour management*. Even though Isabella had ‘reflection’ on its own, she regarded its importance as vital since, “...it comes into everything....”, because “...if you reflect on...your lessons ...then you reflect on all aspects of your lessons...behaviour management... content ... “ Reflection is about engaging in *pedagogical content knowledge* practices but it is also about incorporating the knowledge base *educational ends, goals, purposes and values* of a lesson. Isabella explained that

*...In the end...I want to have active citizens...responsible decision-making...and to me...sheep...sheep comes into...I don't want sheep ...I want them to be able to think for themselves...and make decisions ...and look at things...and not take it...for what it is...but...you know investigate...or...or just...umm...just be critical of...what goes around them ...and to make sure that they've got all the facts and that they can...umm...you know...sort through it...this whole socially critical thing ...and this teaching values...ties into forming their own opinions...you need to have values about certain things...*

Furthermore, the teaching of Social Science can never be value-neutral (Thornton, 2001). Isabella stated that

*...I don't think you can teach Social Science...without teaching values... So...I don't mean to say... 'teaching values'...I don't mean...saying... "This is how you should feel" ...blah...blah...or...I think it involves me saying... "This is how I feel about it?"...umm... "Does that make you angry?"...Does it...do you think that's fair?"...Yeah...things like that ...This kind of ties...into my whole teaching...philosophy...umm...because this to me is an outcome... Well...it's not an outcome...of Social Science ... only...it's an outcome of ...education...full stop...But I think...Social Science...is one means...where there's more opportunity...to do...to do this...just because...of the very essence of what Social Science...is...*

Her pedagogical content knowledge was evident in her discussion of teaching as a variety of

*...skills...particular to Social Science...to my students ...and I think... Mapping skills...umm...report writing...being able to teach kids how to write ...reports...umm... investigating...collecting data...making observations... field sketching... kids need to be able to orientate a map ...to find things on it...and to be able to use it...a map...usefully...or in everyday life...*

She also pointed out that to be able to teach knowledge, "...I have to have a good knowledge base...". However, she also states the importance of good teaching strategies, "...because ...without ... good teaching strategies ...then...", good content knowledge, "...doesn't come across ...to the students...".

Isabella explains the important link between *teaching strategies* and *behaviour management*, "...because ...if I have good teaching strategies ...then it results in ...an effective form of *behaviour management*...". She stated that

*...what I believe about being an effective teacher...and not having to worry about behaviour management...because you ...you know... you have effective lessons ...if they are interested in...I mean that's not always going to be put...and I don't think it's going to be possible...when I first start...No...I think that is something that comes ...later...once ...with experience.*

Isabella explained the challenges of *behaviour management* strategies during her Professional Practice Teaching:

*...like it's so hard...as Prac teachers...to ...to really get a hold of ... behaviour management...because...they know...they know you are a student teacher. I wouldn't negotiate rules on Prac...and I find that...I'm really cautious about overstepping the boundaries...on Prac...because it isn't my class...It's still their class...and the kids...sometimes the kids are so used to that teacher...that doing something different...often can backfire...I know that sounds terrible ...but ...I think it can ...and my Prac teacher...that I have as my supervising teacher...at the moment...not for Social Science ...but for Science...He...the kids are very relaxed around him ...and I think ...you know...I wouldn't really need to change anything...because they are good kids...Social Science is a bit different ...only because they are bit younger...*

But Isabella also commented on her *behaviour management* successes during her practicum. For example

*...knowing the boundaries ...Humour...I think is part of it...I found it interesting because I found that students...you know...if you have a problem with behaviour management...and you address the issue...in the classroom...then they'll do as you say. ...Like ...if...I moved kids...before...and they do it...and that was ...I think one of the biggest shocks ...to me...as a Prac teacher... "Ohh...they are doing what I'm saying..." I try and ...umm...try and portray to them that...even though I am ...a student teacher... "Hey...I've still got the same ...umm...expectations as your normal teacher..."*

Isabella explained that when she gets her own class in 2003, she wanted to adopt a proactive approach, especially in communicating expectations, because it

*...is part of...respecting students...Like...in order to...respect the students ...you have to tell them...you can't just...you know...you can't come down on them...you have to tell them what you expect of them...*

In terms of negotiating rules with students, Isabella was more circumspect about the model of *behaviour management* she will eventually settle for. At this stage, Isabella was inclined to opt for the interventionist model (Edwards, 1999) rather than a democratic approach

*...because I might not feel comfortable ...doing that...until I've got a bit more experience...I think...not so much...in control...I think is feeling comfortable...and I've have had ...a bit more experience ...and I know what will work...but then ...you don't know what will work...until you try it...will you? ...I guess it's about experimenting ...seeing what works for you...*

### **Summary: Isabella's initial experience as a social science teacher**

The data elicited from Isabella during her initial conceptions of social science teaching in May 2002 indicated a focus on four of Shulman's categories: *educational, ends, goals, purposes and values; content knowledge; pedagogical content knowledge*, and *general pedagogical knowledge* focusing on *teaching strategies* and, *behaviour management*. The nomination of *pedagogical content knowledge* to 'relevant topics relate to student – personalised', 'analysis, interpretation, decision making', 'higher order thinking', and 'reflection' indicated Isabella's understanding of *pedagogical content knowledge* at the micro level of her map, while the identification of *classroom communication, teaching strategies, behaviour management*, and *content knowledge* indicated her understanding of *pedagogical content knowledge* at the macro level. The linking word of 'is' suggested that reflection is synonymous with effective social science teaching. Commentaries from her TAP stated that reflection comes "... into every thing... if you reflect on your lesson ...then you reflect on all aspects of your lessons...".

*Educational ends, goals, purposes and values* featured strongly in the data. Her concept map indicated both affective and cognitive outcomes, such as 'active citizens' and 'awareness of own country and history'. The outcomes of 'field work' and 'higher order thinking tasks' broadly reflect the application of cognitive skills necessary in field work and the strategies required for a variety of learning activities. Affective outcomes were apparent in 'socially critical views' that help students

‘develop their own values’. She stated in her TAP that her goal was to have students think for themselves, make decisions, be socially critical - “...I don’t want sheep...”. Isabella further stated that teaching values in social science is unavoidable, but her desire is not just to impart her own values, rather she wants to actively engage students to question inequities and issues of social justice.

*Content knowledge* was featured strongly in the data. Her concept map identified the three general concepts of ‘Interest/passion for environmental issues’, ‘good content knowledge base’, and ‘interest/knowledge in world issues/events’ that contribute to the disciplines of history, geography, and SOSE. The power of the linking words, ‘the teacher needs to have’, indicated the dependency of effective social science teaching on the three aspects of content knowledge. She stated in her TAP that in order to teach skills such as mapping skills, report writing, and collecting data during fieldwork, “...I need to know them myself...”.

*Teaching strategies* emerged from the data. Her concept map showed that *teaching strategies* was a general concept that directly contributed to inquiry based teaching. She stated in her TAP that good *teaching strategies* is necessary to get knowledge across to students, and it is also directly related to *behaviour management*, because good teaching strategies will result in effective *behaviour management* outcomes.

*Behaviour management* featured in the data. Her concept map showed that negotiation and the teacher communicating her expectations are the basis for effective *behaviour management*. Her map also showed *behaviour management* role in student learning that ultimately contributes to students’ knowledge base of Australia. She stated in her TAP that “...if I have good teaching strategies... then it results in...an effective form of behaviour management...”. However, her experience during professional practice teaching showed that the teaching practicum is not a good time

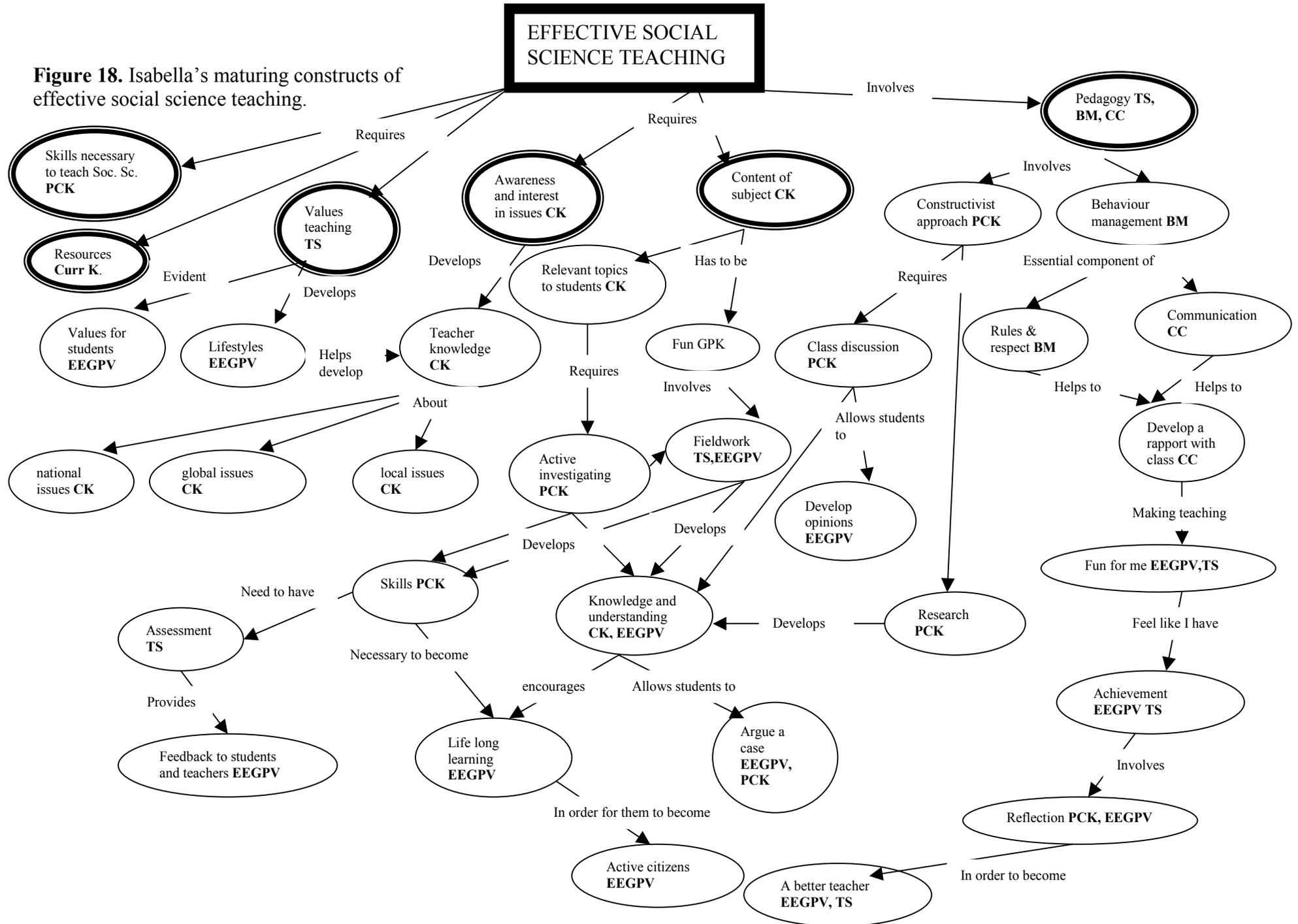
to negotiate rules "... because it isn't my class...". She added that "... kids are used to that teacher...and doing something different ... can often backfire".

Isabella's initial conceptions of social science teaching indicated a strong focus on cognitive and affective outcomes, especially in terms of helping students develop their own value systems and apply skills learnt in class to real life situations. She stressed the importance of the teacher's knowledge base when seeking to impart skills and strategies to learners. She emphasised the skills of negotiation in behaviour management practices as a means determining rules and procedures in the classroom. Overall, Isabella displays a sense a strong sense of democracy in her teaching philosophy based on her beliefs that all students are complex thinkers, reflective and self-directed learners, and responsible participants in society.

### ***Isabella's maturing constructs of social science teaching***

After six months' time lapse, Isabella's second map contained all the structural aspects of a concept map diagram, that is, there were general concepts, subordinate concepts, relationships, branches, hierarchy levels, cross links and outcomes concepts (Figure 18). Two other general concepts, namely, 'resources' (Curr K), and 'skills necessary to teach social science' (PCK), do not have subordinate concepts, perhaps indicating a lack of integration of her domain knowledge. Both concepts, for example, could have been situated under the general concept of 'pedagogy' (TS, BM, CC). Although her second concept map was more simplified in terms of general concepts and relationships, there was greater development in the areas of subordinate concepts, branches, hierarchy levels and outcomes concepts. Two cross-links in her map again show that Isabella has sought to integrate knowledge bases into other hierarchies.

**Figure 18.** Isabella’s maturing constructs of effective social science teaching.



Isabella's map indicated that the identification of outcomes concepts, inter alia, 'lifelong learning' (EEGPV), 'argue a case' (EEGPV), 'develop opinions' (EEGPV), 'active citizens' (EEGPV), and 'fieldwork' (EEGPV), indicated a continuing focus on *educational ends, goals, purposes and values*. The nomination of 'awareness and interest in issues' (CK), 'content of subject' (CK) at the general concept level, and nomination of 'national issues' (CK), 'global issues' (CK), 'local issues' (CK), 'teacher knowledge' (CK), 'relevant topics to students' (CK), at the subordinate level, also showed that *content knowledge* was still a strong focus of Isabella's teaching. Although *behaviour management* was incorporated into 'pedagogy', its role was still significant in Isabella's teaching since it not only determines the 'rules and respect' (BM), but the type of rapport in class that results in fun for herself and consequently a better teacher.

At this stage, the nominated concepts of 'content of subject' (CK), 'pedagogy' (TS), 'develop a rapport with students' (CC), and 'behaviour management' (BM) indicated Isabella's understanding of *pedagogical content knowledge* at the macro level. The identified concepts of 'constructivist approach' (PCK), 'class discussion' (PCK), 'active investigating' (PCK), 'reflection' (PCK), 'research' (PCK), 'argue a case' (PCK), 'skills' (PCK), and 'class discussion' (PCK) showed her understanding of *pedagogical content knowledge*. They are part of the inquiry process of social science teaching.

The focus of her Think Aloud Protocol (TAP) was on: *educational ends, goals, purposes and values; content knowledge; pedagogical content knowledge; behaviour management; and classroom communication*.

Isabella's explanation of the integral role of values in the social science teaching indicated the importance she placed on the knowledge of *educational ends, goals, purposes and values*. She said that

*...I think sharing your values with students allows students to develop their own values...And you have to practise these values outside...in your life...like if you're a "greenie" you should recycle, have a "vegie" patch. It's almost like your values determine your lifestyle maybe...I think that's important ...like to be a good social science teacher then you must practise what you teach. And that way it's an ongoing process. ...and it also helps you develop your knowledge as well because if you practise it... then you're more knowledgeable about it...*

Isabella also stressed the importance of the teacher's *content knowledge* base because

*...it becomes very evident to your students when you don't know something and they almost lose respect, well not so much as lose respect but they respect what you say when they know that you know what you're talking about...*

In general terms, Isabella said that a key element in teaching social science is having an awareness of the issues, because it

*...helps develop your knowledge... You can have knowledge without this awareness but your knowledge is more effective when you have an awareness and interest...and I suppose this ties into like the syllabus almost...with the three ...you know ...levels of investigation...your local, regional and global issues.*

Her knowledge base of *pedagogical content knowledge* was evident in her following comments that stressed the importance of both content and skills of students. In other words, it is "... not just knowledge for me ...", but for students who will "... want to know more about what's going on in the world ...". Isabella explained that

*"...effective social science teaching also needs...umm...the subject to be relevant. It also has to fun for the students...Umm...relevant topics that require active investigation which develop the necessary skills. ...I mean investigating, I think fieldwork is the fun part. And both these things develop skills and they develop knowledge*

As well, Isabella argues that there are certain types of assessment that help to develop their ability to marshal arguments. As she explains,

*...I would argue that there are certain types of assessment that are essential to social science and help to...you could almost say that kind of ...you know...promoting, you only ever do this type of assessment for geography or social science or history type things. ...and this develops, like this can link in like class discussion...and knowledge and understanding allows the student to argue a case, develop opinion...*

*Classroom communication* and *behaviour management* are also linked indirectly to ‘knowledge and understanding’, although they belong to different hierarchies. Isabella explained that

*Communication...umm...well these are on a par in terms of behaviour management...communication and developing rules are probably the most important parts of that, and I must admit that this wasn't important in my last ...but after going to \_\_\_\_\_ it is big time, because I taught thirty five Grade 10 social science students and it was awful...and it was good. Rules and respect, communicating with students, all lead to you developing the rapport.*

### **Summary: Isabella's developing thoughts on social science teaching**

Isabella's conceptions of a social science teaching at the conclusion of her Bachelor of Education studies indicated a focus of four of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; *educational ends, goals, purposes and values*; and *general pedagogical knowledge* focusing on *behaviour management* and *classroom communication*. Her concept map nominated ‘knowledge and understanding’ as both a *content knowledge* and *educational ends, goals, purposes and values* knowledge bases that are pivotal to her general pedagogical skills and *content knowledge*. Commentaries from her TAP also indicated that students must have knowledge and understanding of subject matter before they can argue a case.

*Pedagogical content knowledge* emerged from the data. *Pedagogical content knowledge* at the macro level was evident with the nomination of *content knowledge* and the *general pedagogical knowledge* skills of *teaching strategies*, *classroom communication*, and *behaviour management*. Her concept map identified the success ‘constructivist approach’ is determined by ‘classroom discussion’, while the acquisition of ‘knowledge and understanding’ is determined by an effective constructivist approach. She stated in TAP that student knowledge and understanding will come about if the activity is fun, relevant, and students have the opportunity to develop their investigative skills.

*Content knowledge* featured strongly in the data. Her concept map nominated *content knowledge* as a general concept that possesses subordinate concepts involving topic relevance, active investigation in class and in the field, all of which should lead to fun and knowledge and understanding. She stated in her TAP that content knowledge is vital for both teachers and learners, because if teachers cannot impart that knowledge, then they will be judged by their students accordingly. She also stated the importance of teachers keeping abreast with current affairs because “...it helps develop your knowledge ...” and “...your knowledge is more effective when you have an awareness and interest ...”. Relevance and fun, according to Isabella, are other key elements because relevance both explicitly and implicitly motivates students to actively investigate topics. She believed that field work, especially, should be fun.

The knowledge base of *educational ends, goals, purposes and values* also featured strongly in the data. Her concept map showed the importance of *educational ends, goals, purposes and values* in her teaching, with its presence in most hierarchies in either an affective or cognitive outcomes, such as ‘lifelong learner’, ‘knowledge and understanding’, and ‘active citizens’. Her map also nominated ‘fun for me’ and ‘a

better teacher' as important outcomes for herself as a teacher as well. Commentaries from her TAP discuss her teaching of values as "...sharing your values with students ..." in order for students to embrace their own set of values, which they should put into practice. She draws on the analogy of teaching: "... to be a good social science teacher ...you must practise what you teach ...".

*Behaviour management* and *classroom communication* were identified in the data. Her concept map indicated that an effective *behaviour management* program that incorporates the elements of respect, rules and *classroom communication*, should lead to a rapport with students. A reflective phase would help her consider her achievements that would ultimately make her a better teacher. She related the experience of her professional practice teaching in her TAP, where it clearly showed that *classroom communication* with students and developing rules and respect was vital in establishing good relations with students.

Isabella's conceptions of social science teaching at the end of her preservice year indicated that she continued to regard the importance of content knowledge in teaching, especially in terms of relating it to students' interests and backgrounds. She also nominated 'fun' as an important ingredient in effective social science teaching for both herself and students. The key to establishing an effective behaviour management program is to develop a rapport with students. Overall, Isabella's teaching philosophy encompasses the elements of lifelong learning, based on the processes of investigating, creating, and participating.

### ***Isabella's constructs of science teaching on realization of independent practice***

Isabella's conceptual structure of *science* teaching after six months of inservice teaching was less complex than her previous concept maps (Figures 17 and 18) in



terms of general concepts, subordinate concepts, branches, cross-links, and outcomes concepts. The hierarchy levels, however, show more development in her final map, suggesting that despite the reduction in hierarchy numbers, there is greater development of propositional knowledge within the three general concepts. The identification of ‘content knowledge’ (CK) at the general concept level and the propositional concepts of ‘safety procedures’ (CK), ‘risk assessment’ (CK), and ‘science skills’ (CK), indicated a continuing focus on *content knowledge*, especially in the area of safety in the laboratory. The nomination of cognitive and affective outcomes concepts (EEGPV) in the three hierarchies also indicated the continuing importance of *educational ends, goals, purposes and values* in Isabella’s teaching. Of particular interest are the good memories that science should have for both the teachers and students. *Behaviour management* continues to be strong focus as well, the success of which depends on ‘lesson preparation’ (TS), ‘a set policy and procedures’ (BM), and consistent support from staff (K of Ed Con) and administration (K of Ed Con).

The identification of ‘risk assessment’ (CK), ‘a set policy and procedures’ (BM), ‘lesson preparation’ (TS), and, ‘duty of care’ (CC), indicated that Isabella had an understanding of *pedagogical content knowledge* at the macro level. The concept of ‘activity based’ was nominated for *pedagogical content knowledge* at the micro level of her map because it is a process by which learners understand scientific concepts by manipulating scientific equipment and therefore, constructing knowledge.

The focus of Isabella’s Think Aloud Protocol (TAP) was on: *pedagogical content knowledge; educational ends, goals, purposes and values; content knowledge; and behaviour management*. Her statement on how students should learn science, that is,

as an ‘activity- based’ (PCK) enterprise, justified the nomination of *pedagogical content knowledge* on her concept map diagram. Isabella explained that

*... think kids should learn science by doing science...so doing science doesn't involve writing...or reading... or listening to me talk for two hours...it involves them getting out and doing as many activities...experiments as they can ...umm...my role as a science teacher ...especially in the junior school is more of a facilitator...all I do is guide them ...*

Isabella stated that an ‘activity based’ curriculum enabled her reach the *educational ends, goals, purposes and values* of science teaching, that is, by making it fun. She explained that “...last term we made ...goo or slime...you know...and they loved it...and it was easy...they played with it for an hour ...”. Her other reason for adopting the ‘activity based’ approach to teaching was that

*...more students are interested in science...like goes to university to study it ..becomes a scientist ...and then on the other side...I want someone who's had fond memories of their science days ...*

She stressed the importance of having *content knowledge* in various fields of science to successfully conduct ‘activity based’ science teaching. As she explained

*...you need to know how to use equipment...you need to know basic reactions between different chemicals...you need to know how to use a bunsen burner...you need to know how to set up an experiment...the more knowledge you have...the more exciting things you can do with kids...*

Isabella admits, however, that her *content knowledge* is not so extensive that she could “...spark that real interest in them ...”. She spoke of the day when she will be able to conduct a “...spectacular experiment that just lights up the whole room and the kids will go WOW! ... ” But she concedes that at this level “...it's not too bad... because the stuff we do in class is good ...”.

Her comments on *content knowledge* also extended to her concern about laboratory safety procedures and appropriate risk assessment because

*...different chemicals...umm...how toxic they are ...how they can affect kids if they got into the eye...what to do...how much treatment they may need...because I don't know much about chemicals...so I don't know that this chemical may ...burn them...so ...I just think over time...I'll get to know it...like over a term...I've just learned much more...risk assessment is to be done every prac...you can't anticipate everything...but you need to at least try...and if you haven't done a risk assessment ... then you're liable...*

Isabella also expressed her concern about her lack of specific *content knowledge* for teaching Mathematics because

*...I'm not a maths teacher...but I have to teach it ... is not what I expected ...which is really difficult subject to teach ... because not really many kids want to do maths...*

The desire to keep student on task then, was dominated by her *behaviour management* practices that essentially involve “...making sure they're doing what they are meant to be doing ...”. She explained the challenges of her teaching as being

*... consumed by behaviour management...keeping the kids on task...and I never expected it to be such...I mean...I knew it would be important... but I never expected it to be such a huge part of teaching ...like its just that its just always keeping on the ball ...try to be consistent...try to...even in the playground...trying to make sure you are putting across this image of someone who is in control ...who knows what they are doing...and setting a standard there ...so that whenever you meet any these kids in the classroom... they know your standard...besides that...you've got to find balance between...I mean...I find it difficult because I...umm...because I'm young...the kids relate to me a lot...so sometimes...um... I will have good relationships with kids ...but then kids try to take advantage of that relationship...so it's difficult when you are a first year...*

Isabella described her *behaviour management* strategies as one of articulating expectations to students, and trying to deal with problems in the classroom before “...I have to take it out of the classroom ...”. She explained the importance of support

*...because...you know...you need to know that you can go there and get this sorted out ...which is important...I go to the other staff all the time for help...I'll say... "What do I do when this happens?"...or ...What do I do if someone does this?" ...you know ...just having their support...and just having good staff means that...even if the kids are bad ...or they are really ruining your day ...if you work*

*with good people...and get along with them...then it makes a massive difference to whether or not you survive...I suppose...*

### **Isabella's knowledge in action and reflection on realization of independent practice**

Isabella's video stimulated recall (VSR) interview was based on a lesson about 'solutions' that she had taught to her Year 8 Science class earlier on the day. The lesson included students conducting an experiment to determine the nature of dilute solutions, concentrated solutions, and saturated solutions. Isabella used a combination of didactic and learner-centred models to teaching in which students first observed a demonstration of the experiment before they moved into groups to conduct their experiments, using solutions, particles, and test tubes.

Isabella stopped the videotape 30 times during the recall interview, and 35 categories of a teacher's knowledge bases were identified from her responses (see Table 8).

**Table 8: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	5
-Classroom communication	-
-Personal beliefs	-
Content knowledge	2
Curriculum knowledge	2
Knowledge of learners and learning	8
Educational ends, goals, purposes and values	11
Knowledge of educational contexts	-
Pedagogical content knowledge	4

Isabella's *teaching strategies* focused on instructions largely because she was working with students who had not been in a science laboratory before

*...and there are all these rules they have to learn ...and so I was just asking them... "What do we do when we empty chemicals down the sink?" ...they know they have to have the tap running...that's just one of their rules...and I was trying to get them into the habit of as*

*soon as I say... "Stop what you are doing...Look at me!" ...they stop ... during an experiment...someone will be doing something wrong...and I'll need to talk to everyone straight away to say... "Okay...this what you need to be doing" ...with the Grade 8s... you have to give so much detailed instructions ...It's unbelievable how you think you have explained something properly...and then you realize that they really have no idea of what you've said...and so...I think ...especially with science ...and doing experiments... you have to give such explicit instructions...*

She is also required to have *content knowledge* of the laboratory safety procedures such as a "Chem-Watch" update every term

*...so that if ever anything goes wrong with a chemical...you just run into the prep room to find out the immediate treatment of it...You know...you also have to do risk assessments before every prac...they will determine what kind of safety features we'll use...and if you don't know anything about any chemicals you use...I will determine whether or not I'll let the kids...use that chemical...because there was a prac last week where they had to use potassium manganate...very toxic ...so instead of letting them do it...I just did it as a demo...*

In terms of *educational, ends, goals, purposes and values*, Isabella generally felt that the experiment "...went really well ...". She said they

*...worked really hard...there were incidents...um...where they mixed some chemicals that they shouldn't have but I reiterated the rules about not randomly mixing chemicals ...and I think it was an accident anyway ...but other than that....it went well...they got the results that they wanted...*

Laboratory procedures were a feature of her *educational ends, goals, purposes and values* knowledge base. Isabella explained the importance of having even the most basic protocols in place like

*...keeping the room neat...putting things back after they have used them...so ...I know it might sound a bit ...umm...but you have to tell them to do it row by row...otherwise it's just this mass of kids that come out...and they all...they just go crazy...getting their aprons ...the simplest things...*

She admits that procedures such as the ones described above "...can sometimes take too long ...", and suggested that

*...if we had better layouts in the rooms...where they have benches and desks...then 'pracs' could be ready for them at benches ...and they could do their work at the desk...just get up and go to the bench and start the prac...and then we would not be handing out equipment all the time...*

Her philosophy in science teaching is another example of her knowledge base of *educational ends, goals, purposes and values* that focuses on

*...kids in the junior school who should...come out with the feeling that science is fun...because not everyone goes on to do science in the senior school ...so therefore...those that do it...should have good memories of it...and it also encourages more kids to do science... later on...*

The basis for these affective and cognitive outcomes rests with the junior science curriculum that stresses an “...activity based...” approach. Her demonstration of the experiment to the class was evidence of her *pedagogical content knowledge* where she wanted to get across the idea that the more solute dissolved, the more concentrated the colour would be. Isabella explained that this

*...kind of science teaching ...which is ...a kind of discovery learning where you're not telling them ...you're just kind of giving them steps and figure it out for themselves ...I could have said, "This one's concentrated...this one's saturated" ...but I felt that doing that way is a much better way for them to learn...*

Isabella explained that the key to success of experiments like this was based on students writing up the bulk of their experiment before they start, and then the teacher uses scaffolding techniques to explain the procedures and chemicals used. She used exemplars as a means of modelling previous work done by students the previous year to show students that “This is how I want it done”.

Isabella also showed her understanding of *pedagogical content knowledge* through her discussion of students' misunderstanding of scientific terms. This was especially in relation to the word “soluble” and its antonym, “insoluble”, where a number of

students had mistakenly believed that “unsoluble” was the correct opposite. She said that

*...in science you have to be careful of...some of the misconceptions that the kids have...and ...umm... its amazing... some of the things that you discover...that they believe...and they're totally wrong but...you know ..that's the way they have thought for their whole life...*

Her *knowledge of learners and learning* extends from an understanding of individual students to class the class as a whole, at both cognitive and affective levels.

Isabella stated that this class

*... work really well together ...I think that because...they're a PE extension class...so they spend a lot of time playing sport ...and they have a lot of stability...like for Maths and English...they have the same teacher... they love working with chemicals...I think that for the first five weeks of the term...every lesson they would ask me, "Are we blowing something up today, Miss?" ...*

However, she found it disconcerting that in other areas of their group experiment they were less responsive because

*...even though ...I've given them instructions...I've shown them...some of them still don't know what to do...so it just helps to go around and just make sure they know what they are doing...and a lot of them won't ask for help...which is really strange...*

Other matters of equal, or even greater concern for Isabella was the general security of equipment in the laboratory because there were some students who

*...love to steal ...magnets...they love...last week we had balloons...umm...and they wanted to keep them...and I said... "No!" ...So...I checked that everyone had returned their balloon...Weights...they love to steal weights...*

Isabella spoke of a student who had recently joined the class, and although he tried hard in class, he was not achieving outcomes that she felt he was capable of. She commented that

*...he's so...such a well behaved kid...really attentive...likes to do everything the right way ...you want just as many of those kind of kids in your class...*

On the other hand, there are those students who exhibit *behaviour management* challenges such as two boys

*...that are a bit boisterous. Mark...he came in late...I have to speak to him all the time about his calling out...makes ridiculous comments...I mean later on in the lesson...he sings...And his mate Michell...not listening...not doing any work...mucking around...I ended up sending him to the planning room for one lesson...*

Her *behaviour management* strategy for dealing with Mark was not a punitive one but one which had him working in collaboration with a peer as a means of

*...settling him down...because he would work better with Doug than with anyone else...so...that was fine...he settled down and stopped...*

### **Summary: Isabella's realization as a science teacher**

The two sets of data elicited from Isabella after six months of teaching show that her focus on science teaching is on four of Shulman's categories: *educational ends, goals, purposes and values; content knowledge; pedagogical content knowledge; and, general pedagogical knowledge* focusing on *behaviour management*. Her concept map identified the subordinate concepts of 'students interested', 'senior science', 'science careers', and 'produce scientists' as *educational ends, goal, purposes and values* knowledge bases that underpin her teaching. She stated in her Think Aloud Protocol (TAP) that she wanted students who are "...interested in science..." and "...becomes a scientist ...". Commentaries from her video stimulated recall (VSR) identified "...more kids to do science..." as a focus of her teaching.

Other *educational ends, goals purposes and values* emerged in the two data sets. The subordinate concepts of 'happy school', 'fun', and 'good memories of science at school for teachers and students' on her concept map diagram were the desired affective outcomes of her teaching. She stated in her TAP that her major goal was to

have students in the junior school "...come out with a feeling that science is fun...". Her VSR commentaries stressed the importance of students having "...good memories of ...it". She noted that during the experiment students "...worked really hard..." and that "...they got...the results that they wanted..." – a cognitive goal of the lesson. Isabella's knowledge base of *educational ends, goals, purposes and values* extended to almost enshrining the most basic of laboratory procedures.

*Content knowledge* featured in the two data sets. The general concept of 'content knowledge' (CK) on her concept map identified 'risk assessment' (CK) and 'safety procedures' (CK) as *content knowledge* bases that were key to her teaching. She stated in her TAP that "you need to know how to use equipment... different chemicals ...how toxic they are...". At a specific subject level, she expressed her concern due to the lack of *content knowledge* in her mathematics teaching. Her VSR statements identified the importance of regular updating the information on toxic chemicals in "Chem-Watch".

*Pedagogical content knowledge* featured strongly in the two data sets. *Pedagogical content knowledge* was nominated to the subordinate concept of 'activity based' since it implied a student-centred approach to teaching, a key component of science learning. As the Science Syllabus (QCSS) states, learning "...requires active construction..." and "...learner-centred strategies..." (p.6). The nominated knowledge bases of *teaching strategies, classroom communication, behaviour management, and content knowledge* indicated Isabella's understanding of *pedagogical content knowledge* at the macro level of her map. Commentaries from her TAP indicated that the activity based model, that is, "...kids should learn science by doing science ...", was the primary focus of her teaching approach. She stated in her VSR that she used 'discovery learning' as "...a much better way for students to learn ...". She

commented as well on her scaffolding techniques during demonstrations, and her use of exemplars as a way of modelling work. Isabella also said that her understanding of student misconceptions of scientific terms provided her with greater insight into student thinking as a basis for her teaching.

*Behaviour management* converged in the two sets of data. Isabella's concept map indicated that effective behaviour management was based on support from staff, the administration, set policy and procedures, and 'lesson preparation', that is, knowledge bases that draw upon her understanding of a combination of *behaviour management* policies, *teaching strategies* and *knowledge of educational contexts* – all of which would ensure a consistent approach. She stated in her TAP that much of her lesson preparation is "...consumed by *behaviour management*...I never expected it to be such a huge part of my teaching ...". Comments from her VSR suggest that strategies such as relocating disruptive students to work in collaboration with other better students, does work.

Isabella's conceptions of science teaching in her inservice year of teaching indicated a focus on procedures and protocols of the laboratory where safety was of paramount importance. She stated that science should be activity based as a means of generating and sustaining interest in science, through discovery learning, scaffolding, understanding student misconceptions, and encouraging students to have fun in learning science. She said that behaviour management was an unforeseen challenge but she had been fortunate with the support mechanisms in place at school. Overall, Isabella's teaching is based on a philosophy of caring where students are encouraged to work confidently as self-directed individuals and with others, and to develop an appreciation of science and possibly, careers in science.

### ***Discussion: charting Isabella's development***

Isabella's conceptions of teaching at the conclusion of the third data collection in May 2003, reveal a degree of consistency in her conceptual structure. Isabella's initial experience as a social science teacher indicated a focus on five of Shulman's categories: *pedagogical content knowledge; content knowledge; general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*; and, *educational ends, goals, purposes and values*. Isabella's developing thoughts on social science teaching indicated a focus on *general pedagogical knowledge* focusing on *behaviour management* and *classroom communication; pedagogical content knowledge; content knowledge*; and, *educational ends, goals, purposes and values*. Isabella's realization as an independent practicing teacher indicated a focus on four of Shulman's categories: *pedagogical content knowledge; content knowledge; general pedagogical knowledge* focusing on *behaviour management*; and, *educational ends, goals, purposes and values*

Isabella's *content knowledge* base revealed a consistency in her conceptual structure. *Content knowledge* in Isabella's initial thoughts on social science teaching stressed the importance of the teacher having the disciplinary knowledge of the social sciences, including a passion for environmental issues and knowledge of world issues. Her developing thoughts on social science teaching indicated the continuing importance of the teacher having knowledge of subject matter, as well as being fun and interesting for students. In contrast, the focus of her *content knowledge* at her realization of teaching practice was almost exclusively on knowing the risk assessment and the safety procedures of science laboratories, knowing how to use scientific equipment, and knowing the toxic chemicals.

Isabella's consistent conceptions of *behaviour management* indicated changes within her conceptual structure. Isabella's initial experience of social science teaching showed a regard for negotiation and communicating the teacher's expectation (Figure 17) as the basis of effective *behaviour management*, but she said in her TAP that this was not possible during the limited duration of her professional practice teaching at her school. Isabella's developing thoughts on social science teaching indicated that effective behaviour management was based on rules, respect and classroom communication (Figure 18). Isabella's *behaviour management* on realization of independent practice revealed that her conceptions of effective was viewed in much broader terms than just the classroom, but one also based on support from staff and administration, as well as planning and preparation (Figure 19). Isabella reiterated the importance of staff support in her TAP, and she admitted that much of her lesson planning was consumed by *behaviour management* strategies. Commentaries from her VSR showed that strategies such as having disruptive students work in collaboration with motivated students had a settling effect on the former student.

Isabella's conceptions of *educational ends, goals, purposes and values* show change within her conceptual structure. Her initial experience on social science teaching indicated a focus on having students becoming active citizens, to have their own socially critical views, have fieldwork skills, and to engage in higher order thinking tasks (Figure 17). Statements from her TAP supported the idea of active citizenship, especially in terms of students developing their own ecological value systems. Conceptions from her developing thoughts on social science teaching indicated a desire to make teaching fun and to become a better teacher (Figure 18), and to sets standards of values and practices which students might ascribe to. Her focus at the stage of her realization of independent teaching practice indicated a desire

for students to enjoy science, of good memories for both students and teachers in a happy school (Figure 19). Comments from her TAP emphasised the point of students enjoying science and having good memories of the subject, but Isabella also spoke of the need to have set procedures for students when conducting experiments.

*Pedagogical content knowledge* was a consistent component of Isabella's conceptual structure of social science teaching. Her concept map (Figure 17) shows that *pedagogical content knowledge* was nominated at the macro level, as well as at the general and subordinate levels. It was a component of *teaching strategies* and *educational ends, goals, purposes and values* within the one hierarchy, and part of the key concept on another occasion. Isabella spoke about *pedagogical content knowledge* in her TAP in terms of the skills needed in studying the social sciences. Isabella's concept map (Figure 18) during her developing thoughts on social science teaching shows that *pedagogical content knowledge* continued to be nominated at the macro level, and concepts were nominated at both the general and subordinate levels as well. *Pedagogical content knowledge* was a component to the key concept, and to the concepts of *content knowledge, educational ends, goals, purposes and values, teaching strategies*, and to *general pedagogical knowledge*. *Pedagogical content knowledge* was a focus of her TAP during her developing thoughts on social science teaching with the continuing emphasis on skills development. Her concept map (Figure 19) at the realization of independent practice stage of teaching showed that *pedagogical content knowledge* continued to be identified at the macro level, and was nominated to a subordinate concept that was part of *curriculum knowledge, and educational ends, goals, purposes and values/ knowledge of learners and learning*. *Pedagogical content knowledge* was a focus of her TAP in which she stated that students learn science by doing science, while comments from her VSR indicated that

*pedagogical content knowledge* was closely linked to her comments relating to her *educational ends, goals, purposes and values* of teaching science.

Isabella's initial stages of her experience as a social teacher showed that she considered such concepts as 'reflection', 'analysis, interpretation, decision making', 'higher order thinking', and 'relevant topics relate to student – personalised' (Figure 17), as *pedagogical content knowledge* links to other aspects of social science teaching. Isabella stated in her TAP that reflection covers all aspects of teaching, and students needed to know a variety of skills, ranging from mapping skills to investigating data.

Isabella's developing thoughts on social science teaching showed that she considered 'research', 'constructivist approach', 'class discussion', 'argue a case', 'skills necessary to teach social science', and 'active investigating' (Figure 18) as *pedagogical content knowledge* links to other aspects of social science teaching. Isabella spoke of the importance assessment in her TAP as a good way for students to develop their argumentative skills, and develop opinions.

Isabella's *pedagogical content knowledge* on realization of independent teaching practice indicated an 'activity-based' approaches to other aspects of science teaching (Figure 19). Commentaries from her TAP indicated the important role of the teacher as facilitator in an activity based approach to science teaching where students are *doing science*. Isabella stated in her VSR that she used exemplars of work done by previous students to indicate her expectations about students' written work. Isabella also spoke of the importance of allowing students to engage in discovery learning, but she also emphasised the importance of scaffolding techniques to help students understand the procedures in experiments, and knowing students' misconceptions. Overall, Isabella's knowledge base of teaching indicated a continuing desire to engage

in constructivist approaches to teaching, a major concern for safety procedures and knowledge of chemicals, and also keenness to instil in students an understanding of laboratory procedures.

## JANE

Jane completed her secondary schooling at a state high school where she took Studies of Society and Environment in Year 8, and Geography from Years 9 - 12. She enjoyed both subjects, and her travels overseas furthered her love for Geography where she was able to observe at first hand the people, landforms, and resources of each country. Her teachers were an inspiration, and her ultimate decision to become a teacher was based on her association with two Geography teachers. Both had travelled extensively, both had a passion for Geography, and both encouraged classroom discussions.

### ***Jane's initial thoughts on social science teaching***

Jane's response to her initial focus questions indicated a belief that teaching should be student-centred, that is, where meaning is created by the student, rather than by the teacher because "...it is retained 'better' and makes more sense". Jane regards herself as a facilitator for learning because

*There is no use in me just regurgitating information to students, if this was the case, I might as well tape record my voice and put a cardboard cut-out in front of the room. I believe that school/ Geography/SOSE should be fun and enjoyable. When I have to teach a particular topic, I think about how I can present the information in a way that is student-centred, engaging and enjoyable (not only for the students, but also for myself! I don't want to be bored!).*

Jane wanted to be a teacher because she was "...absolutely passionate about Geography...", and wanted to instil her passion of people and places into her students – "...I want them to embrace the world they live in ...". She also said that she wanted to stimulate their desire to learn, make a difference to the education system, be in an

occupation that makes a significant contribution to society, and, to be in a classroom full of students because “...I just love interacting with people ...”.

Jane enrolled in a Bachelor of Education program at Griffith University where she majored in Studies of Society and Environment (SOSE) and English. She spent her final professional practice teaching at a small, coeducational, urban state high where she taught Studies of Society and Environment (SOSE), and English. A lesson of Year 9 SOSE was videotaped for a stimulated recall interview. Jane received a Suitability Rating of ‘1’, the highest, from Education Queensland.

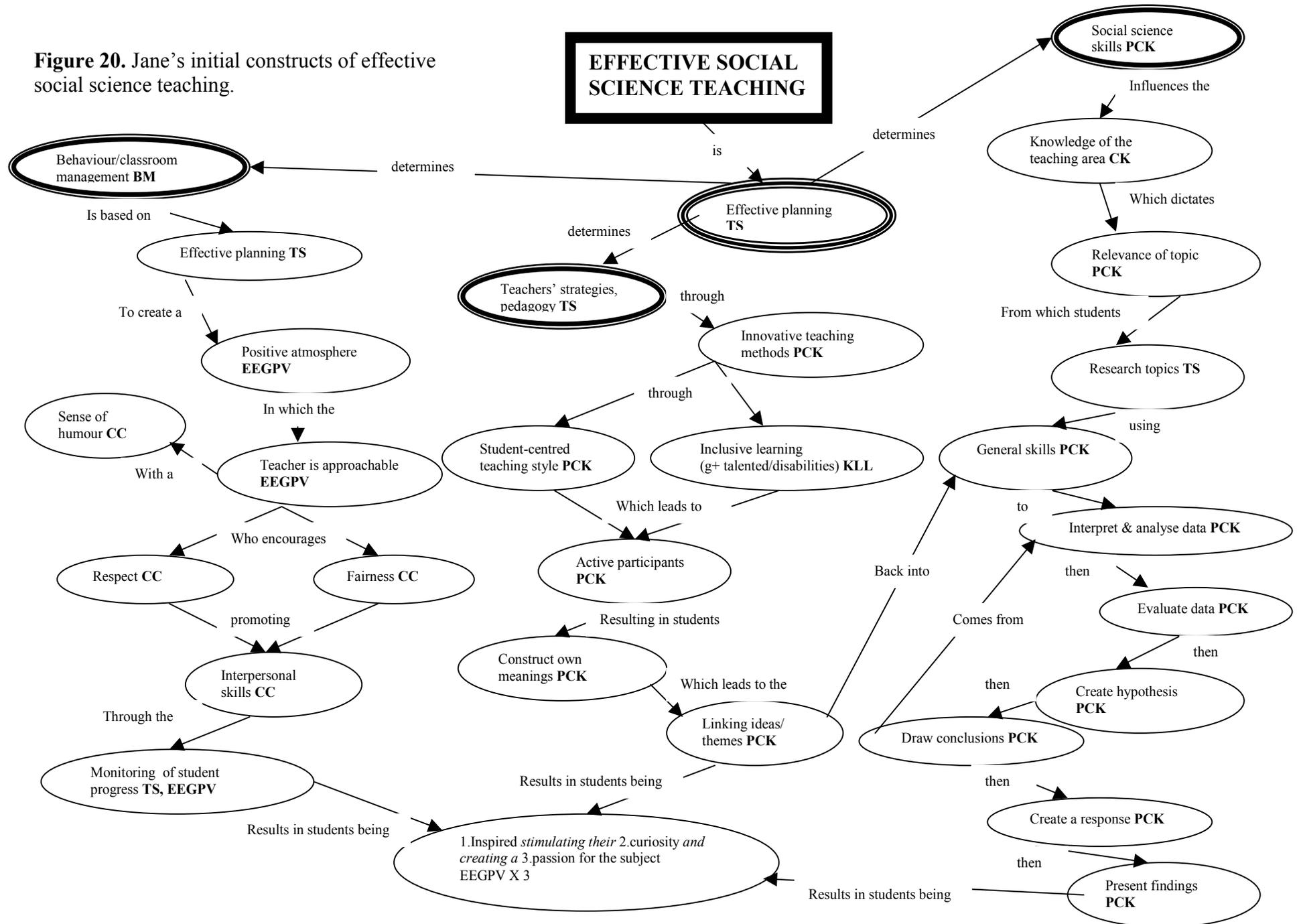
She was appointed to a coeducational, regional state high school in following year where she taught Years 8 and 9 SOSE, Year 8 English, and Year 9 and 10 Geography. Jane taught a lesson to a class of Year 10 Geography students that was videotaped for the final video stimulated recall interview.

### ***Jane’s initial constructs of social science teaching***

Jane’s concept map contains all aspects of a map construction, that is, there were general concepts, subordinate concepts, relationships, branches, hierarchy levels, cross-links and outcomes concepts (See Figure 20). Linking arrows and their linking words establish logical relationships between concepts, and one cross-link indicates that there was evidence in Jane’s thinking about integrating knowledge bases across hierarchies.

Central to the success of Jane’s social science teaching is ‘effective planning’ (TS), because as her concept map showed, planning dictates the types of teaching strategies that include ‘student-centred teaching style’ (PCK), thereby allowing students to construct meaning. Although ‘effective planning ‘ (TS) determines *behaviour management* practices, Janes concept map showed that ‘behaviour/classroom

**Figure 20.** Jane’s initial constructs of effective social science teaching.



management is also determined by a variety of *classroom communication* strategies such as ‘sense of humour’, ‘fairness’, interpersonal skills, and ‘respect’.

‘Effective planning’ (TS) also determines how the teacher’s ‘social science skills’ (CK) are to be used. ‘Social science skills’ (PCK), according to Jane, is foundational in determining what topics are to be researched by students in their inquiry approach to learning; the remainder of subordinate concepts in the hierarchy have been nominated by the researcher for *pedagogical content knowledge* because they represent various strategies in a depth study – the basis of inquiry in the Senior History Syllabus (BSSSS, 1995) and Studies of Society and Environment (SOSE) Syllabus (QCSS, 2000). The knowledge bases of ‘effective planning’ (TS), ‘fairness’ (CC), ‘behaviour/classroom management’ (BM), and ‘relevance of topic’ (CK), indicated that Jane also had an understanding of *pedagogical content knowledge* at the macro level.

While Jane’s concept map focused on a range of Shulman’s categories including *content knowledge*, the focus of her Think Aloud Protocol showed that her thinking about effective teaching centred on *pedagogical content knowledge, knowledge of learners and learning, teaching strategies, and behaviour management*. Jane equated the most general concept of ‘Effective planning’ with ‘effective Social Science, “...because you’ve obviously got to plan your activity ...”. Jane’s planning and teaching includes aspects of Shulman’s (1987) “model for pedagogical reasoning and action” with stages of *comprehension, transformation, instruction, evaluation, reflection, and new comprehension* (see Figure 2). *Transformation* involves, a process of “preparation” of materials to determine what Jane calls, ‘relevance of topic’ (PCK), and the goals or outcomes of the topic. Jane explained relevance in terms of,

*...the knowledge...and with that knowledge...the way you link...  
if you can effectively link...the ideas of what they are doing...of*

*the topic they are studying now...and linking it into other areas... Social Science...which is what its about...you've got people and places ...and resources...and systems...If you can link all that in ...you will have relevance of topic.*

“Representation”, the next phase within *transformation*, involves the way that the ideas can be represented to students, such as Jane’s proposition of ‘innovative teaching methods’ through ‘inclusive learning’ (Groundwater-Smith et al., (2001).

Her *knowledge of learners and learning* was evident when Jane explained that

*...you've got to know the way in which they learn... about multiple intelligences...the metaphysical...( )...umm... do they have any disabilities...are they learning impaired... are they sight impaired ...are they gifted and talented?*

“Selection” is the third phase within the *transformation* process, and this concerns the instructional repertoires such as Jane’s ‘teacher’s strategies, pedagogy’ (TS) and in this case, this involved a range of teaching strategies including ‘student-centred teaching style’ (PCK), ‘innovative teaching methods’ (PCK), and ‘active participants’, leading students to ‘construct own meanings’ (PCK) , “...instead of traditional ‘chalk and talk’ ...so the teacher doesn’t present...the information...the students have to research it for themselves ...”. The Studies of Society and Environment Syllabus (QSA/QSCC, 2000) states that student-centred learning is an active construction of meaning, and that teaching is “...the act of guiding and facilitating learning” (p.8).

The third stage of the cycle of pedagogical reasoning, involves *instruction*, matching Jane’s concepts that indicate the observable performance of Jane’s *pedagogical content knowledge*. These include the previously mentioned specific concepts in the “transformation” stage, particularly the ‘student-centred teaching style’ and ‘innovative teaching methods’ that results in active student participation and constructivist learning. An essential element in Jane’s constructivist approach to

teaching is students creating and testing hypotheses in their research work such as the depth study in Senior Modern History Syllabus (QSA/BSSSS, 1995). She explained that students start by

*...using primary documents...or...umm...have to make predictions  
...based on the data...such as tables...on whole populations... or  
interpret the data...and...umm...using their general skills... and  
from my experience...SOSE... you have to look at your research  
...you have to interpret ( )... and evaluate the relevance of it...  
or...is the data enough to make a hypothesis...*

In terms of presentation of their findings, Jane suggested a number of options including

*...to the whole class...like if it's a small activity...umm... they  
might do it individually... then they might present their findings  
to the class...or it might be that they might have to write an  
assignment about it...depends...*

Jane was also flexible in terms of students' cognitive abilities used in research, that is, adhering to the order of difficulty according to Bloom's taxonomy (Bloom et al., 1956). As Jane pointed out,

*...you can turn it around ...its safer...like doing an assignment  
... this is the kind of way I do it...but generally speaking... it  
doesn't have to be that way...*

Flexibility is also the cornerstone of her *behaviour management* program, citing the approachability of the teacher, because as she pointed out

*...if you have an approachable teacher...you can speak to your  
students...you find a common level...when you speak to them  
...you don't have as many problems...*

But of most importance is the planning

*...because you must have a management plan...for example  
...like a seating plan...or if you have...umm...even just...  
even have an activity...the way in which you want them to  
work...you must plan for everything...keep them on track  
...if you want your teaching strategies to work...*

Along with her other concepts promoting effective *behaviour management*, namely,

the reciprocal nature of ‘sense of humour’, ‘respect’, and ‘fairness’, Jane’s primary goal was to create a positive atmosphere.

Ultimately Jane wants her students

*...to be inspired...I want them to be curious...I want them to have passion...curiosity...probably...is the biggest one I want them to have...Its important to question things...I don't want them to take things at face value...umm... to be asking why...*

### ***Jane's initial knowledge in action and reflection***

Jane’s video stimulated recall was based on a lesson with her Year 9 Studies of Society and Environment class about the construction of the three Gorges Dam in China. Her constructivist teaching approach included expert scaffolding, and group work, utilising a variety of resources, ranging from the whiteboard, an overhead projector, and ‘butcher’s paper’.

Jane stopped the videotape 22 times during the recall interview, and a total of 28 categories of knowledge bases were identified from her responses (See Table 9).

**Table 9: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	14
-Classroom communication	1
-Personal beliefs	-
Content knowledge	-
Curriculum knowledge	-
Knowledge of learners and learning	6
Educational ends, goals, purposes and values	-
Knowledge of educational contexts	1
Pedagogical content knowledge	3

Jane explains the nature (Groundwater-Smith et al., 2000) of her class in terms of her *knowledge of learners and learning* in that

*...some of my experiences with these classes ...most of them are Year 9s, I have them in English as well...and so behaviour-wise,*

*I've got to learn about them fairly well. And that group of girls I'm going to speak to...will be prepared from now on...as if ...we decided that in morning tea...from now on...after this ( ) they will be separated. Umm...but I've got to know the students fairly well. They all know me by name ...and I know them by name as well ...and I'm fairly clued into their learning strategies...and their preferred learning methods. So...I like doing these kinds of activities ...of labelling things and actually drawing it...hands on, because I know a lot of the students who like to draw, especially the ones with poor literacy skills. But if I can put things on, put colours on it...and they are hands on...and "Oh, this is my idea, this is how I can do it..." Works so much better, and I have less problems with ...behaviour...if I have to give lecture style...do notes and stuff – problems!*

She then commented on the learning preferences of one particular

*... student I am with at the moment...umm...has a lot of problems with literacy, but I figured out within the ...SOSE class and my English class, but he likes drawing and he likes "break" dancing. So, Obviously, I can't put break dancing into SOSE, but anything I can do, I make it visual for him...and then he gets to work. But this is the most work I have ever seen him do ...in either of my classes I have taught so far. He's actually switched or ( ) his own learning into it... Yeah ...I find that I can...If I...can pick out their learning strategies or their learning techniques...I should say...I can modify my teaching strategies to become more successful.*

Her observations show that she had gained a good understanding of her students in a cognitive and empirical sense at both the group and individual levels.

In terms of her *teaching strategies* Jane explained that

*...this is basically how I like to run my class. Give them the content ...I would definitely cover it shorter ...umm...but then get them into the activities and the students start doing their thing...and answer questions along the way...make sure everyone...doing the right thing. Up bit further, I made a decision on my feet...umm... "Make sure you label the areas". Like ...once I see that everybody has understood the actual task, they get on with it, and as they go through it, if anyone has problems ...bring the class back together and say, " Hey guys..."*

In fact, gaining students' attention is an essential tool in Jane's *teaching strategies*.

Jane explained that

*When I bring the class and I'm trying to get their attention...and I'm like...yeah, "Righto, listen up. Look this way. Pens down"...I've learnt that ...if...they are not listening...I'll stop...I'll wait...and then, I'll start again. That can be really repetitive...but that's a technique I've*

*picked up so far. Just call them to attention, then wait till they are listening and give them the instructions...rather than just keep talking over them...*

However, not all students were on task, a state of affairs which Jane readily admitted, but saw no point being “...on the back of students who aren’t doing their work, because at the end of the day...those four girls won’t do their work anyway”. Instead, “...I spend most of my time going around to the rest of the group, that are actually doing their work ...”. In other words, rather than being bogged down in an ongoing power struggle with a small group of students, who possibility exhibit *behaviour management* problems of her mentor teacher’s making, Jane chose to take what she regarded as the productive option. Jane’s dilemma is not unique since all preservice teachers have constraints imposed on them that limit their ability to manage students (Bennet & Carre, 1993).

There were other incidents Jane experienced that typically confront the novice teacher during their teaching practicum. There were the initial problems with the photocopying:

*...this will be enough...25 copies...no...25 copies is not enough .I’ve now learnt...to make it 35 copies...for a 25 student class ...with 10 extras. This is me trying to be environmentally friendly. But...I...umm ...fixed up the problem by giving one between two...*

The map that Jane held up to the class could only be seen by students who were at the front - “...The kids at the back...they can’t see a thing”; the overhead projector was out of focus; and, instructions to the class should have been written in pencil first so, “...when I make a mistake, I can rub it out and do it again...”. After watching the video on the Three Gorges Dam, students, according to Jane, were asking “ridiculous, completely irrelevant ... questions about...” the lock systems, rather than the social or economic impact of the dams. This was compounded by the fact that Jane could not remember the questions she was to ask students. As she explained, “I had questions

lined up...to ask...but as soon as the video finished, I didn't write them down...and then...I couldn't remember”.

There were, however, other occasions when Jane felt she had used questions to good effect, that is, to jog students' "...memories because they had an exam about ... and flooding ...getting them...making sure they are familiar with the terms... commercial ...residential...”. Jane's technique involved, "...making sure everyone is listening by using their names. And that I don't replay every answer they give ...so that...whatever I say, therefore...the authority”. (Cole & Chan, 1994).

Jane's *pedagogical content knowledge* of teaching was evident when she also used questions to have students link knowledge learnt in the current lesson with the previous, "...so everybody knows what they are on about...”. Furthermore, in eliciting answers from students, she was encouraging the students to construct their own knowledge, rather than structuring the lesson by going

*... through things step by step ...saying, “Righto...put in the residential area ( ) ( ). Okay, now...put in a commercial area. Now, put in this. Now, put in this...” And could have structured a lot more to make sure that everybody was completed by the end of the lesson, but the reason I didn't do that, was that I wanted them to make ...to see the link...the interlinking effect of all these areas on rivers.*

The manner in which one addresses students is just as important. As Jane explains,

*I've taken into consideration ...without even really thinking...the ways to speak to students ...to speak to them on a one-to-one basis ( ) if you can possibly do it...not standing over them...you know bearing down on them, but trying to get down to their level...I'm beside them ...but not over them...I'm not having a domineering stance.*

This theme of tolerance is also reflected in the kind of learning climate Jane has with her students:

*...I think the noise level is fine. Umm...they are all working...I'm going around checking the groups...and I think each I've checked five or six times...and spoken to individual students and asked them about...and they are all talking about the park...*

### **Summary: Jane's initial experience as a social science teacher**

The two data sets elicited from Jane in May 2002 indicate a focus on three of Shulman's categories: *pedagogical content knowledge*; *knowledge of learners and learning*; and, *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. Her concept map identified 'active participants' as a key to a constructivist approach. Commentaries from her TAP indicated her preference for student-centred teaching which gives learners the opportunity to construct their own knowledge, rather than be the recipients of 'chalk and talk'. Her VSR identified her class questioning techniques as a means for students to deliberate, discuss, and construct their own knowledge.

*Pedagogical content knowledge* featured in her two data types. Jane's concept map showed that the nomination of *teaching strategies*, *classroom communication*, *behaviour management*, and *content knowledge* indicated she had an understanding of *pedagogical content knowledge* at the macro level. Multiple *pedagogical content knowledge* bases were identified at the micro level for the inquiry or depth study approach, beginning with 'general skills'. Each subsequent subordinate concept in the hierarchy was assigned a *pedagogical content knowledge* base since it represents different phases or different thinking strategies as learners progress through the process of inquiry. As she explained in her TAP, it is important for students to be able to have the skills to use source documents and "...to make predictions...based on the data ...". Jane also spoke of the importance of effective planning that entails reworking comprehended knowledge to make it relevant for learners. According to Shulman's (1987) "model of pedagogical reasoning and action", teaching first involves comprehending "... a set of ideas to be taught..." and "we expect teachers to understand what they teach..." (p.14). The second stage of effective planning is

what Shulman (1987) calls, *transformation*, that is, the ideas which have been comprehended by Jane, and then to be transformed “... in some manner, if they are to be taught” (p.16). Commentaries from her VSR indicated her willingness to challenge learners by encouraging them to establish their own links to phenomena.

*Knowledge of learners and learning* emerged from the two data sets. Her concept showed that the success of ‘innovative teaching methods’ (PCK) depended on both ‘student-centred learning’ (PCK) and ‘inclusive learning’ (KLL). As Jane stated in her TAP, “...you’ve got to know the way they learn...”. The statements about learners in the Studies of Society and Environment (SOSE) Syllabus (QSA/QCSS, 2000) highlight the fact that learners are individuals with divergent views about the world, that they learn in different ways, and that they grow and develop at different rates. “Adaptation” is another phase of *transformation* that involves “fitting” the represented material to suit the characteristics of students, a process to which Jane has already alluded in her concept of ‘inclusive learning’. The Studies of Society and Environment Syllabus (2000) statement on “Equity in curriculum” is unequivocal in its support of an inclusive curriculum for all students. Commentaries from her VSR indicated Jane’s understanding of her learners at both the group and individual level.

Both *teaching strategies* and *behaviour management* featured in the two data sets. Her concept map showed that *teaching strategies* was nominated to both ‘effective planning’ (TS) and ‘teaching strategies/pedagogy (TS). Both play crucial roles and their linking words of ‘is based on’ and ‘determines’ that link ‘teachers strategies/pedagogy’ (TS) and ‘behaviour/classroom management’ (BM), show how strongly dependent these concepts are on effective planning. Other powerful linking words, namely, ‘is’ that link the key concept to ‘effective planning’, and ‘determines’ that link the latter with ‘social science skills’. In short, the linking words that link the

key concept and other general concepts to 'effective planning' indicate the pivotal role of the latter on effective social science teaching. Her TAP states that effective planning is essential "...because you've obviously got to plan your activity...you must plan for everything ...". Commentaries from her VSR, however, reflected some of the basic planning challenges she faced in organising resources for students. As noted previously, effective *behaviour management* is subject to effective planning, but it still plays an over arching role in her concept map in developing a 'positive atmosphere' (EEGPV) based on 'fairness' (CC) and 'respect' (CC) from a teacher who also possesses a 'sense of humour'. Her TAP commentaries stressed the approachability of the teacher, while commentaries from her VSR indicated a teacher who was tolerant of noise levels in her class as long as student discussions were task related.

Jane's initial conceptions of social science teaching indicated a focus on constructivist approaches to teaching, which would lead to students who are inspired, curious, and have a passion for their subject. She believes that the basis for this constructivist approach is centred on the depth study. The success of the depth study and for that constructivist teaching entails knowledge of learners learning. 'Effective planning' is the cornerstone of her teaching – effective social science teaching would not be possible without it, since it determines the effectiveness of behaviour management, pedagogy, and social science skills. She stated that effective *behaviour management* provides the positive atmosphere for effective learning and teaching. Overall, Jane displays a strong sense of social justice and democracy based on a constructivist approach that considers the individual student as a creative and complex thinker who is capable of learning in different ways.

### ***Jane's maturing constructs of social science teaching***

A six month time lapse showed less development than her previous map (Figure 20) in terms of general concepts, subordinate concepts, relationships, and branches. Logical relationships between concepts are still established through the effective use of linking arrows and their linking words, however, no cross-links indicate an item streamed map structure.

The focus of her map was on *educational ends, goals, purposes and values*, a number of which were present in two subordinate concepts in the pedagogy hierarchy, indicating the importance Jane placed on process in the acquisition of outcomes. For example, directly subordinate to the 'range of teaching methods' (TS) concept, are the sub goals of 'learning (EEGPV); 'developing learning potential' (EEGPV); 'participation' (EEGPV); 'critical inquiry' (PCK); and 'promoting life long learning skills' (EEGPV), two of which again appear in the core outcomes. The concept that follows also contains a set of sub goals, which indicates the desired student achievement, such as meeting both the required cognitive and affective outcomes of the SOSE Syllabus. There were, as well, a number of requisite affective and cognitive sub goals from the teacher's point of view, such as being 'considerate' (CC), 'fair and just' (CC), 'compassionate' (CC), humour (CC), and being "'in touch" with students' (CC), all of which, according to Jane, are necessary to achieve the desired outcomes.

'Classroom management' (BM) continued to be a focus of her teaching in order to create a 'supportive/caring environment' (CC) based on the nominated knowledge base of 'equity' (EEGPV), 'critical thinking' (EEGPV), 'life long learning' (EEGPV), 'learner/student centred' (EEGPV), 'participation' (EEGPV), and, 'supportive environment' (EEGPV), indicating the continued importance of behaviour management strategies in her teaching. 'Pedagogy' (TS) also continued to be a focus

of Jane's teaching that including a range of nominated knowledge base in the subordinate concepts that also resulted to the previously mentioned *educational ends, goals, purposes and values knowledge* bases. Whilst planning was central Jane's first concept map (Figure 20), it was not mentioned in her second map (Figure 21).

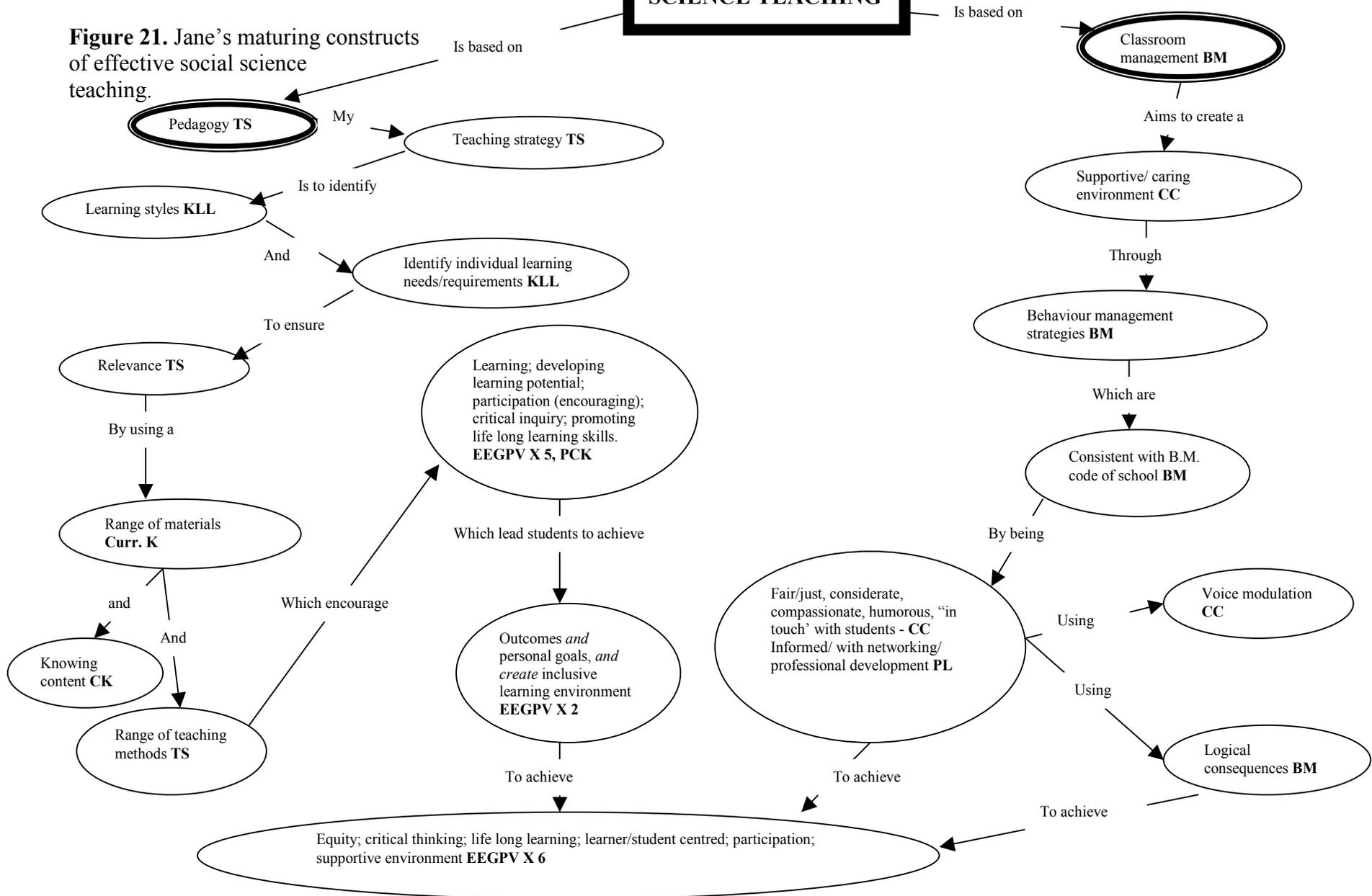
*Pedagogical content knowledge* was not the strongly focused knowledge base as shown in her first concept map (Figure 20). The process of 'critical inquiry' (PCK) was only part of a concept containing other knowledge bases. Despite this lack of development of *pedagogical content knowledge* at the micro level of her map, the nominated knowledge bases of 'pedagogy' (TS), 'supportive, caring environment' (CC), 'behaviour management strategies' (BM), and, 'knowing content' (C K), indicated her continued understanding of *pedagogical content knowledge* at the macro level.

The nomination of 'informed with networking /professional development' (PL) represents an elaboration of Shulman's categories (Figure 21). Jane's thoughts about teaching have moved beyond the classroom to membership of professional associations to inform her classroom teaching. *Professional learning* is the link between Jane's *behaviour management, classroom communication and educational ends, goals, purposes and values*. As noted earlier, *professional learning* is about the changing nature and demands placed on schools and teachers that move beyond *knowledge of educational contexts*.

The focus of Jane's Think Aloud Protocol (TAP) was on *behaviour management, teaching strategies, and pedagogical content knowledge*. She identified voice modulation (Nelson-Jones, 1996) as an importance feature of her *behaviour management*. She said that

**EFFECTIVE SOCIAL SCIENCE TEACHING**

**Figure 21.** Jane’s maturing constructs of effective social science teaching.



*You know ...I've never learnt how to raise my voice until this final prac. They were good kids though, I didn't really have to... I didn't have any major problems so I think I might be in for a shock if I have some naughty kids one day or what they deem as naughty.*

She summed up her *behaviour management* policy as a means of creating a

*... supportive and caring learning environment through behaviour management strategies, which are consistent with the behaviour management of the school...by being fair, just, considerate, compassionate, humourist...Being informed with new developments like in theory and in management practices ...*

Jane's pedagogy was divided into two parts: *teaching strategies* and learning strategies. She explains her teaching strategies as one that identifies

*...learning styles...and then modify my teaching strategy to ensure that's its relevant...identifying their learning, their needs within that style. Like for each individual student. Umm...ensuring that it is relevant using a range of materials, using a range of teaching methods...*

In terms of *pedagogical content knowledge*, Jane spoke of promoting critical inquiry, during her professional practice teaching, "...when I was doing my final prac you give the students some information and they need to come up with a hypothesis from that ...".

### **Summary: Jane's developing thoughts on social science teaching**

The data elicited from Jane at the conclusion of her Bachelor of Education studies indicated a continuing focus on two of Shulman's categories: *pedagogical content knowledge teaching*; and *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. The identification of *teaching strategies*, *classroom communication*, *behaviour management*, and *content knowledge* on her concept map diagram indicated her understanding of *pedagogical content knowledge* at the macro level. *Pedagogical content knowledge* was assigned to 'critical inquiry' because it is key to the constructivist processes in the social science syllabi. Whilst

Jane's first concept map had nominated multiple *pedagogical content knowledge* bases for strategies nominated in the inquiry process, her second concept map received one nomination, largely because she did not elaborate on the strategies involved. Nevertheless, she had positioned 'critical inquiry' as one of the important group of knowledge bases within one concept that relate to student learning, participation and developing life long skills. Her TAP stated that the most efficient way of promoting critical inquiry is to give "...students ...information and they need to come up with a hypothesis ...".

*Behaviour management* emerged from the data. The linking words 'is based on' that links 'classroom management' to the key concept on her concept map, indicated the strong dependency the latter has on *behaviour management*. Subordinate concepts within the hierarchy identified the consistent theme of caring, consideration, and humour, as well as a new emphasis on 'logical consequences', and a behaviour management policy that is consistent throughout the school. Her TAP stated that 'voice modulation' should also be a part of behaviour management, and in general terms, teachers need to keep abreast with new developments in behaviour management.

*Teaching strategies* featured in the data. 'Pedagogy' was the other general concept on her map that has been nominated for *teaching strategies*. The linking words, 'is based on', also indicate the dependent nature of effective social science teaching on pedagogy. The subordinate concepts that relate to teaching strategy (TS), 'learning styles' (KLL), 'relevance' (TS), and 'range of materials' (Curr K ), provide opportunities for students to engage in higher order thinking through a process of critical inquiry. Her TAP stated that *teaching strategies* should be modified to suit

individual students' learning strategies so as to ensure relevance, by "...identifying their learning, their needs within that style".

Jane's conceptions of social science teaching at the completion of her Bachelor of Education studies indicated a continuing preference for *pedagogical content knowledge, behaviour management, and teaching strategies*. She identified the critical inquiry or depth study as the key to developing learning potential, higher order thinking, and eventually life long learners. She considered effective behaviour management as one that is in accordance with the rest of the school. She also stressed the importance of flexible teaching strategies that cater for the individual learning styles of the student as the basis for effective social science teaching. Overall, Jane displays a strong sense of democracy based on equity and a constructivist approach to teaching where students are capable of engaging in the skills of lifelong learning in a supportive and caring environment.

### ***Jane's constructs of social science teaching on realization of independent practice***

Jane's construction of her third concept map diagram after six months of inservice teaching indicated a hierarchy of concepts that began with the nominated knowledge bases of 'implementing' (PCK), 'reflecting' (PCK), and 'planning' (PCK) that ultimately led to the nominated *educational ends, goals, purposes and values* knowledge bases of 'lifelong learning', 'critical thinkers', 'informed citizens', 'curious about the world', 'motivated and enthusiastic about being an active participant/member of the world', 'enjoys learning and enjoys my class', and 'has aspirations to change/contribute to our society' (Figure 22).

Six cross-links that link the three general concepts in a cyclical way indicated the integration of *pedagogical content knowledge* at the highest levels of hierarchies and

consequently throughout the hierarchies. In essence, the cyclical connection of these three general concepts showed that Jane's conception effective social science teaching is reliant on all three operating in unison, in either direction. So, whilst planning will involve reflection before implementing a lesson, so implementation will lead to reflection that will then inform a re-evaluation of planning. Both 'planning' and 'implementing' then, are inextricably linked, although the powerful linking word, 'demands' that links 'planning' with the key concept indicated the key role of planning in effective social science teaching. Significant in the cyclical process is the concept of 'planning' (PCK) which was central to Jane's first concept map (Figure 20), but was not part of her conceptual thinking in her second map (Figure 21). Her concept map (Figure 22) indicated that planning goes beyond the *pedagogical content knowledge* process but to include other factors as 'units of work' (Curr K), 'follow work program' (Curr K), 'the syllabus' (Curr K), and 'the humanities philosophy' (CK), an indication of the realities of practice teaching.

The strong focus of *educational ends, goals, purposes and values* knowledge bases on Jane's map indicated the continued importance she placed in outcomes based education. *Behaviour management* continued to be a strong focus in her teaching but unlike her first two concept maps, behaviour management was not nominated at the general concept level. However, the concepts indicate a *behaviour management* policy that should have a plan, are consistent throughout the school, and have realistic consequences, tending to reflect the realities of practice.

The focus of Jane's Think Aloud Protocol (TAP) was on *pedagogical content knowledge; educational ends, goals, purposes and values; behaviour management; and knowledge of learners and learning*. In terms of *educational ends, goals, purposes and values*, Jane spoke of linking the Humanities Department's philosophy

with work programs “...so you are specifying what needs to be covered and what outcomes you are going to be using ...”. Much of the planning is done with teams of teachers who are charged with the responsibility of producing units of work. She said that

*...there’s a list of outcomes that have been set down in the work program ...that outline the unit of work...and what needs to be achieved in that ...then you sit down with your team...and work through how those outcomes are going to be arranged...Year 8–15 ...so all the teachers are together...but in 10 Geography...there are four of us...then you figure out how you are going to meet these outcomes...how those outcomes are going to ...guide you to an assessment...*

Jane said that she wanted a class of students who had fun in caring and supportive environment “...where teacher and student feel comfortable enough ...to interact...”, and where critical thinking is encouraged.

An important facet in the *pedagogical content knowledge* process is her concept of ‘productive pedagogies’ which she described as

*...things like higher order thinking...umm...substantive conversation ...and meta-language ...umm...connectedness to the world...such a background knowledge...or ...knowledge integration ...*

She spoke of using action research as one method of inquiry to develop higher order thinking by having students

*...identify the problem...they research it...then they evaluate and analyse the data and... then they...realise...you know...this is the problem...this is the action we can take to change the problem or improve the situation...so they list possible actions they could take...they predict the outcomes of these actions...they evaluate whether...which action should be taken...and then they take action...and then they reflect on that...*

There were other instances of her *pedagogical content knowledge* base of teaching, such as modelling examples to the class and then having students do the activity themselves. For example, students



*...had to do an evaluation matrix...So...I set them the scene that...to use this matrix on a party you were going to have...take three examples of cups you would use ...let's create some criteria for what's a good cup...and let's see how well they hold the water...and we went through the procedure...and they filled out the matrix...and it was a really good example...a visual example that they could see...and yeah...catering for multiple intelligences...so ...not only was that a valuable kinaesthetic task...it was also a prism task with a narrative...*

Jane's *pedagogical content knowledge* base of effective social science teaching is summed up in the interlinking role of 'planning', 'reflecting' and an 'implementing' phase in which "...planning is obviously the first one..." in the cycle, so "...when you first start...you would reflect on what has happened before ...". So

*...once the learning experience has occurred...from the implementing stage...you can reflect on that...and then you link that back into you planning for the next time ...so whether that is linking that back into the next unit of work you do...or linking that back ...just for the lesson plan...reflect on it...*

However, she said that she "...didn't have anything to reflect on last term ..." because she had just been appointed to the school, and hence her difficulty of establishing the cyclical mode for effective teaching.

Jane spoke of having a *knowledge of learners and learning* in order to create the kinds of learning environments that students respond to, such as

*...building o prior knowledge to plan for the future...so ...if you're in a team that has taught that particular group before...you could use your prior knowledge of the group...to build on what you've got...*

She said that her *behaviour management* strategies involved negotiation of the expectations of the class that are in line with the school policies. However, in general terms, Jane said that

*Behaviour management at our school is quite lax...in the sense that not all teachers are implementing the same rules...or for those who do...you are not given the required support from the admin team...students know how much they can get away with...and push the limits... because the consequences will be small...*

### ***Jane's knowledge in action and reflection on realization of independent practice***

Jane's video stimulated recall interview was based on a lesson about the negative impact of multinational corporations that she had taught to her students of Year 10 Geography earlier on the day. They had the task of identifying a problem as part of their action research task, research it in the library, and then write up the results in paragraph form. Jane used a learner-centred approach to her teaching, in combination with information packs and a whiteboard.

Jane stopped the videotape 26 times during the recall interview, and 32 categories of knowledge bases were assigned to her responses (See Table 10).

**Table 10: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	2
-Teaching strategies	1
-Classroom communication	1
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	2
Knowledge of learners and learning	4
Educational ends, goals, purposes and values	13
Knowledge of educational contexts	-
Pedagogical content knowledge	8

Jane said in her *educational ends, goals, purposes and values* knowledge base that she wanted her students to identify a problems, and then create realistic action plans – in a theoretical sense, and not something unrealistic as being “...out the front in Townsville ...with ten thousand people ...”. What is important, Jane stressed, is for students to understand the cycle of ‘the action research process’ of identifying a problem, investigating the problem, evaluating the data, listing possible actions, predicting outcome, selecting the best action, implementing the action, and evaluating the action. Students should

*...embrace this cycle and actually take power from the fact that they know where they are going in this cycle...and they can...really use that to their advantage...they know what's expected from each section ...and they know what's expected from each lesson...it's all made very explicit...So...they don't have that feeling... "Oh...I don't know where I am going with this..."*

Jane gave students an overview on an A4 piece of paper that outlined in table form "...all the steps they need to follow...all the questions they need to answer..." in the action research process, as well as "...how they need to set out their paragraphs...". Her knowledge of *educational ends, goals, purposes and values* also included her comments on the four different topics on multinational corporations of which students had to choose at least one, identify a problem within that topic, and then investigate the problem in the library. She said that the

*...final product will be a couple of paragraphs ...one paragraph outlining why this multinational company...is a problem...A couple of paragraphs ...outlining the who/what/where/why/how...some statistical data...a couple of maps...an evaluation matrix of the action that they should take...*

Jane was pleased with the identification of the problem phase "...because a couple of students from each group..." had identified issues to research, and because other students who were initially unsure of their topics were able to get some feedback as well and help them crystallise some ideas about their topics for research.

However, she expressed concern over the lack of *content knowledge* in some information packs, a problem she blamed on other members of the teaching team whose individual contributions were of questionable quality, which meant "...they are going to have to do more work...because it's not good enough for the students...". Her other concern centred around getting students to move into those groups to work on their topics of choice. She felt that some students had decided to remain at their desks simply to be with their friendship groups. Jane said that one of her goals was "...to get them out of their seats...and get them out and about and active..."

A possible solution, and evidence of *her pedagogical content knowledge* base, was to have students do an activity called ‘woolly thinking’, a type of kinaesthetic concept map in which

*...you have a central person who's the main idea...and...umm...you brainstorm with it on the board first...or...you have your main concept...and figure out key elements ...and you make each of those key elements a person...and you get a big ball of wool...and you have a runner...who runs out these key elements and interlinks them...Then you have another group of people who observe this 'kinaesthetic concept map' ...and they explain all the links...and why they are linked this way...*

As well as having the steps of the action research process on paper, Jane showed students an episode of Law and Order in the previous lesson that “... demonstrated each step of the action research process...”, to get them to recall how the cycle worked and then to apply it in their own action research. Another facet of her *pedagogical content knowledge* base was to model the action research process by selecting a multinational company such as Nike, in which they

*...identified a problem...did some research...umm...identified some that we could take...And we created a matrix and then...evaluated the data...made a recommendation and then spoke about ...hypothetically what action we could've taken...So ...each step that they're about to take in their own research...has been...has already been demonstrated in class...so they've seen the entire cycle working...but it's reviewed for their own chance to do it...*

Jane said that the big challenge for students was to identify a problem “...because it involved a lot of researching and reading of data...and to make links between the information ...”. She acknowledged that some information packs were not explicit and that students needed to make inferences about the data, which was something “...they'd have to develop for themselves...umm...which would be very difficult ...”.

Jane admitted that their findings would not be exceptional but the purpose of the exercise was to see the issues at the surface level first, and to understand what is

involved at each stage of the cycle. She also sought understanding from students by having them articulate the implications of issues. She explained that

*...I'm getting them to demonstrate...rather than give one word answers...get them to demonstrate their knowledge and understanding of what they are reading ...*

In terms of *knowledge of learners and learning*, Jane spoke of her class as “...pretty good ...”. She said they usually sit in their friendship groups and have the kind of dynamics “...that is pretty warm and friendly and supportive ...”. She explained the friendships groups as being together “...since last year...that was the pattern that I walked into on day one...” but “...I'm pretty happy with them working in their friendship groups ...a bit of collaborative learning”. Her *knowledge of learners and learning* extended to the individual work habits of

*...two boys I am talking to now...umm...they can get off task really easily...but they also work very...very well...so it's one of those Catch-22s...jump on them and they'll sit there and they won't do anything for the rest of the lesson...or kind of just let them go...and softly...softly...*

Other strategies in her *behaviour management* strategies included circulating around the room, or standing “...in their proximity...makes them be quiet ...”. Jane said that if students were talking while she was teaching from the front of the class she would

*...put their name in...or to question them... "Isn't that right...Matthew" or "Do you think that's correct...Blake?"...And then I would test them on their responses...*

### **Summary: Jane's realization as a social science teacher**

The two data sets elicited from Jane indicated that the focus of her teaching was on four of Shulman's categories: *educational ends, goals, purposes and values*; *pedagogical content knowledge*; *knowledge of learners and learning*; and, *general pedagogical knowledge* focusing on *behaviour management*. Her concept map that indicated that *educational ends, goals, purposes and values* was assigned by the

researcher to the affective concepts of ‘fun’ and ‘a supportive classroom environment’, both of which should be the result of effective lesson planning. Jane stated in her Think Aloud Protocol (TAP) that the teacher should feel comfortable enough to interact with students in a fun and caring environment. Jane’s outcomes also show the benefit of a supportive school environment for the new teacher. Commentaries from her video stimulated recall (VSR) showed that whilst she appreciated the value of friendship groups, it could also mitigate in the action research process.

*Educational ends, goals, purposes and values*, in fact, featured strongly in the two data types. Her concept map diagram indicated that developing critical thinking amongst her students was an important outcome. She said in her TAP that it was essential to link the work program to the Humanities Department’s philosophy, to give consistency in both philosophical and curriculum terms. Her VSR comments indicated students had to understand ‘the action research process’ in order to create a realistic action plan as well as to establish a sense of purpose in forthcoming lessons.

*Pedagogical content knowledge* featured strongly in the two data sets. Her concept map showed that *pedagogical content knowledge* was nominated to the general concepts of ‘planning’, ‘reflecting’ and ‘implementing’ cycle, which is key to effective social science teaching. She stated in her TAP that whilst planning is important, the success of the cyclic process was based on the ability of the teacher to reflect after the implementing phase and during the planning of the lesson. Jane said in her VSR that ‘the action research process’ gave direction in students’ thinking despite the challenges students generally experienced in the initial stages of the research process.

*Knowledge of learners and learning* emerged from the two data sets. Her concept map indicated that knowledge of learners and learning was nominated to those subordinate concepts that related the knowledge background of students, gave students choice in learning, and teaching that built on students' prior knowledge. Commentaries from her TAP showed that students respond to learning environments that build on their prior knowledge. She stated in her VSR that students in her class were friendly and supportive and that working in friendship groups has its advantages and disadvantages.

*Behaviour management* emerged strongly in the two data types. Her concept map indicated that effective lesson plans should incorporate a *behaviour management* plan that takes into account realistic consequences and is in line with the overall school plan. She said in her TAP that *behaviour management* strategies should involve negotiation between teacher and students in accordance with school policies, but expressed concern at the lack of effectiveness of the school policy. Her VSR commentaries indicated that Jane used circulation in the classroom and subtly used students' names during questions to bring wayward students back on task.

Jane's conceptions of effective social science teaching after six months at her new school show that she was strongly focused on constructivist forms of teaching. The goal was for students to develop action research practices. Teachers needed to have knowledge of learners both affective and cognitive to successfully implement these goals. Part of this process involves students having negotiation rights in terms of behaviour management strategies in the classroom. Overall, Jane's approach to teaching was based on democracy that encouraged the development of learners to become active investigators and deep thinkers in an environment of care and support.

### ***Discussion: charting Jane's development***

Jane's conceptions in effective social science teaching at the conclusion of the third data collection in May 2003, reveal consistencies as well as change in her knowledge base of teaching. Data elicited from Jane's at the initial stage of her experience as a social science teacher indicated a focus on three of Shulman's categories: *pedagogical content knowledge*; *knowledge of learners and learning*; and, *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. Jane's developing thoughts on social science teaching indicated a focus on two of Shulman's categories: *pedagogical content knowledge*; and *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. Jane's realization as an independent social science teacher indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *general pedagogical knowledge* focusing on *behaviour management*; *knowledge of learners and learning*; and, *educational ends, goals, purposes and values*.

*Knowledge of learners and learning* represented a refocus of her conceptual structure of social science teaching. Her concept map (Figure 22) on realization of independent teaching indicated the importance of 'builds on prior knowledge' that was directly linked to the inquiry processes and planning. Jane spoke of building on students' prior knowledge in her TAP, while commentaries from her VSR indicated her approval for students to work in their friendships groups because it encouraged collaborative learning.

The nature of Jane's *educational ends, goals, purposes and values* represented a change in her conceptual structure of teaching, and it featured most strongly at the stage of her realization of independent teaching practice. 'Promoting diversity', 'informed citizens', and 'critical thinkers' were examples of *educational ends, goals,*

*purposes and values* knowledge bases that were identified on her concept map (Figure 22); she stated in her TAP of linking the curriculum with the philosophical values of her department; and, commentaries from her VSR indicated her strong desire for students to understand ‘the action research process’.

There was also change and consistency within the same nominated knowledge bases over the three data collection points. *Behaviour management*, for example, was nominated to the general concepts of ‘behaviour/classroom management’ (Figure 20), and ‘classroom management’ (Figure 21), both of which possessed a range of subordinate concepts that supported an effective *behaviour management* program. Comments from both TAPs and VSR indicated the importance of an approachable teacher, one who had good voice modulation, who was tolerant to noise levels in class and who was keen to keep abreast of new directions in *behaviour management*. Her concept map (Figure 22), however, showed that her thinking on *behaviour management* was an embedded concept that was part of a network of subordinate concepts that linked into ‘lesson planning’. In effect, Jane had rationalised her conceptual thinking on *behaviour management* to an aspect of her lesson planning that was subject to the planning/implementing /reflecting cycle of her teaching. Statements from her TAP and VSR indicated an awareness of the effectiveness of *behaviour management* strategies, notably the school’s *behaviour management* policy, and various strategies she had used with her students.

*Pedagogical content knowledge* was a component of her conceptual structure at the three data collection points. Data elicited at the initial stages of her experience as a social science teacher indicated a clear understanding in the *pedagogical content knowledge* where it was nominated at the macro level of her concept map (Figure 20), and strongly nominated at the micro level in terms of mainly a depth study approach

to teaching. Comments from her TAP and VSR indicated a focus on aspects of the inquiry approach. Jane's developing thoughts on social science teaching show that *pedagogical content knowledge* was evident at the macro level of her map (Figure 21), and comments from her TAP indicated the continuing importance of inquiry. Her final concept map (Figure 22) showed that *pedagogical content knowledge* was identified at the macro level, as well as at both general and subordinate concept levels indicating the strongest integration of *pedagogical content knowledge* in Jane's conceptual structure of social science teaching. *Pedagogical content knowledge* was strongly focused in both her TAP and VSR, through her discussion of the action research model and the cyclical process of planning.

The study showed that Jane's *pedagogical content knowledge* was strongly linked to other components of social science at the initial stages of her experience as a social science teacher; not as strongly linked at the stage of her developing thoughts on social science teaching; and, was most strongly linked on realization of her individual teaching practice. Jane's initial experience as a social science teacher showed that she had identified 'social science skills', 'general skills', 'innovative teaching methods', 'student centred teaching style', 'active participants', 'construct own meaning', and 'linking ideas/themes' as processes in the *pedagogical content knowledge* links to other facets of social science teaching (Figure 20). Jane's other concepts of 'interpret and analyse data', 'evaluate the data', 'create hypothesis', 'draw conclusions', 'create a response', 'present findings', indicated her understanding of the processes in a depth study approach to teaching. Jane stated in her TAP that she preferred a student-centred approach to her teaching, and for students to have the skills to make predictions. Commentaries from her VSR indicated her desire to have students develop their own links with phenomena. Jane's developing thoughts on social

science teaching showed that she considered ‘critical inquiry’ as the link to other aspects of social science teaching (Figure 21). Jane stated in her TAP that she was keen to promote critical inquiry in her teaching.

Jane’s *pedagogical content knowledge* on realization of independent teaching practice indicated that the cyclical process of ‘planning’, ‘implementing’, and ‘reflecting’ were key links to other aspects of social science teaching (Figure 22). Jane identified ‘inquiry methods’, ‘kinaesthetic activities’, ‘higher order thinking’, ‘productive pedagogies’, ‘modelling examples to the class’, ‘real life examples’, ‘stimulus Qs (questions)’, ‘connect with the real world’, ‘catering for multiple intelligences’, ‘meaningful learning experiences’, ‘literacy’, and ‘the team creating authentic assessment’ as indicators of the processes from the above cyclical phase in her social science teaching. Commentaries from her TAP reiterated the importance of the ‘planning, implementing, reflecting’ cycle, based on productive pedagogies. Jane stated in her VSR that students found it difficult to draw inferences from collected information. Overall, Jane’s knowledge base of teaching shows a continuing growth in the inquiry approaches to teaching that allows for authentic learning experiences in a supportive and caring environment.

## JO

Jo completed her secondary education in the state education system where she undertook history from Years 9 – 12. She said that she thoroughly enjoyed the subject, especially North America History, although it was presented in a didactic fashion where “...I would soak up the content and ask questions at the lesson’s conclusion”. Despite this teacher-centred approach to teaching, she admired and respected the knowledge of her teacher.

### ***Jo’s initial thoughts on social science teaching***

Jo’s response to the initial focus questions showed that she was not in favour of a transmissive approach to teaching because it does not cater for individual learning styles and ability levels; opportunities for student feedback are limited; and, it minimises interaction between the teacher and students. She stated that, “Teachers are not all knowing and should not pretend to be”. In short, students should feel comfortable in their learning environment where they are encouraged to offer alternatives to the curriculum “...in order to achieve meaning”.

Her metaphor for teaching is that of a guide and explorer, in which she guides learners to their learning objectives, and provides opportunities for them to investigate issues. She said that students would be attracted to the social sciences if they were given the opportunity to participate in learning experiences that were meaningful to them. Jo wanted to be a teacher because she takes “great pleasure” from seeing young people succeed, and the desire to share her love for History and English with others.

Jo enrolled in the Bachelor of Education four year program, majoring in Studies of Society and Environment (SOSE) and English. She spent her final professional practice teaching at a large, coeducational, suburban state high school, where she

taught Studies of Society and Environment (SOSE) and English. A Year 9 SOSE lesson was videotaped for stimulated recall. She received a Suitability Rating of '1', the highest, from Education Queensland.

She was appointed to a coeducational, country state high school where she taught Years 8, 9, 10 History, Year 10 English, and a combined Year 11 and 12 Modern History class. The Year 10 History class was videotaped for stimulated recall.

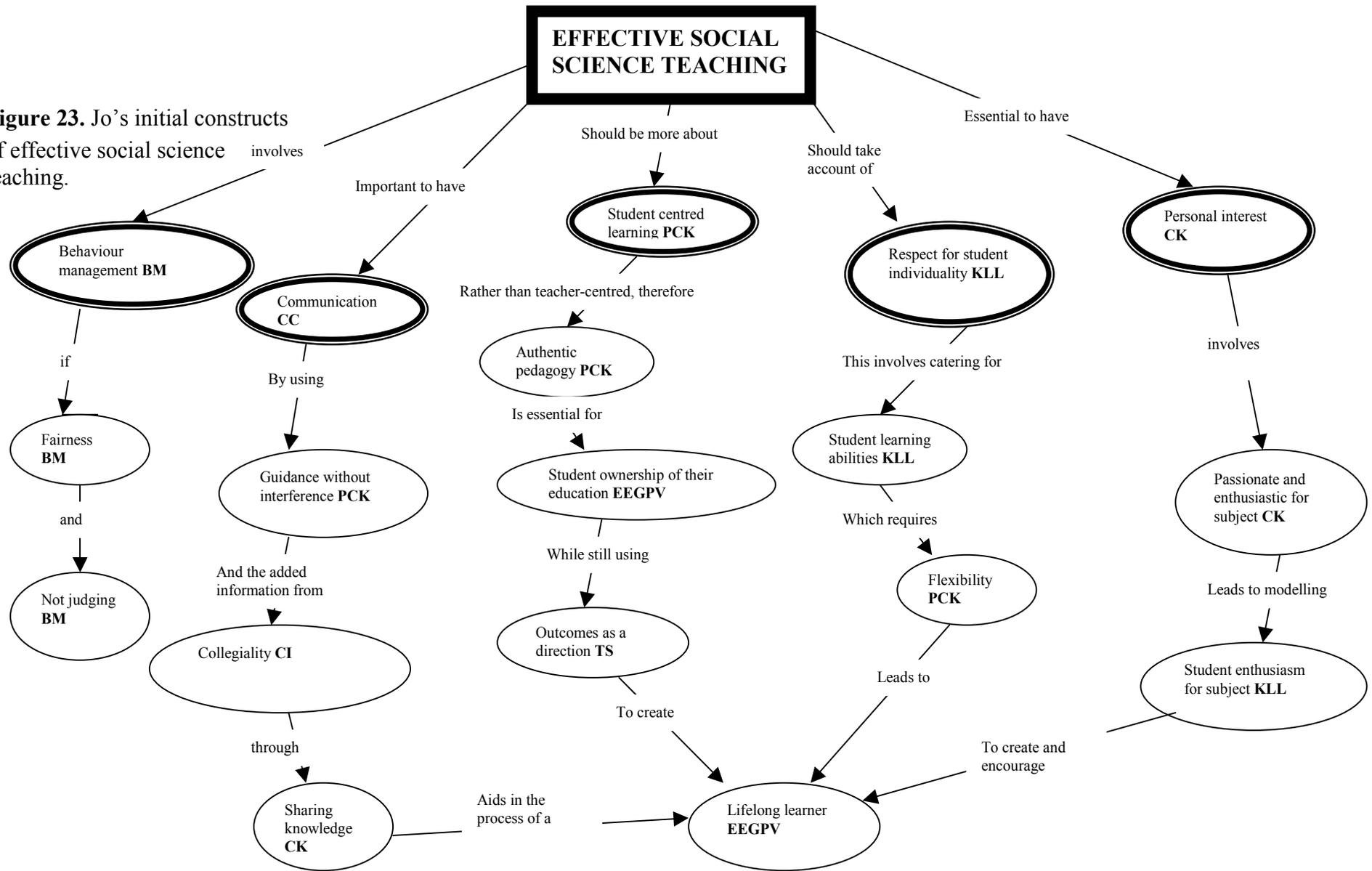
### ***Jo's initial constructs of social science teaching***

Jo's map construction shows a hierarchy of concepts, beginning with general concepts of 'behaviour management' (BM), 'communication' (CC), 'student centred learning' (PCK), 'respect for student individuality' (KLL), and 'personal interest' (CK), leading to 'lifelong learner' (EEGPV). A lack of cross-links indicated that there was no integration of knowledge bases across the hierarchies on her map (see Figure 23).

The most prominent knowledge bases were *content knowledge*, *educational ends, goals, purposes and values*, and *behaviour management*. The linking words 'essential to have' that link 'personal interest' (CK) to 'passionate and enthusiastic for subject' (CK) and 'student enthusiasm for subject' (KLL) indicated the importance of *content knowledge* in Jo's as a means of motivating students. Whilst 'lifelong learner' (EEGPV) is the core outcome, her map also showed that 'student ownership of their education' (EEGPV) was also an important goal in her teaching. Jo's map also indicated that behaviour management that is based on 'fairness' (BM) and 'not judging' (BM) was important for effective social science teaching.

Her nomination of 'outcomes as a direction' (TS), 'behaviour management' (BM), 'communication' (CC), and 'personal interest' (CK), indicated that Jo had an understanding of *pedagogical content knowledge* at the macro level. The concepts of

**Figure 23.** Jo's initial constructs of effective social science teaching.



‘student-centred learning’ (PCK), ‘authentic pedagogy’ (PCK), ‘flexibility’ (PCK), and ‘guidance without interference’ (PCK), were identified for *pedagogical content knowledge* since these concepts indicate a constructivist approach to learning. Jo’s map also showed that ‘student centred learning’ (PCK) and ‘authentic pedagogy’ (PCK) are essential for ‘student ownership of their education’ (EEGPV).

The identification of *community integration* for ‘collegiality’ indicated thinking about teaching that again extends on Shulman’s categories, because it entails collaboration both within and outside of school in order to enhance the quality of teaching and learning within the classroom (Figure 23). Jo’s concept map indicated that ‘collegiality’ was necessary to share knowledge, and hence work as a team for the purpose of developing life long learners. *Community integration* is an indication of the changing expectations on teachers to work with community members that extends beyond the recently introduced *professional learning* or *knowledge of educational contexts*.

The focus of Jo’s Think Aloud Protocol (TAP) was *classroom communication*, *content knowledge*, *behaviour management*, and *pedagogical content knowledge*. Jo commented on the importance of communication from an empirical perspective. Jo explained that

*...you really need to get to know your students ...otherwise...they won’t have a respect for you ...So...on my Prac. I’ve tried hard to get the communication flowing that they feel comfortable with that they can approach me...I try as hard as I can to have a profile in school...I walk around and say...”How ya goin?” ...that sort of thing ...I think it’s really quite significant...*

She also highlighted the importance of the cognitive side of *classroom communication* because

*...without proper ...umm...communication on students...will not have an understanding of what we want from them ...and also to ...they won’t feel comfortable and willing to participate in...umm*

*...the classes...or the learning experiences that you have set out for them...*

This should involve what Jo calls ‘guidance without interference’, and the *pedagogical content knowledge* base of constructivism in her teaching (Brooks & Brooks, 1999). In other words

*...it shouldn't be about what the teachers knows...It should be about ...umm...the student experiencing something in order to create something...So...I would say that the student ...umm... learning about WWII...umm...teacher probably giving them ...umm...subject like..., “What was the cause of...How did the Nazis come to power ”? Students would go off...and investigate a few reasons...come back and...as a group evaluate ...their reasons as a class...and discuss why or why not...give them feedback in a constructive way ...*

Jo also regards the discussions between student and student (Husbands, 1996), as crucial because, “if I’m not explaining something clear enough...Umm...and another student has an idea of what I’m trying to say... they can communicate with that student ...what it is I’m trying to say”.

Of equal importance is the communication between teacher and teacher (Cochran-Smith & Lytle, 1999). Jo said that

*...if a student has more ability in the written form ...where their strengths and weaknesses lie ...it is really important...to have that communication flowing between colleagues...If something is not working in your class...then you need to find out alternatives ...and you might not the tools to do that yourself...you need to talk it over with other teachers...*

Or, sharing knowledge with colleagues about *content knowledge*, “... if you’ve come up with a great idea of how to approach a unit of work ...and the students really respond...you can share it with your colleagues...and say, “Here...have a go at this...”.

*Content knowledge*, according to Jo is central, “...because if you are not interested in what you are teaching...umm...why the heck are you doing it in the first place”?

Like Shulman (1987), she stressed the passion one must have in order to be an effective Social Science teacher: "...I find that I'm very passionate about most things I do ...and I've seen it...it rubs off on students ...and they become enthusiastic about what they do...". Jo said that

*...when I was a high school student...I took a lot of pleasure from watching my teachers...umm...walk around the room...being passionate and ...umm...being enthusiastic about what they were trying to do...involve us in as students...*

Consequently, Jo considered a *pedagogical content knowledge* approach or student-centred learning as "paramount". She lamented teaching approaches that were "didactic", or a style that

*...often resort back to worksheets...umm...teacher gives students worksheets ...students fill out worksheets...teacher stands up front ...of the room and...umm...sporadic questioning to take the results ...answers from the worksheet...*

Instead, she would have students engaged in social constructivist learning that involves

*...doing activities where you have that group participation...by combining ...umm...the students' knowledge together...they come up their own idea...and perhaps present it to the class instead of the teacher claiming ownership of knowledge...students have ownership of knowledge.*

Jo made reference to Gardner's (1997) multiple intelligences of learners when she stated that,

*...I would try to find as much about how students best learn... using collegial...umm...information...records of past grades... umm...try to cater for...umm...learning...through various activities that encourage depth and space in subjects. This involves authentic pedagogy...where I try to link what ... umm...what is...important to them ...*

Her understanding of *pedagogical content knowledge* was evident in her discussion about 'relevance' - a key feature of Jo's teaching approach because

*...in order...for students to...umm...create...to learn...they*

*need to find relevance...umm...in their learning experiences ...umm...as I was saying ...why would you want to study... umm...the Crusades...umm...you would talk about the 'war on terror' and the current situation...the Gulf War...the idea of conflict between Islam and Christianity ...by putting it into real world context...students...umm...can better appreciate what has happened in the past...I'm really ...a strong advocate for creating ...experiences that are real world...*

In terms of her experiences with *pedagogical content knowledge* during her

Professional Practice Teaching, Jo explained that

*...I'm experimenting...I've got to find out what my strengths and my weaknesses are...umm...still I try to create as much student-centred learning focuses...I've only taught once so far...at my current Prac....umm...but the majority of ...umm...my lesson plan is developed at...around student-focused activities...*

Effective *behaviour management*, according to Jo, is the realization of effective teaching, when the cognitive and emotional demands of students have been met.

*Behaviour management*

*...will take care of itself ...If you have students engaged in...umm... cognitive objectives...through learning experiences...but if it does come into play...then you need to be fair and make the student aware of the fact that it is about the rules you accept...*

Jo advocated the kind of reality therapy/choice theory espoused by Glasser (1998c) in that

*...I am quite firm...when I'm in the class...If I want to something done...I will set the agenda at the beginning of the class ... the learning experiences will be such that...there wont really be a need to come down harshly ...but they will know ...what their consequences of their actions will be...*

### **Jo's initial knowledge in action and reflection**

Jo's video stimulated recall was based on a review of a lesson about the major battles fought during the Second World War that she had taught to her Year 10 History students earlier on the day. Her teaching strategies involved a combination of

direct instruction and scaffolding, using a variety of resources including, a whiteboard, worksheets, an overhead projector, a VCR, and textbooks.

Jo stopped the videotape 60 times during the recall interview, and a total of 71 categories of knowledge bases of teaching were identified from her responses (See Table 11).

**Table No 11: Breakdown of knowledge bases**

Knowledge Base	No.
General pedagogical knowledge	
-Behaviour management	10
-Teaching strategies	28
-Classroom communication	10
-Personal beliefs	-
Content knowledge	4
Curriculum knowledge	-
Knowledge of learners and learning	10
Educational ends, goals, purposes and values	3
Knowledge of Educational contexts	-
Pedagogical content knowledge	6

Jo used a number of visual resources in her *pedagogical content knowledge* as she sought to achieve the lesson goals. Jo explained that

*by using a map ...I could...umm...get the students to see where Australia was...in comparison to the Pacific Islands ...like Malaya and Singapore...and maybe make it a little more life like and real for them, rather than just something out of a book...that they have no idea ...or concept of where these places are...With the questions after the video, I trying to get students ...umm...to start thinking about the Japanese train of thought. Why were they so persistent about the war in the Pacific ...and then try to link it with the next activity...I'm trying to have students empathise with...umm...get a real life feeling of what the POWs went through during World War II...and put a couple of faces to what...what happened in the Pacific.*

However, she expressed some concern over her *teaching strategies*, especially her questioning techniques because

*I was getting a little frustrated here because ...umm...just my own assumptions and judgements...on what students should know. I felt that this was a fairly easy task and...that they should know who was on what side, ...during World War II ...so...umm...I was getting a*

*little frustrated...and as a result...umm...my thoughts weren't clearer. So, I need to work on...maybe...my questioning techniques. The students are giving me...umm...correct answers but they weren't the exact answers that was ...on the ...umm...information sheet. I was trying to draw it out of them but...it...it was...probably my questioning technique, because I couldn't get them to give me the right answer...and I ended up having to tell them...Just here, I'm...umm...trying to think of...umm...questions to put up on the board and the ...I think the students can tell I'm thinking about things...so...if I have that pre-prepared then I wouldn't give that impression...I wasn't insisting on hands up...At this point of the lesson...I was trying to get students to give hard, fast and quick answers, so that we could keep the momentum going...or picking up the pace of the lesson, but then...it sort of died away... which was kind of disappointing.*

Jo was zealous in her criticism of other aspects of her *teaching strategies*. First, there was the brainstorming activity in which she wanted to find out how much students knew of the major campaigns in the Second World War, by having students respond “...off the top of their heads, so they weren't scared to approach the subject”. But students wrote “...down five points very quickly...” anyway, which Jo regretted because the information did not come out in a “...concise and more controlled...” way. Second, she felt that she was not “...exerting an influence in the classroom at...that particular time”, since students were “...still carrying on their conversations ...”. Jo felt that she “...should have been more prepared ...for that opening situation ...finding out who was going to be sitting where...but I have to work on that”. Third, because of this tendency for students to chatter - “...I let them get away with a lot ...umm...during the lesson...discussion wise...” – Jo expressed disappointment at interrupting them during a silent reading session. Finally, Jo felt she could have moved around the class in a more consistent way; her cues (Nelson-Jones, 1996) were ineffectual; poor time management, particularly when moving from phase to phase; handwritten questions on the worksheet were difficult for students to decipher; and she felt that her presence impeded students viewing the video, when she should have been strategically located elsewhere in the classroom.

Jo was equally severe on her skills of *classroom communication* (Cole & Chan, 1994).

*Just from watching ...my ...board work...I just feel that I'm really limiting...umm...the students. I'm not including the entire class. I need to move around more to gauge the class...umm...for understanding...to find out who does know something about it, rather than just concentrating on the people that are calling out. I spent most of my time turned towards the board. I wasn't speaking directly to the students ...In this part of the lesson, I actually had one of the students read out answers and three times...mainly because I was ...umm...concentrating on other things, other than what she was saying to me, which is terrible. I just noted that my posture...in the classroom...is not ...umm...not authoritative. It's too relaxed...its umm...not generating the...umm...the persona that I am confident in what I am doing. I'm just sort of swaying my hands around...which doesn't give the students ...umm...confidence in my ability. My eye contact leaves a lot to be desired. I'm not showing any enthusiasm...what so ever...It looks like it's a big chore...I don't know what I'm trying to do there, but I'm just not expressing ...that the subject is fun...*

Her concerns were also expressed in terms of *knowledge of learners and learning*.

I'm not sure whether the students are bored or they really don't

*know the answers to the questions from the video ... they weren't really participating. There was a student down the front...who could...he would always put his hand up ...which was really great...but he was participating...but...it was always...off the wall answer...umm... he would give me that...really...had nothing to do with what we were doing...*

However, Jo showed more confidence when dealing with students from a *behaviour management* (Edwards, 2000) point of view. For example,

*When I was trying to get information ...umm...trying to involve students that aren't participating, but I also try to catch those who are doing...umm...something wrong thing...umm...like talking or reading something they shouldn't be doing. Umm... I try ...to call out their names...to catch them off...just to draw them back into the conversation and activity. One of the students ...that is particularly ...disruptive ...umm...when he did offer correct answer, I'd praise him and I'd positively try to reinforce him, so that he might try to give...umm...correct answers instead of ...umm...disruptive behaviour...instead. I just...umm...tried to reinforce to the students that...if they didn't allow me to continue...that this lesson backed onto a lunch period and most*

*students find that....umm...I find it works...that students are prepared to get into the work...and get on with it... rather than risking their own free time. One of the students he had actually let it slip off the table...or pushed it off the table...so I made him go around and pick it up. I decided not to ...umm...shout at him ...or something...to disrupt the rest of the class...which is probably what he wanted. The group of three students ...were sitting together, and...two of them were persistently...umm...disruptive ...not just to each other but to the entire side of the class. Umm ...so...I asked one of the students to move. He wouldn't ...and I said, "Move!". He refused again...so I ...umm...took one of the yellow planning slips ...and I said, "You're choosing to work... here...or choosing to move to the planning room". So...as soon as I took out the yellow slip...he...got his things together and moved.*

### **Summary: Jo's initial experience as a social science teacher**

The two data sets elicited from Jo in May 2002, indicated a focus on three of Shulman's categories: *pedagogical content knowledge*, *classroom communication*, and *behaviour management*. Her concept map indicated the importance of student-centred learning rather than a teacher-centred approach to learning and teaching. Her TAP commentaries reiterated the emphasis on the constructivist approach by stating student-centred learning is paramount. Commentaries from her VSR showed that a variety of resources during the teaching and learning process were important in helping unpack knowledge for student understanding.

*Pedagogical content knowledge* featured in the two data types. Her concept map indicated that *pedagogical content knowledge* was represented at the macro level with the nomination of concepts for *content knowledge*, *classroom communication*, *behaviour management*, and *teaching strategies*. *Pedagogical content knowledge* was nominated to 'flexibility', 'student-centred learning' that specifically leads to 'authentic pedagogy', which in turn, gives students ownership of their education. The linking words, 'should be more about', that link 'student-centred learning' to the key concept, suggest a preference for a constructivist approach. 'Authentic pedagogy' is

key to ‘student-centred learning’ that should then provide ‘student ownership of their education’. Commentaries from her TAP expressed the importance of students investigating and evaluating data without interference from the teacher, especially when students are working in collaboration. Her commentaries also stressed the need for teachers to consider the multiple intelligences of learners and relevance as important facets in the authentic pedagogical process. Jo stated in her VSR that it was important to develop a sense of empathy among students, use of questioning techniques, classroom discussions, and to have students view videos as stimulus to her lesson.

*Classroom communication* emerged in the two data sets. Her concept map identified effective communication as a knowledge base that promotes the constructivist process of ‘guidance without interference’, and by sharing information through collegiality with her peers that leads to lifelong learners. She stated in her TAP that effective communication involves knowing both the empirical and cognitive aspects of students because, “...without proper... communication...students ...will not have an understanding of what we want from them ...”. However, her VSR cited criticism of both her verbal and non-verbal aspects of *classroom communication*.

*Behaviour management* converged in the two data sets. Her concept map indicated that *behaviour management* is a critical aspect of effective social science teaching. The linking word ‘involves’ is unequivocal in this crucial relationship. However, the success of behaviour management is also dependent on values such as ‘fairness’ and being non-judgemental. She stated in her TAP that effective *behaviour management* is not a program that was independent of other pedagogical practices, but one that is realized after the cognitive and emotional demands of students have been met. Her

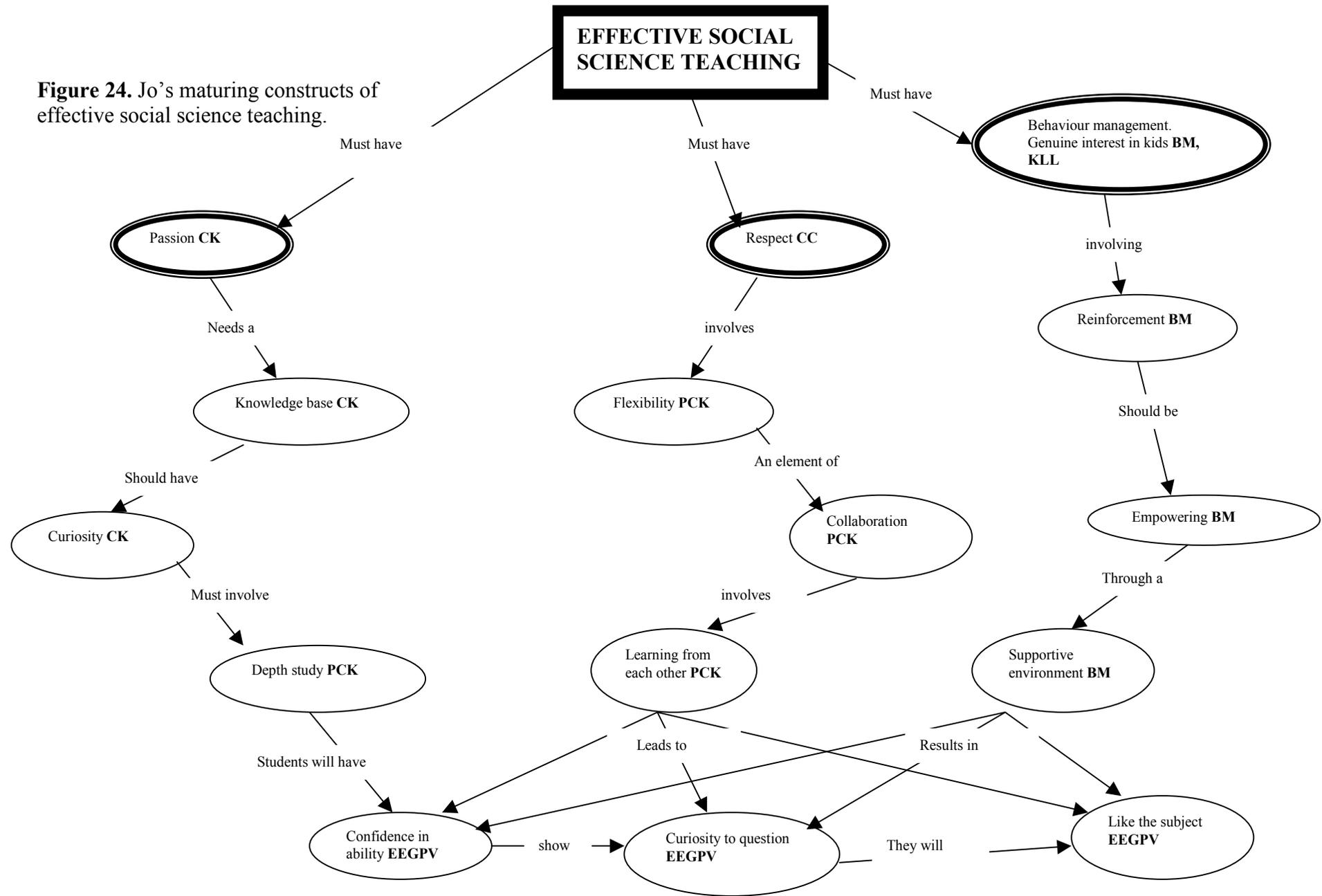
VSR stated that *behaviour management* has a dual role of motivating students to be on task, and by correcting “...those who are doing...something wrong ...”.

Jo’s initial conceptions of social science teaching indicated a focus on the *pedagogical content knowledge* base of constructivism in her teaching, where students gain ownership of their education through authentic pedagogical practices. Her focus was also on the *general pedagogical knowledge* bases of *classroom communication* and *behaviour management*, the success of the former is dependent upon open channels at both the collegial and the student level, while success for the latter is determined by the emotional and cognitive responses from students. Overall, Jo’s teaching is based on a strong sense of democracy that emphasises a constructivist approach to teaching so students can reach their potential as lifelong learners.

### ***Jo’s maturing constructs of social science teaching***

A six month time lapse indicated less development in most aspects of Jo’s concept map structure, as well a change in the identification knowledge bases, with *curriculum knowledge* and *knowledge of educational contexts* not receiving any nominations (Figure 24), though *behaviour management*, *content knowledge*, and *educational ends, goals, purposes and values* were still prominent. Jo’s concept map continues to show the importance of *content knowledge* in her teaching. The power of the linking words, ‘must have’, that link teachers’ ‘passion’ (CK) with the key concept indicate the vital role of not just having a ‘knowledge base’ (CK) but of the passion that is needed to promote a ‘depth study’ (PCK) approach, which ultimately leads to students who have ‘confidence in ability’ (EEGPV), are ‘curious to question’ (EEGPV), and will ‘like

**Figure 24.** Jo's maturing constructs of effective social science teaching.



the subject' (EEGPV). The nomination of these *educational ends, goals, purposes and values* knowledge bases indicated the continuing importance of goals in her teaching. 'Like the subject' was an interesting addition to her concept map, because it reflects her desire to have students like the subject as well as meeting the outcomes of the subject. Behaviour management continued to have strong role in Jo's teaching. Unlike the concepts of 'fairness' and 'not judging' in her first map (Figure 23), Jo regards 'empowerment' (BM), 'reinforcement' and a 'supportive environment' as components of effective *behaviour management* of her second map. The linking words, 'must have' that link 'behaviour management' with the key concept reinforce its importance in Jo's teaching.

The identification of 'passion' (CK), 'respect' (CC), and 'reinforcement' (BM) indicated Jo's understanding of *pedagogical content knowledge* at the macro level. *Pedagogical content knowledge* was nominated to 'depth study', 'collaboration', 'flexibility', and 'learning from each other' at the micro level of the map because each concept represents an aspect of constructivism in the inquiry process of the social sciences. *Pedagogical content knowledge* in Jo's second map had a social constructivist focus.

The focus of Jo's Think Aloud Protocol (TAP) was essentially the same as her first TAP: *pedagogical content knowledge, behaviour management, and classroom communication* were still her focus, with *content knowledge* an additional focus.

Jo made a powerful statement about teaching in general when she stated that

*...it's ridiculous if you don't have an interest in kids then they are going to know that you don't like them, so why go into a profession where... umm... you have no interest in your ...students...*

The above statement is reflected in her person-centred (Rogers, 1969), and interactive (Glasser, 1986c) approaches of her *behaviour management* policy towards her students

*...because...umm...like it or not it is a factor within the classroom and some kids can be naughty so you need to be an effective social science teacher you need to have some tools, I mean strategies, to...umm...not to deal with the students but to find out why they're behaving in a certain way in which to bring them back into the classes.*

Jo explained her *behaviour management* philosophy in terms of empowering students in an environment of equality, tolerance and social justice (Porter, 2000). Jo said that

*...I think it's important not to isolate the student, unless they were extremely disruptive to the classroom and I could not get anything done ...umm...I would try to let them know in some way that I know they're doing but at the same time ...not to draw attention towards them because I think the majority of time that's what kids are looking for is...umm...reinforcement, whether positive or negative. Because also I think by doing that I would be giving them power within the classroom, Its good to empower the students... umm... don't get me wrong, but there are two different sorts. Yes, so positively reinforcing good behaviour...likewise if it's students questioning...umm...all the time...that's fine, I don't mind if they disrupt the class in that way. Its not actually disrupting, its just their own, they need to find out things, that's fine.*

Her comments echoed the sentiments of the Studies of Society and Environment Syllabus (QSA/QCSS, 2000) and the 2010 Queensland State Education document when Jo stated the importance of a supportive environment, because it is

*...where the kids feel safe, like they can ask questions and not be...umm...put down and or...given negative feedback...just letting kids know that its okay to make mistakes or think differently. We don't all think the same. That's where good ideas come about...we have different ideas in the classroom.*

Closely allied to this concept of supportive environment was the importance she placed on *classroom communication, pedagogical content knowledge* and

collaboration with all members of the school community (Cochran-Smith & Lytle, 1999). Jo explained that

*...I think as an educator and to be an effective social science teacher, as in any other teaching profession, you need to have respect for colleagues, respect for your students, respect for where people are coming from. And so I think under that I could put flexibility as well. Just knowing that not all students learn the same way – they're visual, they're kinaesthetic, they're listening people. So flexibility to know that they learn differently and you should treat them as such. Umm...under that perhaps I could put collaboration under flexibility because if you are not communicating well with the student or with a colleague you might find a better way to communicate with them, so getting other people involved...parents and perhaps other teachers or other students to find out information or just to open up the lines of communication in a more positive way. ...letting the kids own their own learning and they'll get a lot more out of it ...if they find out things for themselves and not just standing there saying this is what's what and you can't do anything about it.*

The pedagogical content knowledge bases of collaboration and constructivism in Jo's teaching were reflected in her desired outcomes:

*I would want students to have confidence in their own ability, and not just take things at face value, to not accept everything that I offer. ... to tell me where I've let them down or where I need to improve some things. Curiosity to question ...umm...and just a selfish one, I'd like it if they...umm...if they had a genuine interest in the subject. ... and perhaps I could learn different other things from them ...*

Likewise, Jo stressed the importance of the teacher's *content knowledge* base or passion for the subject, because it provides "...the knowledge, understanding, skill, and disposition that are to be learned by school children" (Shulman, 1987:8). Jo said that

*...you need a passion for your knowledge base...Passion not just for your subject but a passion for your profession because...umm...you need to feel that...umm... desire to perhaps help others find meaning in a subject or get some sort of ...umm...some sort of value in what you're doing and also maybe they might find some value in what you're teaching as well. Under passion would come the knowledge base. If you're passionate you have a desire to want to learn more and then you'll be able to have a much wider knowledge*

*and understanding of your subject. You need a bit, obviously, curiosity to keep your interest in something. And I have a genuine interest and curiosity about historical facts and geography too. ... I must have the curiosity in order to do an in-depth study... So ...to be an effective social science teacher ...the in-depth study...hopefully the kids will have confidence in their ability to analyse, curiosity to ask questions about the subject and hopefully like the subject at the end of it*

### **Summary: Jo's developing thoughts on social science teaching**

The data elicited from Jo at the conclusion of her Bachelor of Education studies, indicated a focus on three of Shulman's categories: *general pedagogical knowledge* focusing on *behaviour management* and *classroom communication, content knowledge*, and *pedagogical content knowledge*. Her concept map nominated *behaviour management* as a general concept that also included a qualifying statement of 'genuine interest in kids'. She questioned the professionalism of teachers in her TAP who "...go into a profession where...you have no interest in your...students ...".

The linking words, 'must have' that link *behaviour management* to the key concept on her map, indicate the strong dependency the key concept has on *behaviour management*. The subordinate concept of 'reinforcement' is her strategy – either negative or positive reinforcement that maintains effective *behaviour management* policies, which according to Jo, also empowers students. As she stated in her TAP, she uses the above strategy not just as a punitive measure, but also as a diagnostic tool in *behaviour management*. She did not like to isolate students unless "...they were extremely disruptive to the classroom...". Jo also stated that it is important for students to feel safe in a supportive environment where they can question and challenge ideas without the fear of rebuke from the teacher.

*Classroom communication* featured in the data. Her concept map identified the general concept of 'respect' as a *classroom communication* knowledge base that is

essential for effective social science teaching. All linking words in the hierarchy invoke certainty in each successive subordinate concept that will ultimately result in students who are curious and questioning of phenomena. Commentaries from her TAP indicated the importance of respect for colleagues and students, flexibility in teaching approaches and collaboration that involves the entire school community to enhance student outcomes.

*Content knowledge* emerged from the data. The powerful linking words ‘must have’ that linked ‘passion’ to the key concept once again indicated the strong dependency of the latter teachers’ *content knowledge*. As her general concept infers, passion and curiosity for one’s subject are critical, and the depth study approach is an effective way of creating passion among students for their subject. As she started in her TAP, students should have confidence to engage in the inquiry process “...and hopefully like the subject at the end of it”.

*Pedagogical content knowledge* emerged in the data. The identification of concepts for *content knowledge*, *classroom communication*, and *behaviour management*, showed that Jo had an understanding of *pedagogical content knowledge* at the macro level of her map. *Pedagogical content knowledge* was assigned to ‘depth study’, ‘collaboration’ and ‘learning from each other’ because the concepts are factors within the constructivist approach to teaching. The concepts imply a process by which students are constructing knowledge, either in the set phases of the depth study, or as a continuous process as the wording of the other two concepts suggest. Commentaries from her TAP indicated a desire for students to be constructivist in their learning strategies and “... not to accept everything that I offer...”, and “letting students do their own learning”.

Jo's conceptions of social science teaching at the end of her Bachelor of Education studies indicated a strong desire to empower students to have confidence in their ability to engage in an inquiry-based approach to their learning. This is based in an environment of respect, collaborative learning and flexible teaching where the teacher's passion and enthusiasm for her subject are clearly apparent. Overall, Jo displays a strong sense of democracy and social justice and regards all students as complex thinkers, capable of constructing knowledge and making decisions about issues at a school, community, and global level.

### ***Jo's constructs of social science teaching on realization of independent practice***

Jo's concept map construction six months after inservice teaching indicated a hierarchy of concepts beginning with the nominated knowledge bases of 'learning experiences' (KLL), 'behaviour management' (BM), 'teacher/student relationships' (CC), and 'teacher knowledge' (CK), all of which lead to the knowledge base of *educational ends, goals, purposes and values* to 'lifelong learning' (See Figure 25). The power invoked by the linking words of 'must have' that link 'teacher knowledge' (CK) to the key concept, indicated the continuing crucial role of *content knowledge* in Jo's teaching, especially in terms of 'syllabus knowledge' (Curr K; EEGPV) and 'school curriculum' (Curr K; EEGPV) that is subject specific and relates to students' backgrounds. Jo's broad understanding of the role *content knowledge* in teaching – more so than in her first two concept maps (Figures 23 and 24) – may indicate a growing understanding of the importance of content knowledge, and the realities of teaching practice. The identification of a range of knowledge bases for *educational ends, goals, purposes and values*, more so than in her first two concept maps may also indicate a broadening of her educational horizons, especially after six months of

teaching practice. *Behaviour management* also continued to be a focus of Jo's teaching, and the inclusion of 'school behaviour management policy' (BM), 'clear boundaries' (EEGPV), 'realistic goals' (EEGPV), and 'negotiate with students (CC, BM), is also an indicator of her broader understanding of *behaviour management* as a result of her inservice teaching. *Classroom communication* focused on the affective side of her teaching, unlike her previous concept maps where cognitive components were embedded within the hierarchies. The focus on the affective domain of her *classroom communication* may indicate a desire for greater clarity in her relations with students by moving the cognitive domains such as pedagogical content knowledge to other parts of her map.

Her concept map diagram indicated an understanding of *pedagogical content knowledge* at the macro level with the nomination of 'teacher knowledge' (CK), 'teacher directed learning' (TS), 'teacher/student relationship' (CC), and 'behaviour management' (BM). *Pedagogical content knowledge* was also identified in 'student – centred learning', 'constructivist learning', 'creative', 'independent thinkers', and 'question information' at the micro level of the concept map diagram because the concepts represent students who are constructing knowledge – an essential component of the inquiry process of the social science syllabi.

The focus of Jo's Think Aloud Protocol (TAP) was on: *educational ends, goals, purposes and values; classroom communication; behaviour management; knowledge of learners and learning; and, pedagogical content knowledge*. Jo stated that she found her first year of teaching overwhelming, especially in terms of the *educational ends, goals, purposes and values* knowledge base of the syllabi and school curriculum. Her concerns involved



*...knowing the ins and outs of the senior syllabus...such as modern history...getting my head around what's required...by the board ...just the bureaucratic stuff that goes on...like the forms...what is required to go to the board...what the students need to know...from that syllabus... ..making sure that I'm teaching about primary and secondary sources in the right manner...asking the right questions ...getting the students to ask the right questions...themselves...and also making sure the exams...or assessment fits...certain units...*

Jo said that the difficulties concerning the syllabi was geographical as well, because she had not been able to locate a copy in the school, so she has had to use the internet, as well as appeal to the head of curriculum to order copies of Studies of Society and Environment (SOSE) Syllabus (QSA/QSCC, 2000) and Modern History Syllabus (QSA/BSSSS, 1995) from Queensland School's Authority (2002) because

*...it is a disadvantage ...not only for myself ...but for my students...because they are the ones that ultimately lose out ...*

She pointed out a further challenge of using an "...incredibly...backward..." work program "...that is at least fifteen years old ...", so she had been working on amalgamating the old work programs with contemporary syllabi. She stated that it was

*...really important for the kids to be up to date with their peers ...if they decide to go onto university...and not only that...the contemporary stuff is more about the student ...and not so much about knowledge...that they have to have...*

Jo stated in her *educational ends, goals, purposes and values* knowledge base that the type of lifelong learning she wanted from her students was both cognitive and affective because

*...if they are ten years down the track...and presented with information through the media ...they can ...think about it in terms of ... "Okay...what was the reason for this report"? ...and get a better understanding about why things are as they are... it also allows them to become better citizens...by thinking about others ...not just from their own perspective...but thinking about how others are affected...by the actions or decisions made by those around them...*

Establishing effective *classroom communication* between the teacher and students is a key to developing these desired characteristics of lifelong learners. Jo said it was essential for teachers to have sense of humour

*...because the students aren't fully developed ...yet...They are still learning ...and they are going to resort to silly behaviour ...so...if I can laugh it off...or see the funny side...of something...then I think...that...makes it a little more comfortable...or easier for the other students in the class...because they see me as a person... not just as ...an authority figure...in that environment...*

Another facet of Jo's *classroom communication* was her ability to negotiate with students because they then see the teaching profession as more than just teachers and students, "...it's also about people ...and about interacting with each other ...". This involves having respect for students in class. For example

*...if they have their hands up...I will say... "You've got your hands up...that's great" ...I will acknowledge them...I make students who are calling out...if they have a relevant contribution...I will say... "Okay...can you put your hand up ...please?... Other students have done so"...and just respecting the other students who are doing the right thing...I try not to come across as being a cow...*

She said that her *behaviour management* strategies were based on developing effective *classroom communication* and vice versa, although the first term was not without its challenges, especially

*...the first three weeks...I knew it was going to be difficult...but I didn't realize how hard it was going to be ...umm...the students were pressing all my buttons...it took all of my self control...to not take it personally...*

By the end of the first term Jo had established *behaviour management* strategies that encompassed clear boundaries and realistic goals, including some basic rules such as "...for courtesy...and safety...like you won't move out of your seats unless asked...or to borrow something ...". In terms of the withdrawal room, Jo said that

*...You are encouraged to use it ...but in my opinion...and I share it with a few other teachers...if you are seen to use this behaviour management policy...in terms of the withdrawal system...too*

*often...then you are not an effective teacher...In the first term that put a lot of pressure on me...*

Her comments on students also indicated the importance of establishing an understanding of *knowledge of learners and learning*. She explained that

*...You also need to have a knowledge of their educational ...as well as their personal background...and who they get along with...and who they work well with...It's no point in putting a naughty kid ...next to another naughty student...I find that you need to be able to adapt to students... in the moment...not just specifically students...but also the situation...because students are different in different classes...at different times of the day...*

Although Jo acknowledged the important role of teacher-directed learning, because there has to be some kind of input from the teacher in terms of informing students of the purpose and outcomes of lessons and units of work, she stated that student-centred learning “...is the most important part of the learning experience...”.

This was evidenced in her *pedagogical content knowledge* comments “...about students’ ownership of their education ...”, and about constructivism

*...so students are creating their own meaning...thinking for themselves...and finding their own answers...they question information...about what their peers are giving them...and then hopefully that will run off into them questioning ...not only the teacher...but also the media...or other adults...*

She said that a specific example of student-centred learning involved an inquiry-based approach where students selected a topic to research and report. She explained that

*...I would get them to work out a problem together in pairs...I would have modelled this on the board ...give them an example of another problem...work it out in pairs...and then work it out in groups...and then come back to the class as a whole ...and try and solve the problem together*

...  
Jo’s desire for students to develop a sense of empathy was further evidence of her *pedagogical content knowledge*. She wanted students to put themselves in a situation

*...and thinking in terms of ... "Well...what can I do...umm... prevent this from happening "...just putting themselves in that moment...in time...*

### ***Jo's knowledge in action and reflection on realization of independent practice***

Jo's video stimulated recall interview was based on a lesson about pollution that she had taught to her class of Year 9 Studies of Society and Environment (SOSE) earlier on the day. Students investigated how different organizations take action to protect our environment against various industrial vandals. Jo's approach to her teaching was primarily learner-centred, using a variety of resources such as clean rubbish, blank posters, coloured pencils, and the black board.

There were 61 stops during the recall interview, and 78 categories of knowledge bases were nominated (See Table 12).

**Table 12: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	14
-Teaching strategies	2
-Classroom communication	5
-Personal beliefs	-
Content knowledge	-
Curriculum knowledge	1
Knowledge of learners and learning	19
Educational ends, goals, purposes and values	24
Knowledge of educational contexts	-
Pedagogical content knowledge	13

Jo stated in her *educational ends, goals, purposes and values* knowledge base that one her biggest goals in teaching was for students to own their work, and that meant becoming involved

*...in the task...not outside of it...looking at it as a one dimensional thing...but inside the task...they see...okay ...this happens...and they have the consequences and those sorts of things...*

For example, part of their group work task required students to write up their summaries on the blackboard, which carried a subtle but important message to their peers – the blackboard is not just “teacher-only territory”, but a tool that students can use as well. Those who were sitting in their seats

*... see that it's not just the teacher's work ...that they are writing down...but it is also their peers ...that they are writing into their books ...So...I think it has added value for them...*

Other evidence of her *educational ends, goals, purposes and values* knowledge base included her comments on the research, collation and presentation stages of students' topics. Jo explained that

*...students were...asked to collect rubbish...last week...in order to prepare for ...this activity...Umm...this was so that they could decorate...and make the association between pollution... rubbish ...and the organizations that help to protect our environment ...from these things...the kids have already selected their information from the internet in the computer labs...Every poster...students had to answer the same questions for each of the organizations... they had to summarize ... what are the objectives...what are some examples of projects...So seeing how personally they can become part of...one of the groups...like Greenpeace...*

Jo then displayed a completed poster activity done by a group of girls as a gentle reminder to those who were not up to speed, and also as a means to motivate them because

*...the poster was quite good...it also set a standard...that they might like to meet...themselves...so just letting them figure out for themselves...what they are going to do...and what they are going to achieve...*

Having the girls present their findings to the class “... just to give us a bit of transition...to the next topic...in the unit...” was evidence of Jo's *pedagogical content knowledge* base, that is, to have students to see the connection to the preceding lessons within the unit of work. Jo used other strategies from her *pedagogical content knowledge* base of teaching such as her scaffolding techniques

with individual students where she explained written text and then having students consider the options. She used questioning techniques

*...to get ideas from students... “Okay ...what is land pollution?”  
...and I had already put down tyres ...plastic bags ...on the  
highway...and I’m trying to get them to think of ... “Oh we have a  
refuse tip or a dump here...across the road” ...and I’m like...  
“Okay ...what’s over there?”... “Trees”... “Okay...what’s behind  
the trees?” ... “The dump”...Okay ...so we can put that one  
down...so just putting it into their context...*

She spoke of giving her questioning “...a bit more clarity...” so all students would “...know a little bit about what world heritage is ...”; of getting down to their level; and, of trying

*...to direct them into a line of thought about what the pictures were  
about...and why we were looking at those pictures ...and how they  
were going to be linked to the lesson...*

Jo instructed students to write their information up on the board “...because they already had their own...regarding the organizations...” but she also wanted to give them the opportunity “...to add any further information ...”, which was “...just another added thing of them owning work ...”. As she said

*...its not me writing it up there...like I could put an OHT up and  
said... “Okay you need to write that on to this piece of card  
board...”. So ...it’s really about them...seeing the value in the  
learning experience that I have created for them...*

There was further evidence of her *pedagogical content knowledge* during the introduction of her lesson, or what she called “...doing the anticipatory set ...”, in which she sought to link the previous learning experience with the preceding lesson. She explained that they were

*...trying to associate the picture on the OHT ...which is to do with  
Greenpeace activists and ...umm...their protests...so just trying to  
get...them thinking along those lines of how we protect our  
environment ...just using their prior knowledge...to engage in the  
lesson...*

Jo said she started off the lesson as a teacher-directed learning experience, using explicit instructions like “...Okay...this is what I want you to do ...”, before making what she called

*...the transition...using their ideas...put them up on the board and we are now moving into the more student oriented learning experience...So this is the part where students will get into their groups...umm...work together...to come up with collaborative information...*

Her lesson then, moved from the definitional phase, to the global scale of pollution, and then “...towards something more specific in Australia...” like the Collinsville’s mine

*...and just making it ...not so much about the world ...because the world is not a concept I think that students grasp...So ...I put it in a local context like a mine...and the pollution that the mine has...and how they can take steps to protect their own environment ...in their own backyard...and small...little steps for them...*

In terms of *knowledge of learners and learning* Jo said that most of her students were visual learners, although “...a couple of them learn orally ...”. Most of her class found that it was “... too much ...to do one task...and listen to me at the same time ...”. She also found that

*...working kinaesthetically...like moving up to the blackboard ...and writing out...and work in their groups on the ground...and those sorts of things...really does help them socially...and just getting the free thinking happening... as well...because they are in their own element with each other...*

Jo said her class was made up of both high achieving students and hard working students, and although the latter group was not outstanding academically, she said that

*...I really appreciate them sometimes...a lot more than the high achieving students because...they are working hard for themselves ...I try to help them as much as I can because I know that they want to do well...and it’s really rewarding for me ...to see that ...they are interested ...in getting better marks...*

The other feature about her class is that it is small in numbers, and took up just the first two rows in the room. She said that most students "...get on fairly well... they know each other very well..." so

*...I don't always think its necessary for me to always...umm...sort them into ...umm...mixed genders...in groups...so they already have their friendships set up ...so they are working freely...with each other and they don't have to work ...at communicating with each other...so that works...But I will address ...perhaps...mixing them up in the future I think...just give them a bit of change ...and different angles on different ideas...*

Jo's *classroom communication* strategies included statements about the efficacy of her instructional techniques in class. For example, confusion briefly reigned at the beginning of the group work activities, and she admitted that her instructions were not

*...stated clearly...the steps these groups had to take...and why there were doing this activity...I probably should have said... "Okay... you are in your groups...summarise what these organizations are for...umm...then I want you to write it on a poster... and you will be reporting back to the class...this information" ...So...I needed to make that clear...*

She also spoke of how some students would test her "...to see what your reactions were going to be ...", but she found the best way to deal with that was "...to sort of laugh with them...instead of getting back up ...". Jo said that she sometimes gets "...a bit tongue-tied..." and students notice this

*...so I've got to laugh along with them at the same time...instead of like...Uh-uh...and getting all flustered ...I think...it really helps kids know that... "Ohhh...she is a human...you know...she makes mistakes" ...I think it helps kids relate to me...instead of just ...being a one-dimensional thing...I'm a person as well...*

Despite the generally cordial relations she had with her students, she used a variety of *behaviour management* strategies as a means of encouraging and sustaining a positive learning environment, such as using positive reinforcement to reward good behaviour. She also made an effort to acknowledge good answers "...especially with me dragging information out of kids...I try to give some good feedback...I'll praise

them ... “That a good answer” ...”. Her other *behaviour management* strategies included circulating around the room, and using techniques to get students to be quiet before she spoke. She explained that

*...I'll often use ... “Okay...that's one minute of your time...that I'm taking...I'll wait” ...and sometimes I'll say... “We are going to be great friends...we spend so much time together” ...and they...hate that...because they don't want to be my friend ...So...I find that techniques usually works...*

Jo spoke of one student who had “resistance to authority-disorder”, because whenever he was given a direct instruction to work, he would say “No”, but “...then you walk away...he will then get on with the job ...”. However, she found that in this particular activity he was soon off task, and considered modifying the activities that had been assigned to other students in the class, but

*...then I thought... “No...I won't do that because he's not doing the work the rest of the class...has been assigned to do...and he has to know that he can't do whatever he wants to do...and that I will adjust to him” ...*

She noted that he was sometimes “...apathetic to all work ...and so I'm letting him know ... “I am watching you...I am checking up on you”. He later grabbed hold of another student's hat, and when Jo demanded it back, he threw it away, but she resisted the temptation to shout at him because “...it would have got the other students looking and created a disturbance for them ...”. After picking up the hat herself she spoke to him, saying

*... ‘Okay ...you have to get your book out right now’ ...now I'm giving him no other opportunity... “Get your book out...write the work into your book...otherwise you are going to be withdrawn from the class” ...and I think he knew that he would have been in trouble...that's why he is getting his books out of his folder...*

When students were asked to attach rubbish to their posters, this same student immediately picked a piece of 3” x 2” timber

*...and I think he was seeing if I would do my 'block' at him...so I thought... "Okay...well...I'll let him use it...as long as it would not rip the poster"...So...just let them have it their way sometimes...compromising...*

### **Summary: Jo's realization as a social science teacher**

The two data types elicited from Jo show that the focus of her teaching was four of Shulman's categories: *educational ends, goals, purposes and values; pedagogical content knowledge; knowledge of learning and learning; and, general pedagogical knowledge* focusing on *classroom communication and behaviour management*. Her concept map indicated the importance *educational ends, goals, purposes and values* knowledge base in effective social science teaching because it was nominated in all hierarchies, as well as the core *educational ends, goals, purposes and values* knowledge base that had been nominated to 'lifelong learning'. Jo stated in her Think Aloud Protocol (TAP) that she wanted lifelong learners who were critical, empathetic, and good citizens. Commentaries from her video stimulated recall (VSR) indicated a strong desire for students to own their work, principally through activities that were learner-centred.

In fact, *educational ends, goals, purposes and values* featured strongly in the two data sets. Her concept map indicated that Jo wanted students to have ownership of their education so they could develop into 'independent thinkers', be creative, and, 'question information', all of which contribute to the attributes of a lifelong learner. She commented in her TAP about difficulty of meeting these goals because of the unavailability of syllabi and the age of some of the work programs. She stated in her VSR that allowing students to cross into traditional teacher territory such as writing on the blackboard helped to give student ownership of their education. She

commented on the value of having students conduct their own research, work in collaboration, and present findings to their peers.

*Pedagogical content knowledge* also featured strongly in the two data sets. Her concept map showed that the nominated *pedagogical content knowledge* bases to ‘student-centred learning’, ‘constructivist learning’, ‘independent thinkers’, ‘creative’, and ‘question information’, underpinned students’ learning experiences in effective social science teaching. The nominated knowledge bases for *content knowledge*, *classroom communication*, *behaviour management*, and *teaching strategies* indicated her understanding of *pedagogical content knowledge* at the macro level as well. She said in her TAP that students were creating their meaning and thinking for themselves in her student-centred approach to teaching. She also pointed out the importance of modelling to help students understand the phases involved in researching a topic. Commentaries from her VSR indicated the importance she placed on having students seeing the link between lessons, and lessons within a unit of work, and of her questioning techniques that allowed students to connect information to reach conclusions. She also spoke of using context to help them relate new information to their prior knowledge; the use of stimuli to help students makes links in the lesson; and, by allowing students to write their summaries on the blackboard, adding value to the constructivist process.

*Knowledge of learners and learning* emerged from Jo’s two data sets. Her concept map indicated that ‘teacher knowledge’(CK) required not only an understanding of the ‘school curriculum’ (Curr K; EEGPV), syllabi, and subject knowledge, but students’ interests and prior knowledge. She stated in her TAP that teachers should know the students’ educational and personal backgrounds, as well as how they interacted with their peers. Commentaries from her VSR indicated that her students

were essentially visual learners who interacted well with each other, they enjoyed kinaesthetic activities, and that the class was made up of both high achieving and hard working students.

*Classroom communication* featured in the two data types. Her concept map showed that *classroom communication* was nominated to every concept in 'teacher/student relationships' hierarchy, indicating the importance of this knowledge base in Jo's teaching. She also indicated *classroom communication* as important in negotiating expectations from students to ensure an effective *behaviour management* policy. She said in her TAP that those teachers who possess a sense of humour, show respect for students, especially through the process of negotiation, will get a positive response from students and were likely to view teachers as people, not just members of the teaching profession. Commentaries from her VSR indicated her willingness to see the funny side of events that don't necessarily go to plan, and to acknowledge to students that she has made a mistake, because it helps students see her as a person and not just a "...one dimensional thing ...". She also stressed the importance of giving explicit instructions at the beginning of activities.

*Behaviour management* featured in the two data sets. Her concept map identified 'clear boundaries'(EEGPV) and 'realistic expectations' (EEGPV) based on negotiation as factors for an effective 'school behaviour management policy' (BM). She said in her TAP that the first three weeks of her teaching were difficult, but after establishing some clear boundaries and realistic goals towards the end of the first term, the situation improved. She commented on the option of using the withdrawal room as a both as a place of reflection for unruly students, but also she felt that the administration used the process as a way of monitoring the performance of teachers. Commentaries from her VSR indicated a variety of *behaviour management* strategies

such as using positive reinforcement, circulating around the room, and subtle cues. Jo also spoke of using compromise and commonsense when dealing with *behaviour management* issues.

Jo's conceptions of effective social science teaching after six months at her new school indicated a strong focus on learner-centred approaches to teaching where her goal is to have students take ownership of their learning. She spoke of the importance of context, and of tailoring the learning to suit students' interests and prior knowledge. She said that possessing a sense of humour and being able to interact with students was essential in establishing an environment conducive for learning. The establishment of clear guidelines of rules of behaviour resulted a positive learning environment, despite the initial difficulties she had encountered in her behaviour management strategies. Overall, Jo's philosophy of teaching is based on democracy where the student is encouraged to become an active investigator, community-minded, knowledgeable, and a creative person in a learning environment of care and support.

### ***Discussion: charting Jo's development***

Jo's conceptual structure of effective social science teaching at the conclusion of the third data collection in May 2003, reveal both consistency and change. Jo's initial experience as a social science teacher indicated a focus on two of Shulman's categories: *pedagogical content knowledge*; and, *general pedagogical knowledge* focusing on *classroom communication* and *behaviour management*. Jo's developing thoughts on social science teaching, indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *classroom communication*; *behaviour management*; and, *content knowledge*. Jo's realization of independent practice indicated a focus on five of Shulman's categories: *pedagogical content knowledge*;

*general pedagogical knowledge* focusing on *classroom communication and behaviour management*; *knowledge of learners and learning*; and, *educational ends, goals, purposes and values*.

*Knowledge of learners and learning* was one knowledge base in her conceptual structure that represented a change. Her map (Figure 25) shows that ‘learning experiences’, ‘flexibility’, and ‘student background’, reflected both her cognitive and affective concerns for students. She said in her TAP that it was important to know students’ prior knowledge, their interests, their personal background, and how they interacted with their peers. Jo stated in her VSR that her students were of different abilities and achievement levels and were essentially visual learners; they enjoyed kinaesthetic activities; and, interacted well with each other.

*Educational ends, goals, purposes and values* represented the second change in her conceptions of teaching. Her concept map (Figure 25) indicated a broad range of cognitive and affective *educational ends, goals, purposes and values* knowledge bases, such as ‘ownership of education’, ‘lifelong learning’, realistic goals, and ‘school curriculum’. Jo stated in her TAP that she wanted students to become independent thinkers and challenge accepted dogma, but pointed to the age of work programs and the unavailability of syllabi as stumbling blocks to achieving these goals. Despite these concerns, Jo said in her VSR that she was happy with the way students conducted their research work.

Whilst *Behaviour management* was a consistent conception of Jo’s conceptual structure, there was also change. Jo’s concept maps (Figures 23 and 24) showed that *behaviour management* had been nominated at both the general and subordinate levels, but her final concept map (Figure 25) was perhaps more reflective of the realities of individual practice, such as a *behaviour management* policy that was based

on 'clear boundaries', 'realistic goals', and 'negotiation'. Whilst her TAPs and VSR from her initial experience and developing thoughts on social science teaching considered the success of *behaviour management* as one that was dependent upon the teacher realizing the cognitive and affective demands of students through a supportive learning environment and empowering students, commentaries from her TAP and VSR on realization of independent practice again reflect the realities of individual teaching practice. Jo commented that the success of her *behaviour management* after her first term of teaching was based on establishing clear boundaries and clear goals. She also spoke of successfully using positive reinforcement, compromise, common sense, and about the effectiveness of the administration's guidelines about the use of the support room.

*Classroom communication* was also consistent in her conceptual structure. Her concept map (Figure 23) at the initial stages of her experience of social science teaching showed that *classroom communication* has a strong cognitive role in her teaching. Jo said in her TAP that effective communication promotes the constructivist process, especially in terms of gaining a better understanding of students' affective and cognitive domains. However, comments from Jo's VSR show she was critical of verbal and non-verbal aspects of her communication. Her concept map (Figure 24) on her developing thoughts on social science teaching show that *classroom communication* continued to have a strong role in the cognitive aspect of conceptual structure. Jo said that respect was the key because, without it, teachers and students could not work together. Respect helps students to develop confidence, the curiosity to question, and to like SOSE. Her concept map (Figure 25) on realization of independent teaching practice indicated the importance of teacher/student relationships that were based on the teacher being flexible, having a sense of humour.

Comments from her TAP and VSR reiterated the importance of having a sense of humour, to come across to students as a person who was more than just one-dimensional. Jo also spoke of the importance of negotiation between the teacher and students in order to remove the “them and us” thinking from students, and to give explicit instructions in class.

*Pedagogical content knowledge* was a component of Jo conceptual structure of teaching throughout the three data collections. Her concept map (Figure 23) at the initial stage of her experience of teaching social science showed that *pedagogical content knowledge* was identified at the macro level of her map, as well as the general and subordinate levels. Her map also showed student ownership of their education (EEGPV) was the direct result of *pedagogical content knowledge*. *Pedagogical content knowledge* was effectively part of *classroom communication* and *community integration*. Jo spoke of the importance of student-centred learning in her TAP and of using visual representation in her VSR. Her concept map (Figure 24) at the stage of her developing thoughts on social science teaching showed that *pedagogical content knowledge* was nominated at the macro level of her map, and to subordinate concepts. *Pedagogical content knowledge* continued to be a part of *classroom communication* and to *educational ends, goals, purposes and values*. Comments from her TAP indicated a constructivist approach to her teaching. Her concept map (Figure 25) on realization of independent practice indicated that *pedagogical content knowledge* was nominated at the macro level, and at the subordinate level. Her map also showed that *pedagogical content knowledge* concepts were within the ‘learning experiences’ (KLL) hierarchy, an indication perhaps of the greater emphasis Jo had placed on *pedagogical content knowledge* in student learning. Comments from her TAP and VSR reflected the continuing importance of the inquiry processes in her teaching.

Jo's *pedagogical content knowledge* at the initial stages of her existence as a social science teacher showed that she considered 'student learning', 'authentic pedagogy', 'flexibility', and 'guidance without interference' (Figure 23) as process links to other aspects of social science teaching. Jo stated in her TAP that guidance without interference should be about student experiences in learning, about the value of relevance for student learning, and about developing lessons that focus of student activities. Jo commented in her VSR on the importance of using a variety of visual resources to give students a broader understanding of topics.

Jo's developing thoughts on social science teaching showed that she continued to regard 'flexibility', and 'collaboration', 'learning from each other', and 'depth study' (Figure 24) as process links to other aspects of social science teaching. Jo emphasised the importance of flexibility in her TAP, and about letting students do their own learning.

Jo's *pedagogical content knowledge* on realization of independent practice indicated continuing process links to other aspects of social science teaching. Whilst 'student-centred learning' and 'constructivist learning' were recurring themes, 'independent thinkers', 'creative', and 'question information' represent additional concepts in her conceptual structure (Figure 25). Jo spoke of modelling ideas in her TAP and having students develop a sense of empathy. Commentaries from her VSR reflected the student centred learning theme she had alluded to earlier, that is, having students present their findings to the class, both orally and in writing on the blackboard. Jo spoke of giving more clarity to her questions, by doing the anticipatory set so students could make connections with previous lessons, by contextualising issues, by and using scaffolding techniques to help students consider their options. Overall, Jo's knowledge base of teaching showed strong growth, from a focus on

herself as teacher to an emphasise on knowledge of learners and how they learn in a constructive learning environment.

## JOHANNES

Johannes attended a state high school where he studied social science in Year 8, and geography from Years 9 – 12. Although he found that his teachers lacked passion in their teaching, his enjoyment for geography stemmed from the intrinsic value the subject offered, especially in the areas of mapping, and analysing patterns in data. These skills learnt in class linked up with his personal interests of bushwalking, cycling and camping.

### ***Johannes's initial thoughts on social science teaching***

Johannes's response to the initial focus questions indicated a belief that teaching should fulfil a number of simultaneous roles such as: reservoirs for students to access their disciplinary knowledge and expertise; as facilitators in supporting learners to construct their own knowledge; and, as models to encourage appropriate behaviour. He provided a metaphor for teaching, “If learning is constructing, then teaching is scaffolding”. He believed that students are likely to enjoy social science if they find it relevant to their world experiences, and challenging in a supportive and caring environment. Johannes stated why he wanted to be a teacher:

*Good teaching can lead to an education that is empowering and liberating. I want to be a good teacher, and consider it to be a rare privilege to earn a living in a profession that can offer opportunities to positively influence so many lives personally and indirectly. I want to foster students' development of high self esteem, resilience and life long learning skills and attitudes, such that they can continually strive to their fullest potential. I hope to be contributing to society by improving the citizenship of students, such that they are more active, informed, tolerant and compassionate participants.*

Johannes enrolled into the Bachelor of Education program as a graduate entry (2 years), after completing a Bachelor of Science in Australian Environmental Studies, majoring in ecology and environmental planning. His curriculum areas were

Studies of Society and Environment (SOSE) and Science. He spent his final professional practice teaching at a large, coeducational, urban state high school where he taught both Year 9 Science and Year 11 geography. The Year 11 geography class was videotaped for a stimulated recall interview. He completed his preservice education as an intern at the same the high school. He received a Suitability Rating of '2', the second highest, from Education Queensland.

He was appointed to a coeducational, urban high school where he taught two Year 8 Science classes; two Year 9 Science classes, one being an "extension class"; two year 10 Science classes; and Year 11 vocational Mathematics. Johannes's was not troubled by the fact that he did not have the opportunity to teach in his chosen second teaching area. The Year 9 Science class was videotaped for a stimulated recall interview.

### ***Johannes's initial constructs of social science teaching***

Johannes's concept map shows a depth in the hierarchies beginning with the most general concepts of 'knowledge' (CK), 'collegial circle' (PL), 'pedagogy' (TS), 'classroom management' (CC), and 'pedagogical content knowledge' (PCK), leading to the most subordinate concepts of 'holistic understandings' (PCK), 'learner-centred' (PCK), and 'cooperative learning (PCK)' that results in 'critical thinking' (EEGPV), 'lifelong learner' (EEGPV), 'citizenship' (EEGPV), 'informed analysis' (EEGPV), and 'effective participation' (EEGPV) (See Figure 26). Four cross-links that link the two sets of hierarchies, indicate integration of segments of knowledge bases, and hence a high level of complexity in Johannes's thinking.

The prominence of *educational ends, goals, purposes and values* knowledge base on Johannes's map indicated the importance he placed on outcomes based education, which is in accordance with the attributes of lifelong learners outlined in Studies of

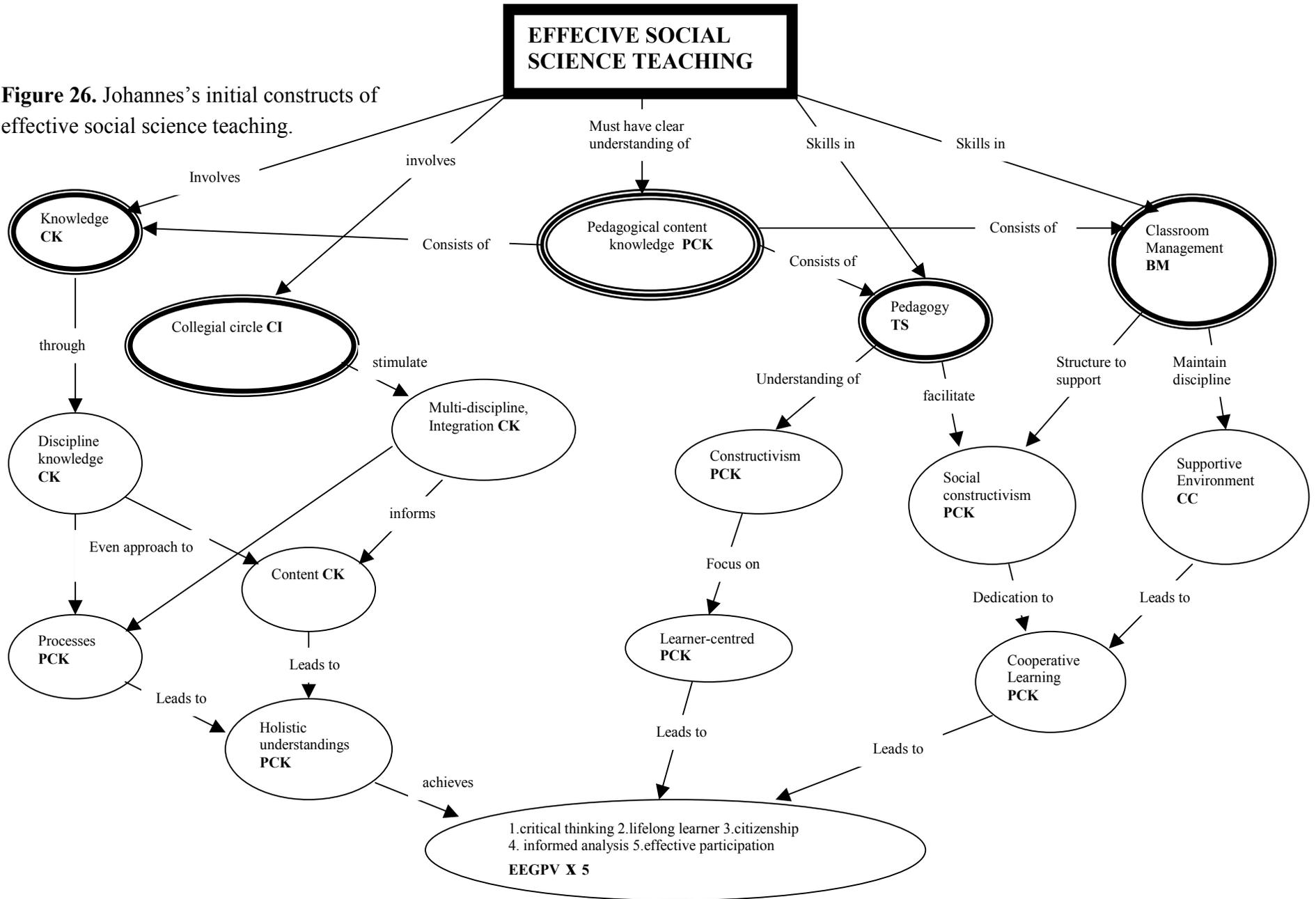
Society and Environment (SOSE). The nomination of 'knowledge' (CK), 'discipline knowledge' (CK), 'content' (CK), indicated the importance Johannes placed on *content knowledge* because it leads to 'holistic understandings' (PCK), the precursor to the core outcomes.

The identification of 'collegial circle' (CI) is an indication of Johannes's thinking about working with others that goes beyond current Shulman's categories. This new category of *community integration* entails a process of school collaboration and engagements both within and out of school in order to enhance the quality of learning. This process is important because it is recognising the changing dimensions and expectations on schools and teachers about working with others and the community that moves beyond *professional learning* or *knowledge of educational contexts*.

The powerful linking words, 'must have clear understanding of' that links 'pedagogical content knowledge' (PCK) to the key concept, indicated its vital role in effective social science teaching. 'Pedagogical content knowledge' (PCK) is the most general concept, and the point from which logical relationships are established with other nominated concepts of 'knowledge' (CK), 'pedagogy' (TS), 'behaviour management' (BM), and 'supportive environment' (CC), all of which further indicate Johannes's understanding of *pedagogical content knowledge*. *Pedagogical content knowledge* has been nominated to 'constructivism', 'social constructivism', 'learner-centred', 'processes', 'cooperative learning', and 'holistic understanding', because these concepts represent aspects of the inquiry approach in the social science syllabi.

The focus of Johannes's Think Aloud Protocol (TAP) was on *pedagogical content knowledge*, *content knowledge*, *teaching strategies*, *behaviour management*. In terms of the general concepts, *pedagogical content knowledge* underpins what it means to be an effective social science teacher. Johannes stated that

**Figure 26.** Johannes’s initial constructs of effective social science teaching.



*... PCK becomes that ...that real art of knowing ...having the disciplinary knowledge...that ...you know through our academic studies...and then studying ...pedagogy in out teaching studies...finding that way of melding the two into something that is really appropriate and relevant to students...*

Johannes understanding of *pedagogical content knowledge* was illustrated in his discussion of the two facets of constructivism. First, there is the constructivism on the student on an individual basis, and second, a teacher-conscious constructivism. The former refers to students working in isolation, while latter relates to the supporting or facilitating role teachers should play in the classroom because as Johannes points out, “...that if you just allow ...purely students to construct their own together...they must pool ignorance...and may create bigger problems...than you had ...”. ‘Social constructivism’ (PCK) on the other hand, “...suggest that students...do better...gain more ...when they are involved with their peers...creating understanding with their peers ...”.

Directly under the general concept of ‘knowledge’ (CK) is ‘discipline knowledge’ (CK), that incorporates both processes and *content knowledge*. According to Johannes, ‘processes’ (PCK) involves, “...investigation techniques...from collecting data...anything down to geography mapping skills ...”, while ‘content’ refers to, “facts... or principles that ...”. Johannes stated that

*in the light of SOSE ...that you need to be able to not just rely on being a Geography teacher...or a History teacher ... You need to see...umm...the value and power of ...umm...integrated...understanding of issues ...rather than reducing it to a simplistic ...sort of understanding through one discipline...*

The Studies of Society and Environment (SOSE) Syllabus (QSA/QCSS, 2000) for example, draw from a number of disciplines, which imply that teachers of the Social Sciences should build up a broad knowledge base of the disciplines.

This will depend upon, according to Johannes, on ‘Collegial circle’ (CI) because, “you cannot operate in isolation... if you don’t have that knowledge...then you’ve got to be open to ...expressing that deficit to other members of staff”. This also can be done a professional development level where facilitators will push teachers, “to question their own assumptions and reconsider the basics of their beliefs and practices” (Cochran-Smith & Lytle, 1999: 271). At a broader level, the construction and reconstruction of knowledge for the curriculum should also include students, administrators, parents and academics, with the aim of developing more equitable social relations and a curriculum that reflects community input (Cohran-Smith & Lytle, 1999). The collegial to community process, Johannes noted, is, “probably the way of the future”.

The result is that students are given the opportunity to develop 'holistic understandings' (PCK) ...of the world of Social Sciences ...and issues through the world of Social Sciences”, which in turn, contributes to what Johannes considers are the five major core outcomes of effective Social Science teaching. This is in contrast to ‘molecular’ approach that emphasises atomistic and segmented teaching and learning (Groundwater-Smith et al., 2001).

With regard to *teaching strategies*, however, Johannes highlighted a challenge facing teachers in the classroom. If the instruction is teacher-centred, “you limit...umm...the dominant students...overtaking the meek students”, however, if the teachers created groups, “that would be very difficult not to have ...umm...the more meek students or...less confident...become overwhelmed by dominant students”. Effective management of the classroom, including *pedagogical content knowledge* “with lots of reinforcement” and encouraging positive social interaction is a way of overcoming this potential dilemma in the classroom.

*Behaviour management*, according to Johannes, "...is not a concept that stands alone, but one that has input into social constructivism". In other words, management practices should move beyond behaviour modification to incorporate a climate that supports all aspects of learning, as identified by a 'supportive environment' concept. According to this model, Johannes was advocating a combination of three broad approaches to behaviour management: the person-centred, interactive, and the interventionist approach (Ground-Smith et al, 2001). Integral in Johannes's *behaviour management* practices is the 'supportive environment', or safe environment, that encourages "...fun in the classroom, as well as giving students the opportunity to express their ideas...", so they can fully develop the core outcomes of 'critical thinking', 'lifelong learner', 'citizenship', 'informed analysis', and 'effective participation'.

### ***Johannes's initial knowledge in action and reflection***

Johannes's video stimulated recall interview was based on a review lesson of a fieldtrip conducted by a class of Year 11 Geography students the previous day. The data which the students had collected concerned the issues and the consequences of residential and commercial development on tropical catchment management. This primary source data was then to be used the basis for their reports. Johannes teaching strategies involved a combination of communication skills, explanation, demonstration, questioning, feedback, behaviour management, motivation and reinforcement, as well as using a whiteboard, and an overhead projector.

Johannes stopped the videotape 28 times during recall interview, and 34 categories of teachers' knowledge bases were identified from his responses (See Table 13).

**Table 13: Breakdown of knowledge bases.**

Knowledge base	No
General pedagogical knowledge	
-Behaviour management	4
-Teaching strategies	3
-Classroom communication	1
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	-
Knowledge of learners and learning	3
Educational ends, goals, purposes and values	2
Knowledge of educational contexts	-
Pedagogical content knowledge	20

The overall *teaching strategies* of the Johannes's lesson was one of eliciting student understanding, because as he explains,

*...they were primary data collectors on this field trip and...umm...essentially their data we wanted to ... wanted them to share ...to facilitate ... structure the lesson such that we went through site by site ... it was a series of questions eliciting ...umm...answers from students to get a complete picture...*

Basically, Johannes wanted students to provide the information to his questions through some prompting-type questions at first, that is, those “questions that were almost had the answer...in the question ... very closed sort of ...umm...series of questions ...” Johannes's use of the open ended questions and then specific question with each category of data indicated his understanding of *pedagogical content knowledge*. His *pedagogical content knowledge* was apparent when he used diagrams on the whiteboard so students could, “virtually represent direction to the site of their map, so they could mark it in, rather than my verbal description”.

Johannes's knowledge of *pedagogical content knowledge* was illustrated in the different ways he represented subject matter to students. He used a number of powerful key words and phrases in his forms of representations such as, ‘clarifying’, ‘unpacking’, ‘eliciting’, ‘explaining’, illustrating’, ‘generalize’, ‘relate’, ‘bridge the

gap', 'use of hands', 'scenarios', and 'visualize', as a means of making subject matter understandable to students in his class (See Appendix D).

In comments about his discussion with students vis-à-vis their reports, Johannes sought "to clarify the requirements of this report... to set some of the ultimate objectives and themes that they should be ...keeping in mind when going through this data". Later in his explanation of standards and criteria for the report, Johannes was,

*trying to unpack the terminology in the standards... and relate it to the actual learning ...I'm trying to bridge that gap... we're talking bridges all the time...between the formal written standards and the classroom language.*

*Pedagogical content knowledge* was evident in his discussion of the data with students, by having them consider the validity of the data collection:

*I wanted them to start to realize how they could share information and...and that neither was right or wrong but...somewhere in the middle was probably the correct answer.*

Johannes wanted students to relate the data interpretation to the principles of management, "rather than it just be data floating out there...I was just trying to facilitate them to develop links and ...umm...causal processes".

He alluded to the constructivist approach again when drawing students' attention to see both sides of an argument, in this case, the value of or the problem of a weed, or whether it is a conflict between land use, or between industrial and residential land use, so

*I was trying to draw students' attention to the needs for a balanced view ...to be able to evaluate all sides of an argument ...umm... before coming up with solutions ...*

Another instance of *pedagogical content knowledge* was the use of scenarios. Johannes first explained to students the negative implications of a *carte blanche* policy of weed removal, because some weeds can be exploited for their commercial value. One such plant that is regarded as a weed is the 'camphor laurel' tree, and by tapping

into their everyday knowledge, students gained a new appreciation of this plant.

Johannes explained that

*...someone mentioned they have a smell ( ) I think we crushed some leaves ...umm... I was trying to draw upon their common knowledge they might relate to, by mentioning campher chests, so...a bit a sort of constructivist idea...*

By linking the curriculum to their everyday experiences, and encouraging students to engage in constructivist activities, Johannes was establishing a framework for critical thinking (Thornton, 1994).

Johannes also used diagrams and hand movement to represent subject matter. He said that

*Here, I decide to use a diagram...because its ... well, from a ...a learning style ...umm...the theoretical perspective I'm sort of trying to appeal to the visual... umm...learner in students ...the diagram to go along with this definition might help... umm...explain the concept better...*

In explaining the benefits of ground cover,

*I see myself using my hands to sort of explain the way... umm... the roots of the grass ...the roots... masses of grass is interwoven, so. Sort of ( ) visually represents the benefits of having ground cover there.*

In seeking to establish an understanding of balanced management practices with his students, Johannes used his *pedagogical content knowledge* to generalize a number of ecological principles of environmental management.

Johannes, however, pointed to the challenges of using his *pedagogical content knowledge*. He stated that

*...the dilemma of facing the situation where...umm ... my academic knowledge ...and I have to try to bridge the gap between that and ...the umm... the necessity for understanding that these students ...without confusing them ...or oversimplifying a complex and somewhat contentious ... umm...concept in area studies...*

In terms of *classroom communication* skills, Johannes used humour as not

only a means of seeing the lighter side of the issues raised about the fieldtrip, but to understand the issues in alternate ways:

*...the birds mating, and the male birds not being able to attract a female because trains...noisy trains overpowering their call...And ...where there is an opportunity, I think there should be humour injected ...to lighten it up and make ...umm...the learning environment a more enjoyable place. It shouldn't be all sorts of rules and...umm... posterity sort of thing...*

An example of the subtle use of *behaviour management* within the context of learning environment (Brophy, 1997) occurred when Johannes detected some chatter at the back of the class:

*I just mentioned students names in context...because at the time he was ...umm...he was sort of distracted. So, I just sort of just ...umm...used his name as an example ( ) the student who ...mention something ( ) the fieldtrip, which served the double purpose of actually bringing him back on task...*

### **Summary: Johannes's initial experience as a social science teacher**

The two data sets elicited from Johannes in May 2002 reveal that the focus of Johannes's teaching was on two Shulman's categories: *pedagogical content knowledge*; and, *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. His concept map indicated a classroom setting that emphasised 'social constructivism', 'supportive environment', and 'cooperative learning' on one hand, and a constructivist, learner-centred approach to teaching on the other. His Think Aloud Protocol (TAP) supports this view of a classroom atmosphere that encourages students to interact in a socially constructivist way, thereby creating opportunities for cooperative learning. The video stimulated recall (VSR) data identified the importance Johannes's places on humour to not only

understand issues in alternate ways but to make the learning environment a more enjoyable place.

*Pedagogical content knowledge* featured strongly throughout the two data types. Johannes identified *pedagogical content knowledge* as the pivotal to effective social science teaching. It is linked directly below the key concept and directly above the other general concepts, which in turn, contain *pedagogical content knowledge* nominated subordinate concepts such as 'constructivism', 'social constructivism', 'learner centred', and 'holistic understandings' that specify and support this process of *pedagogical content knowledge*. The nomination of *content knowledge*, *teaching strategies*, *classroom strategies*, and *behaviour management*, indicated Johannes's understanding of *pedagogical content knowledge* at the macro level of his map.

Commentaries from his TAP added to this understanding of *pedagogical content knowledge* by defining it as a "...way of knowing...", that is, having the ability to rework content knowledge pedagogically understandable ways for student learning. He spoke of importance of social constructivism. Husbands (2001:42) noted that, "Pupil talk is important, too, for the opportunities it gives the pupils to explore language in the context of the history classroom". The concept of constructivism infers a self-regulated process whereby learners construct new knowledge with prior knowledge by organising mental structures to accommodate new understandings (Brooks and Brooks, 1993). The Real Game (DETYA, 2000) is one example where students are encouraged engage in both constructivist and social constructivist activities.

His comments in the VSR further underscores his understanding of *pedagogical content knowledge* through his use of key words and phrases as a way of making content knowledge meaningful to learners. As Shulman (1986) noted, "the teacher

must have at hand a veritable armamentarium of alternative forms of representation” (p.9). He wanted to develop students’ skills of data interpretation in order to relate it to the principles of management. The ability by students to develop these skills will ultimately help them to “...recognise trends, similarities/differences...to explain the cause of an issue/problem...” (Senior Geography Syllabus, 1999:8). Johannes’s also tried to develop students’ skills of seeing both sides of an argument. His approach was in accordance with the general objectives of the Senior Geography Syllabus (QSA/BSSSS,1999), which state that students should be encouraged to use environmental, social, economic, and political criteria to answer the what is being and could be done key question. “Students may of course arrive at varied decisions that are of equal merit because of the quality of the justification” (p.8). He also sought to engage students in some general principles of ecological management.

Generalizations, according to Thornton (2001), are considered the most complex element of knowledge. They are the most powerful combinations of ideas because they transfer from one situation to another and, more so than concepts, allow prediction (p.294). The importance of generalizations is emphasised in the Global Aims of the Senior Geography Syllabus (QSA/BSSSS, 1999), that is, by participating in geographical inquiry, students gain an understanding and knowledge of facts, “ that can be organised around the guiding concepts of geography to form generalizations” (p.5).

*Behaviour management* featured in the two data types. His concept map diagram indicated that *behaviour management* was directly linked to *pedagogical content knowledge*. Johannes considered *behaviour management* practices as a process that moves beyond the modification of student behaviour to facilitate social constructivism in the classroom. He stated in his TAP that he regarded *behaviour management* as not

just a tool to modify behaviour but one in which draws students back on their tasks. Johannes saw his role as more as a facilitator of learning, to explore students' knowledge through group questioning to elicit understanding. Commentaries from his VSR also contained comments about student inattention. On one occasion students were reminded that their inattention during the lesson will have a negative impact in knowing the discipline knowledge necessary for their assignments.

*Teaching strategies* emerged in the two data sets. His concept map showed that *teaching strategies* played a key role in classroom as it is directly linked to both the key concept and the concept of *pedagogical content knowledge*. He stated in his TAP that it is important for the teacher to maintain a balance of presence in the classroom – group work sometimes allows the more dominant students to control proceedings, so the teacher needs have a presence to allow other students to have an input. He commented in his VSR that questioning techniques are an important tool in the pedagogical process. According to the Queensland Senior Geography Syllabus (QSA/BSSSS, 1999), the process of geographical inquiry focuses on questions of issues, their impact, and how are these issues being dealt with.

Johannes's initial conceptions of social science teaching saw the teacher as a facilitator in a classroom where students are actively engaged in constructing knowledge in a cooperative and caring environment. He regarded *pedagogical content knowledge* as the essential component to a constructivist approach to teaching and indeed, to effective social science teaching. He commented on the social constructivist role students should play in class, where they are encouraged to create understandings with their peers through cooperative learning. Social science was not presented as a series of universal truths but as way for students to process knowledge, and to understand concepts and values. Overall, Johannes displays a strong sense of

democracy based on the attributes of lifelong learning where learners are regarded as complex thinkers who are capable of working constructively with others to solve problems.

### ***Johannes's maturing constructs of social science teaching***

Johannes's concept map construction after a six month time lapse shows a hierarchy of concepts, beginning with the general concepts of 'constructivism' (PCK) and 'cooperative learning environment' (PCK), guided by subordinate concepts that ultimately lead a set of common outcome concepts of 'self-empowerment' (EEGPV), 'critical thinking skills' (EEGPV), 'life long learning' (EEGPV), and 'effective social participation' (EEGPV). His map structure indicated a lack of development compared to his first map (Figure 26) in terms of general concepts, relationships, hierarchy levels on one hand, but more branches, indicating a prominence of clusters of knowledge bases within hierarchies (Figure 27). No cross-links in his map, thus presenting a map of less complexity than his first (See Figure 26). His map also showed a lack of development in the nomination of most knowledge bases apart from *educational ends, goals, purposes and values* and *pedagogical content knowledge bases* (See Figure 27). His concept map indicated that there was a broad continuation of the types of concepts nominated for *educational ends, goals, purposes and values*, except for the nomination of 'self empowerment' in his second map. Unlike the prominence of *content knowledge* in his first map (Figure 26), the nomination *content knowledge* was restricted to one concept that was embedded in the 'constructivist' (PCK) hierarchy.

*Pedagogical content knowledge* continued to be strongly nominated on his map. Although the concept of 'pedagogical content knowledge' (PCK) played a subordinate role to one of the general concepts of 'constructivism', it is important to note the

linking words of ‘relies on’, which stresses the crucial role of *pedagogical content knowledge* in the constructivist processes. The nominated knowledge bases of ‘teaching strategies’ (TS), ‘classroom management’ (BM), ‘respect for learners’ (CC), and ‘disciplinary knowledge’ (CK), indicated Johannes's understanding for *pedagogical content knowledge* at the macro level of his map. Other subordinate concepts within this hierarchy, namely, ‘social constructivism’ (PCK), ‘scaffolding’ (PCK), and ‘learner-centred approach’ (PCK) serve to reinforce Johannes’s understanding of *pedagogical content knowledge* at the micro level.

*Pedagogical content knowledge, teaching strategies, and content knowledge* were the focus of Johannes’s second Think Aloud Protocol (TAP). He summed up the role of each hierarchy; the ‘constructivism’ concept and its respective subordinate concepts related to “...cognitive and subjects specific side ...”, while ‘cooperative learning environment’ concerned the

*...affective... the social order I'd like to see in the classroom  
...umm...you can have one or the other and its good...but for  
completely effective social science teaching ...you need those two  
sort of things to come together to achieve, sort of...umm...the  
outcomes ...*

Johannes described constructivism (PCK) as the

*...sort of ... over-arching principle that basically ...umm...for  
myself...for effective social science teaching...I think is getting away  
from the transmissive model... All teaching at the moment...I sort  
of...when I think of ...umm...executing the theory of constructivism  
in my practice...the focus is away from the teacher as the imparter  
of knowledge and students are deemed best to learn ...umm...among  
themselves...and the most valuable knowledge is that which they can  
construct among themselves...and although the teacher is still in  
that model of knowledge...( ) is always just outside that  
learning circle that can be used to bounce stuff off and draw new  
information from.*

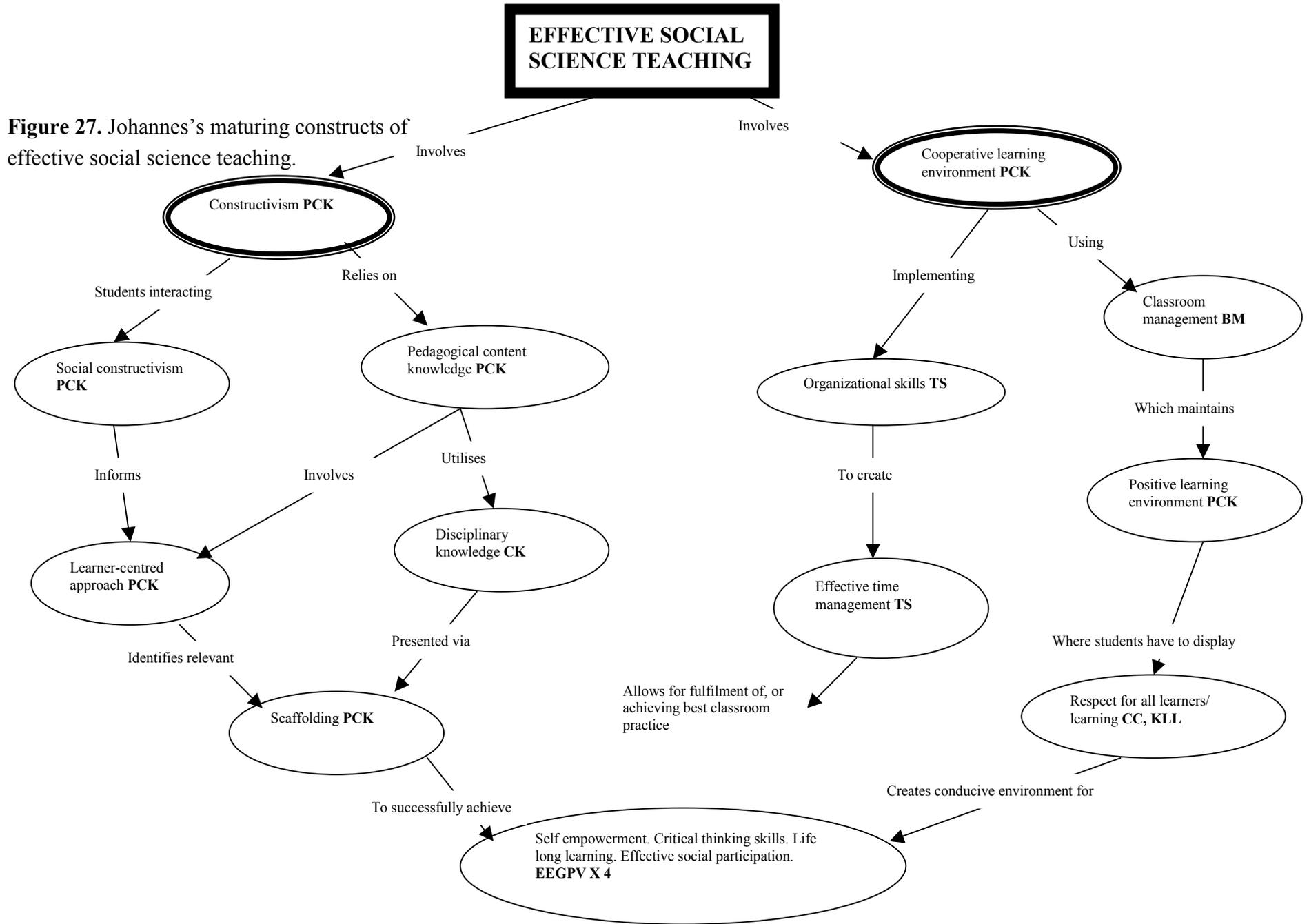


Figure 27. Johannes’s maturing constructs of effective social science teaching.

While Johannes conceded that in terms of *content knowledge* “...you need to have a clear understanding of the ...umm...the origins and construction of that knowledge within the discipline ...”, as in all teaching areas, it is the teacher’s use of *pedagogical content knowledge* in the classroom which is important. That is to say, it is,

*...the ability of the teacher to take that disciplinary knowledge that you’ve learnt through ...umm...either academic experience or professional experience...umm...and relate it to students ...presented in a form that is...umm...useful to students ...I think in their construction of ... umm...their own knowledge.*

This process of representing knowledge for student understanding also involves scaffolding (Vygotsky,1979). Johannes explained that

*...scaffolding I think is the way, the way you take, its part of...within a constructivist approach it’s the ...it’s the sort of...scaffolding is the implementation of your knowledge of, theoretical knowledge of constructivism and students’ experience and structure of the delivery of the disciplinary knowledge...such that they can find a constant link between what they already know...*

However, in terms of understanding what scaffolding is, and its application for classroom practice, Johannes expressed the concern that

*...it’s a bit like when we talk about the concept of...umm...lateral thinking and ...umm...and try to isolate it ...and I always find it annoying when they sort of want to look at the Bono stuff to its very...yeah he’s got these exercises all so cut and dried, and I think...you know...people are laterally thinking all the time and ... you know...whenever people have conversations about anything ...they’re using such a variety...an infinite variety of thinking strategies that I don’t think you can narrow it down to say “Oh they are doing that...they were doing this”. I think scaffolding ... this is what I find when I’m in class ...I’m sort of ...I find I’m teaching best when I’m not trying to analyse it so much ...and I’m really working with the students...what they’ve presented me, what they tell me ...and just trying to sort of ...it’s a little bit intuitive... I think even ...you are just trying to ...where are they coming at...what maybe will work for them and I think that’s a process of scaffolding ...So I think I see scaffolding ...I guess as being both a theory, an idea that fits in with the constructive approach, and also a mechanical operation where you can take a concept and break it down. Which is actually something I wish I had learnt more ... I haven’t seen a recipe yet for how to actually do it...and I find that I never have enough time to figure out the best way to deliver knowledgeable*

*concepts to students such that they understand it quickly or...umm...appreciate the usefulness of it.*

Johannes indicated an awareness of *pedagogical content knowledge* but he also showed his frustration of how to implement the *pedagogical content knowledge* in terms of the scaffolding technique.

Executing the theory of constructivism in Johannes practice will first depend upon his *teaching strategies* of ‘organizational skills’ (Cole & Chan, 1994). He explained the process of organizational skills during his practicum as

*...being on top of marking books, doing everything that upper management wants, the heads of department and ...umm...the deputies, I’ve seen on Prac...the staff seem to get slapped on the wrist for...umm...not doing enough book marking...Umm...when it comes the time...the deputies that are responsible for each year level...will collect up books...just to see how the departments’ going... to see if they are ticking enough day pads and things like that. I think a lot of teachers find ...umm...it doesn’t have much of a link to improving learning or teaching, it’s just a bit of record keeping for the ...umm...deputies ...I think the teachers sort of feel it’s pretty obvious ...you know your kids anyway ...there’s no need for you to...write it down in a book ...put a tick in a book ...you already know what they are doing ...I realise I’m going to be ...I’ll sink or swim ...if I don’t get on top of that...if I can’t get on top of that ...I won’t have enough time ...I always find there is not enough time to completely identify the ...umm...the scaffolding.*

Second, he considered the organizational ability of a teacher as dependent upon the *teaching strategies* of time management because it

*...just allows more time for ...umm...building better lessons, providing better resources...umm...marking, knowing kids...um... just being more on top of things so that when you’re in the classroom teaching...you have, you’re fully informed as to where the students are at, where each student is having problems...things like that...so you can do all the other things like sort of those core pedagogy things a lot better, I think, and also make ...keep yourself more on top of disciplinary knowledge...*

However, Johannes regards time management as not just the responsibility of the individual teacher, but in the governance of the school, especially when it comes to matters like professional development because,

*...we've got to produce life long learners in students ...we have to be lifelong learners ourselves...which a lot of teachers aren't...there's a lot of talk about professional development of teachers but there's never any funds or timetabling to allow teachers to actually research their disciplines better or things like that – its expected that they're just supposed to find these resources, and to find this knowledge, yet also turn up to the class... from nine to three...Umm...when I see that, the more I see schools and teachers, the more I realize that's going to be the biggest problem...*

These comments are reflected in his discussion about building *pedagogical content knowledge* through a 'cooperative learning environment' because

*...you can't operate in a vacuum, it tends to ...umm...particularly when students, from just practical matters...that students come into your class if they have a different set of standards or expectations ...it'll cause problems with other staff and just the whole problem ...yeah ...when any of us have tried to bring a story ( ) that we seem to share in common ...umm...as Prac students is stories of trying to implement good learning and things...and employ these constructive approaches and how they fell flat on their face because students aren't used to it...basically the students haven't developed the skills ...umm...to negotiate their own learning and to learn cooperatively with other students...*

Johannes concluded by observing that

*... I've had people/teachers say that you can never do the perfect lesson... there is a point where you have to say, "Well, that's good enough". And you know...yeah...I'm not sure where that point is...*

### **Summary: Johannes's developing thoughts on social science teaching**

Data elicited from Johannes at the end of his Bachelor of Education studies indicated that there was focus on three of Shulman's categories: *pedagogical content knowledge*, *content knowledge*, and, *general pedagogical knowledge* focusing on *teaching strategies*. In the TAP commentaries Johannes spoke of constructivism as an "...over-arching principle ...", and the need to develop a cooperative learning environment if students are going to "...negotiate their own learning and to learn cooperatively with other students".

*Pedagogical content knowledge* featured strongly in the data. The nomination of concepts for *teaching strategies*, *behaviour management*, *classroom communication*, and *content knowledge* indicated that Johannes had an understanding of *pedagogical content knowledge* at the macro level of the concept map diagram. While ‘constructivism’ (PCK) and ‘cooperative learning’ (PCK) were subordinate concepts in the first map, Johannes had elevated both to general concept status in this map, reflecting the importance he placed on both in the teaching and learning process. The subordinate concepts in his ‘constructivism’ hierarchy were most strongly focused on *pedagogical content knowledge* because these concepts represent facets within the inquiry approach to teaching that will realize the core outcomes. His explanation of *pedagogical content knowledge* in his TAP about constructivist teaching and learning still evoked his powerful understanding of the concept, that is, “...the ability of the teacher to take disciplinary knowledge ...and relate it to students ...” His comments on ‘scaffolding’ also indicate his strong desire to support student constructivist learning in a socially interactive environment, although he was unsure how to go about it at that stage.

*Content knowledge* emerged in the data. His concept map indicated ‘disciplinary knowledge’ as the knowledge base that is essential link between constructivism and scaffolding. As he noted in his TAP, teachers need to have an understanding of the structure of knowledge within a discipline.

The inclusion of the *teaching strategies* knowledge bases of ‘organizational skills’ and ‘effective time management’ on his concept map reflects the importance he placed on these concepts in teaching. He stated in his TAP that organizational skills are crucial because “... if I can’t get on top of that ...I wont have enough time...” His TAP commentary also pointed to the importance of time management in classroom

teaching, and the responsibility that governing bodies of schools have in providing time for teachers to engage in professional development, for example.

Johannes conceptions of social science teaching at the end of his BEd year indicated a constructivist approach to teaching. This approach was clearly apparent in his concept map, where concepts such as ‘scaffolding’, ‘social constructivism’, and ‘learner-centred approach’ underpinned the general concept of ‘constructivism’. His concern for the emotional side of student learning was also expressed in his concept of ‘respect for all learners and learning’. The outcomes on his map again support his pedagogical content knowledge process of teaching, that is, developing cognitive abilities, emotional skills of ‘self empowerment’, and community mindedness. The concepts of ‘organizational skills’ and ‘effective time management’ are additional themes to support best classroom practice. Overall, Johannes displays a strong sense of democracy based on a constructivist approach to teaching where learners are seen as unique individuals who have a broad range of knowledge and experiences. They are capable of working in partnerships with their peers to make decisions and solve problems.

### ***Johannes’s constructs of science teaching on realization of independent practice***

As noted earlier, Johannes was not given any social science classes to teach at his appointed school. Johannes’s third concept map construction (Figure 28) indicated a depth in hierarchy beginning with the knowledge base of ‘pedagogical content knowledge’ (PCK), ‘disciplinary knowledge’ (CK), and ‘knowledge of learners’ (KLL), that ultimately lead to ‘lifelong learning’ (EEGPV). His map show a marked change from his second map (Figures 27) with the cross-link that specifically link the concepts of ‘individual differences’ (KLL) and ‘scientific literacy’ (CK, EEGPV),

thus indicating integration of knowledge bases between the two hierarchies. A further difference with the previous maps was the two linking arrows, between 'scientific methodology' (PCK) and 'content of science' (CK), indicating a cyclical process of the two concepts for students to build up a knowledge base in science.

*Educational ends, goals purposes and values* continued to be strong focus of Johannes's map, with a greater emphasis on cognitive outcomes, namely, 'scientific literacy', 'scientific expertise', and 'science, technology and society'. Whilst *content knowledge* was nominated once as an embedded concept in Johannes's second concept map (Figure 27), it featured strongly at both the general and subordinate levels of his third concept map, an indicating the crucial role of content knowledge in 'scientific methodology'. The significant difference with this concept map (Figure 28) to his other two concept maps (Figures 26 and 27) was the emphasis placed on *knowledge of learners and learning*. The identification of 'knowledge of learners' (KLL), 'learning styles' (KLL), 'individual differences' (KLL), indicated the importance Johannes places on knowing the learner for success of *pedagogical content knowledge* and the core outcomes. The focus on *knowledge of learners and learning* may also indicate the realities of inservice teaching that not so apparent during university studies.

Despite the change in teaching area, his concept map (Figure 28) showed that *pedagogical content knowledge* was consistently regarded as the overarching knowledge base that integrates the other knowledge bases on his concept map diagrams at the macro level (see also Figures 26 and 27). The use of the linking words, 'involves the ongoing development and refining of' that links 'pedagogical content' knowledge' (PCK) with the key concept, indicated Johannes's thinking concerning the developmental nature of *pedagogical content knowledge* in terms of

‘disciplinary knowledge’ (CK) and ‘knowledge of learners’ (KLL) in effective science teaching.

The focus of Johannes’s Think Aloud Protocol (TAP) was on *pedagogical content knowledge; content knowledge; educational ends, goal, purposes and values; knowledge of learners and learning, and behaviour management*. Johannes stated that the key role of *pedagogical content knowledge* involved teachers confidently bringing

*...their disciplinary knowledge ...to bear on students...how the teacher explains and scaffolds learning ...experiences...and bridges the gap...between students’ naïve concepts ... and my more scientific explanations of things...umm...pedagogical content knowledge ...involves how the teacher...corrects those misconceptions of students ...have...and it recognises ... a constructivist approach in...that it ...acknowledges...that it is not enough simply ...to tell a student that they are wrong...but in fact they need to establish the student’s knowledge base...and make the student aware of that and then...work out what...level...then provide ...using their disciplinary ...provide ...learning experiences that...challenge the students to move... a little bit further outside of that ... umm... circle of knowledge that they are actually at...at that stage...And so just to cause just a little bit of...conflict in the student ...enough that ...the student can start to redefine their knowledge ...*

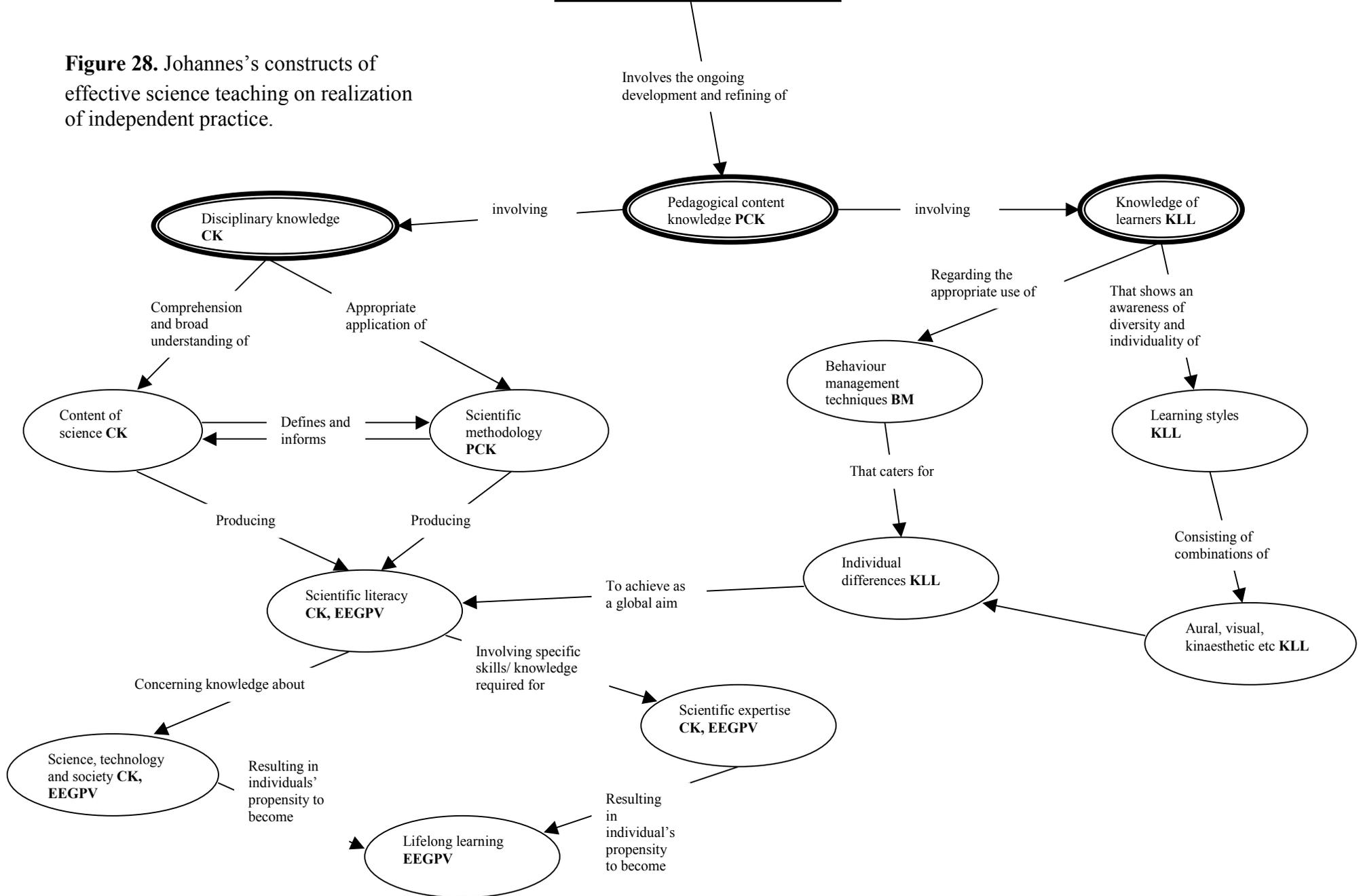
*Pedagogical content knowledge* is exemplified by the subordinate concept of ‘scientific methodology’ in which he stated that it is a

*...process of investigation...the content always needs to be ...umm...clarified to help you find...to help you form the methodology ...learner-centred science teaching that allows ...the students to ...get involved in developing some of that methodology themselves ...to figure out what content...they really need to know to be able to ...umm...create a methodology that will allow them to produce results or answers the questions have raised...*

Johannes statement of the reciprocal roles of ‘scientific methodology’ and ‘content of science’, that is, “...Neither of those can exist alone...”, are the essential ingredients for *pedagogical content knowledge*, which according to Shulman (1987) is “...that special amalgam that ...that is uniquely the province of teachers...”(p.8).

**EFFECTIVE SCIENCE TEACHING**

**Figure 28.** Johannes’s constructs of effective science teaching on realization of independent practice.



Johannes explained the complementary role of *content knowledge* in *pedagogical content knowledge* as

*...the facts that have been gathered over time... the laws... the theories...the history of science...part of the content of science... that I guess are more static...and fixed ...and accepted... and like any discipline ...it's that body of knowledge...*

‘Scientific literacy’ that was nominated for both *content knowledge* and *educational ends, goals, purposes and values*, is something that Johannes felt students should to possess so

*...they feel comfortable about dealing with scientific issues...that they feel empowered ...to deal with scientific issues ...that confront them in their life...Not everyone needs to know quantum physics ...but...I would say that ...there is an amount of scientific literacy people need...for example ...if they are going to an election ...Year 10s at the moment...a lot of Year 10s...don't feel comfortable with doing science...They think its irrelevant...but at the moment they are doing a genetic engineering assignment...which will be a topical issue...In the next few years they are likely to be confronted ...with issues in their daily life...that involve this with...genetically modified foods and so forth...So scientific literacy in that context would involve...these students having enough information... knowledge ...about...these scientific concepts to be able to make an informed decision...*

*Pedagogical content knowledge*, according to Johannes, should also take into account the *knowledge of learners and learning*, and “...where possible to develop...opportunities for students to be self directed...” and allow students to construct their own knowledge (Brook & Brooks, 1998). He explained that there should be

*...hands on science...particularly with these learning styles...aural and visual...can be simple catered for when you are having group work...they are likely to find...you get an organic learning...process occurring ...where if students are good listeners...or is reinforced by hearing things. ....umm...having one of them explain it... may be all it require to clarify...a concept for them...its delivered at the right level...and at the right terminology...and through the right means...Together... the students might be working on*

*something...hands on...and kinaesthetically students learn well that way...they are manipulating materials and its going to have a far...richer experience for them...and have a longer lasting effect on their learning...*

Johannes also recognised the importance of having *knowledge of learners and learning* that included the affective side of learners. He explained from his observations at school so far that

*...there seems to be a fairly homogenous student population...umm... there isn't the obvious diversity...of racial...or ethnic...diversity...of that cultural diversity that you would see in the average state high school ...If you have a student ...you are having problems with... at least have the time that there are ...some obstacles to their learning...that you are confronting...are issues of their ...emotional issues ...to do with their background...or present family circumstances...and when you are made aware of those...you realize that ...knowledge of learners extend beyond ...their cognitive capacities ... So effective science teaching does involve entering a student's emotional world as well...*

.... Johannes also believed that effective *behaviour management* practices will be enhanced if the teacher develops an understanding of the individual needs of students, so "...when they are negative..." they "...don't...impact upon others...rights to learn...". He explained that *behaviour management* "...did not figure as strongly as it may have in the past ..." because at his school there is a structured, whole school approach to *behaviour management*, the principles of which are based on a stimulus-response model (Walker, 1999). He described the model as

*...difficult to get used to...in the beginning ...because it requires you to use language...that is prescribed language ...when you asked them quite specific questions...which didn't roll off the tongue ...and to be non-emotive...Umm...which is difficult ...after being in settings where...umm...it was common place for teachers to ...yell at students and threaten detentions...This system ...when adhered to strictly...you simply ask the questions at the first instance... and the second time...they are requested to leave the setting...*

Despite his initial concerns about this model of *behaviour management*, he acknowledged that the program was successful, and the key to this was in the

*...whole school approach ...and that there is consistency across the whole school...So they very much stress with teachers that ...they should be very consistent with other teachers that follow this plan...and it does really ...define a lot of behaviour management for you...It doesn't have a lot of room for negotiation ...so there is that consistency...so students can't claim ambiguity ...*

He pointed out that the focus of the 'responsible thinking program' (RTP) is on the individual's right to learn "...and the teacher's right to facilitate that ...learning...", and

*...it recognises that fact that...individuals are responsible for learning...it is sort of almost an extension of that ...of the constructivist idea that learning is an internal process...driven by the individual...umm...making decisions ...experiencing changes in their understanding ...and until students do that ...and make the choice to learn...*

### ***Johannes's knowledge in action on realization of independent practice***

Johannes's video stimulated recall (VSR) interview was based on a lesson about metals that his Year 9 Science class had been studying for the past two weeks. This included familiarizing themselves with such term as 'alloys' and 'corrosion' of different types of metals, and understanding the uses and properties of metals. The lesson sought to reinforce the idea of corrosion, that is, the impact of errant water and surrounding conditions on steel nails over a period of time. During the videotaped lesson, Johannes used a combination of teacher directed and learner-centred approaches to his teaching, whereby students responded to revision questions before they moved into group work to conduct their experiments, using steel nails, test tubes, solutions.

Johannes stopped the videotape 35 times during the recall interview, and 52 categories of teachers' knowledge bases were identified from his responses (See Table 14).

**Table 14: Breakdown of knowledge bases**

Knowledge base	No
General pedagogical knowledge	
-Behaviour management	8
-Teaching strategies	2
-Classroom communication	1
-Personal beliefs	2
Content knowledge	5
Curriculum knowledge	3
Knowledge of learners and learning	8
Educational ends, goals, purposes and values	10
Knowledge of educational contexts	1
Pedagogical content knowledge	12

An importance facet of the experiment was to have students understand why the same tests were conducted in six of the twenty-four test tubes, that is, to

*...get them to understand or reinforce the idea that replication was an important part of scientific methodology...and that's an important lesson that needs to be reinforced throughout...the junior science curriculum...*

Other examples of his knowledge of *educational ends, goals, purposes and values* stemmed from his concern that students “...really need to get a little bit hands on... and actually get in and do something...”and

*...that relates to the intention ...that I have...is that science and most teaching in general...needs to be fairly student-centred...and seems to reflect my understanding...off student learning...that its much more valuable ...and much more effective if ...students are actively involved in...the development of knowledge...*

Another important goal was for students to “...take ownership of that ...test tube...” so that can develop “...intimate knowledge...with one of the test groups”.

Johannes stated the key to success with group work (Cole & Chan, 1994) was to

*...keep it flowing along...and make sure there are students who are not off task...Its still important to get around and keep issuing instructions ...to keep them focused and working...*

There was also a workplace, health and safety issue with

*...a bit of oil involved...there was water ...other than that...I was still very...aware of the need to make sure ...that I supervised ...the use of these materials...*

There, were, however, other concerns regarding the *educational ends, goals, purposes and values* of his teaching, particularly in terms of explicitly communicating (Singh, Dooley & Freebody, 2001) the sequence of learning objectives. As he explained

*...I started to be a little bit concerned...what the actual outcomes as far as their syllabus requirements are...with assessment pieces and so forth...and the other thing...being just the day-to-day lessons...why are we doing what we are doing that lesson...how its fits into the prior lesson...and where its working towards ...where are we going from there...thing is to keep the students engaged...and give them the sense that there is some meaning...*

Whilst he disagreed with the overall school policy goals regarding student homework, he had nevertheless established a routine

*...even if it is only in this case just one question...one simple question...it will take two minutes to do...and that way I think it is valuable...because...okay...they go home...and they at least have to just cognitively take another look at their work...and that achieves the aim ...an easy way just to reinforce learning...*

His concern about homework not only stems from personal experience during his own school days but also from his general *content knowledge* base regarding educational research that suggests that

*...homework can do more harm than good...it can overtax students and starts to detract from education and ...puts it with odds...umm...with other aspects of students' lives ...by demanding too much time of them...*

There was also evidence of Johannes's specific *content knowledge* when he explained the dangers of caustic soda in school made soap because

*...that is a poison and a corrosive material...umm...the soap we make can't be guaranteed as being safe...so we can't allow students to see that they may be able to use this soap like any other soap...Its not actually for domestic use...*

There was further evidence of *content knowledge* vis-à-vis his explanation of the action of water on metals, as a result of a misconception from one student. He explained that

*...it is not actually the water wearing it away so much...as...which is a physical process...in geology...this process is more a chemical process where...the actual chemistry of the metal is changing...and so the second substance...the iron...oxide...has vastly different properties...which allows wave action and water action to remove it...*

Johannes noted the challenges of developing a *pedagogical content knowledge* base in order to bridge the gap between his *content knowledge* and student understanding. He stated that

*...you are processing it from a disciplinary sphere...and you go...,"Okay...I know what's that about...I know what these are ...I know how to set this up..."but there is a big difference between knowing that...and actually getting into the classroom...and then structuring ...and implementing a lesson which the students thoroughly understand...There is always more scaffolding ...and more explanation...and chunking required ...to have that run smoothly...*

In discussing the number of bonds that certain elements can make, Johannes used an everyday example of water molecules because it was something they all knew and hence, provided "...a great opportunity ...to reinforce the chemical basis to that well known example ...". As he pointed out

*...If you always remind them of something everyday...in their experience...they are more likely to remember the abstract concepts...*

He used real world examples from his *pedagogical content knowledge* base, such as the action of iron oxide (rust) on automobiles and railings to reinforce the value "...of scientific knowledge in ...umm...application of science and technology to society ...". In order to develop the idea of a flow-diagram in students' thinking, he drew on

their everyday experiences to explain how a diagram at the RNA showgrounds showed the process sugar being refined from raw material to the finished product. ...He also used *pedagogical content knowledge* to make "...links to the work they had previously...that prior learning should inform their learning... and start to link it together..."; to link two curriculum strands; to explain patterns students see around them; to "...explain and elucidate a concept ...that they are unfamiliar with..."; and, to get students to rephrase questions so

*...when they ask a question...I sort of turn it around...ask them a question...and rephrase it...the idea of trying to get them to do that themselves...to answer it themselves...break it down...ask smaller questions and that way ...step by step...get towards answering the questions they started out with...*

In short, Johannes believed that new information should be related in some way to students' prior knowledge and prior understanding. *Pedagogical content knowledge*, according to Johannes, is a process that involves

*...having those prior conceptions...challenged just enough...to cause conflict...but not so much that ...that its totally foreign or disjointed...from our prior knowledge...needs to be that ...being pushed out of comfort zone...and the best way to do that ...is to relate these concepts...to their experiences...*

Johannes's knowledge base of *knowledge of learners and learning* reflects this philosophy in seeking to understand his students both at the group and individual level. His class

*...is an extension class...they are sort of the cream ...of the crop from the year before...they put them in classes based on their academic performance...and behaviour and attitude...*

Nevertheless, he pointed to the challenges of keeping his students motivated for the right reasons because

*...this group of students...like a lot of students...are extrinsically motivated by grades and exams...these kids are having trouble ...even with the limited amount of schooling they've had...its hard for them to come to grips...with the fact...that it is not actually their*

*marks...that they are trying to achieve ...if they have achieved the outcome...then its basically a tick...they still want to know... ”How much did I get out of ten?” and “What is that in terms of A...B...C...?” ...type of grading...*

In terms of his knowledge base of individual learners in his class, he stated that it was still a process of “... getting to know the individuals...” and that he was beginning to realize the subtle differences in students

*...when they talk about those modes of learning...like kinaesthetic ...and aural and visual...we know what they mean in definition...but its very hard ...and takes time to identify that in your students ...I know a couple of students...but there is still a long way to go ...I still haven't got to that point where...I can even right now...elucidate or verbalise what that really is...I can't really at this stage say... ”That student is like this...they do this...they do that...”...I'm still working on hunches...*

However, his observations so far show that he had developed some insight into the abilities and performance capabilities of individual students. He commented on one student

*...who will tend to sit back on his laurels...and not hand in a lot...He would probably be classed as gifted...He's got some really good results with little work...and I think he is a student though...that when you give him attention...and you keep pushing him... he can actually produce some really excellent work...He does struggle with his manual skills...his hand writing is fairly poor...So part of that ...he is probably reticent to do a lot of writing...because he hasn't found that very rewarding...and he finds that its messy ...and it doesn't measure up to his usual performance...*

He also referred to one student who had difficulties understanding the makeup of elements in hydrocarbon compound. The student was

*...confused on that topic...she wasn't quite getting it...and I had a smile on my face then ...because...and I nodded to the student...that “You will remember that now...” ...because she had a problem with it...and we discussed in class last week...umm...and clarified for her...its now something she is remembering...*

His classroom strategies of moving around the class to “...to monitor how individuals are finding the work... how they are performing ...and to become more

aware of the individual learning patterns ...”, is also valuable in terms of *behaviour management* because

*...I find that if you spend all your time in one part of the room ...it means the other end of the room...students feel...if there is a propensity to get off task...they feel comfortable doing so...because that distance gives them a little buffer...and it is much easier to walk around and use proximity...it sort of halves your behaviour management work...*

Johannes’s *behaviour management* included building in routines (Porter, 2000), like “...hands up...reminds students that there are rules to be followed ...”, and the use of such strategies as pauses that

*... ensure ...everyone was mostly quiet and attentive ...because I found out very quickly...if you start talking ...before they are quiet ...it that first request...it suggests that you don’t really expect them to be quiet...and after that ...it is very hard to get anyone quiet again...So...I was taking an extra moment just to get them all quiet...*

He also used the raised voice “...a little...to get their attention... and let them know that I was annoyed... more often than not... will get people’s attention. The next stage of the *behaviour management* strategy is to employ a series of “...responsible ... thinking questions that this school employs ...”. As he explained

*...there is a specific question you ask of a student ...what they are doing...what should they be doing...and what will happen if they disrupt again...In the event that they did disrupt again...they then...have chosen to leave classroom...and go to the responsible thinking centre...where they then have to work out a plan to get back into the classroom ...although this was towards the end of the lesson...its important to maintain discipline to fit in with the overall school’s behaviour management plan...*

### **Summary: Johannes’s realization as a science teacher**

The two data sets elicited from Johannes in May 2003 show that the focus of his teaching was on five of Shulman’s categories: *pedagogical content knowledge*; *knowledge of learners and learning*; *content knowledge*; *educational ends, goals*,

*purposes and values*; and, *general pedagogical knowledge* focusing on *behaviour management*. His concept map diagram indicated that ‘lifelong learning’ was the result of a learner-centred approach to teaching concerning ‘scientific expertise’, and ‘science, technology and society’. His Think Aloud Protocol (TAP) commentaries stated that “...no matter where they are in the spectrum ...the idea is to develop their individual propensity to become lifelong learners ...”. Commentaries from Johannes’s video stimulated recall (VSR) reflect his desire to engage in student-centred teaching where students are actively involved in the development of knowledge.

*Pedagogical content knowledge* featured strongly throughout the two data types. *Pedagogical content knowledge* was explicitly nominated by Johannes as the central concept in effective science teaching that is determined by the extent of ‘disciplinary knowledge’ and ‘knowledge of learners’ in his knowledge base of teaching. ‘Scientific methodology’, along with ‘content of science’ and ‘individual differences’ were the concepts from both hierarchies that directly produce ‘scientific literacy’. Commentaries from his TAP explained *pedagogical content knowledge* as essentially a process of bridging the gap between the teacher’s disciplinary knowledge and “...students’ naive concepts ...”. He stated that the subordinate concept of ‘scientific methodology’ was an investigative process of his learner-centred approach that provided opportunities for students to develop their own scientific methodology. His VSR commentaries defined *pedagogical content knowledge* as a process of making his *content knowledge* understandable by using strategies such as scaffolding, explanation and chunking. It was also a process of challenging students’ prior conceptions, to push them out of their comfort zones, “...and the best way to do that...is to relate these concepts ...to their experiences”.

The two data types featured *knowledge of learners and learning*. His concept map diagram showed that *knowledge of learners and learning* was nominated to the general concept of ‘knowledge of learners’ that encompassed those concepts relating to the different cognitive ‘learning styles’ of students and the emotional characteristics of students, that is, the concept of ‘individual differences’. His TAP commentaries support the notion that teachers provide opportunities for students to engage in self-directed learning, and to take into account their emotional side as well. He stated in his VSR that he was beginning to understand the subtle differences in his students in terms of modes of learning, but still felt he had a long way to go before he could categorically make absolute statements about all students’ cognitive and affective domains in his class.

*Content knowledge* featured strongly in the two data sets. His concept map diagram showed that *content knowledge* was nominated to both the general and subordinate concepts, and indicated the importance to which Johannes regarded *content knowledge* in terms of the teacher’s subject matter knowledge, and to the *content knowledge* of learners in the field ‘scientific literacy’ and ‘scientific expertise’. As he stated in his TAP, students need to have a knowledge base so that they can feel empowered to deal with scientific issues. Statements from his VSR showed that he possessed general content knowledge about educational issues, and specific content knowledge about science.

*Educational ends, goals, purposes and values* emerged in the two data sets. His concept map diagram indicated that ‘scientific literacy’, was the result of the interplay between ‘content of science’ and ‘scientific methodology’. The linking words, ‘producing’ give strong indication that ‘scientific literacy which consists of ‘scientific expertise’ and science, technology and society’ is an educational goal. Commentaries

from his TAP indicated and supported this proposition that ‘scientific literacy’ was not just a concept based on content knowledge, but one that warranted an *educational, ends, goals, purposes and values* knowledge base nomination as well. He stated in his VSR that a goal in his science teaching was to have students “...actually get in and do something ...”; to establish simple routines for doing homework; to ensure the correct workplace, health and safety procedures were in place; and, to be explicit in communicating learning objectives.

*Behaviour management* featured in the two data sets. His concept map identified ‘behaviour management techniques’ as the link that complements the cognitive domain of learners to their affective characteristics as indicated in ‘individual differences’. He pointed out in his TAP that the underlying philosophy of *behaviour management* in his school focused on the student taking responsibility for their learning. Johannes stated that the success of the program lay in its consistent application throughout the school “...so students can’t claim ambiguity...” He explained in his VSR that the basis the program lay in stimulus-response model that employs a series of specific questions posed by the teacher to the student.

Johannes’s conceptions of science teaching after the first six months of teaching at a state high school, continued to focus on constructivist forms of teaching. His statements on pedagogical content knowledge indicates his strongest understanding of constructivism as a process of the teacher representing knowledge in ways that satisfy the cognitive and emotional demands of learners. Both *content knowledge* and *knowledge of learners and learners* play pivotal roles in the *pedagogical content knowledge* since both are represented in the general and subordinate concepts and are directly linked to pedagogical content knowledge. His statement on educational ends, goals, purposes and values, also show strong focus on learners constructing

knowledge by manipulating scientific instruments and working in collaboration with their peers. His concern for students taking responsibility for there is the basis of his behaviour management policy. Overall, Johannes teaching is based on the principles of democracy that is underpinned by his desire to develop knowledgeable and expert learners who will be empowered to question issues that confront society.

### ***Discussion: charting Johannes's development***

Johannes conceptual structure of effective social science teaching and effective science teaching at the conclusion of the third data collection in May 2003, reveal both consistency and change. Data elicited from Johannes at the initial stages of his experience as a social science teacher, indicated a focus on two of Shulman's categories: *pedagogical content knowledge*; *general pedagogical knowledge* focusing on *behaviour management* and *teaching strategies*. Data elicited from Johannes at the stage of his developing thoughts on social science teaching indicated a focus on three of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; and, *general pedagogical knowledge* focusing on *teaching strategies*. Data elicited from Johannes on the realization of individual practice showed a focus on five of Shulman's categories: *pedagogical content knowledge*; *content knowledge*, *general pedagogical knowledge* focusing on *behaviour management*; *educational ends, goals, purposes and values*; and, *knowledge of learners and learning*.

*Knowledge of learners and learning* represented a significant change in Johannes's conceptual structure of teaching. The fact that *knowledge of learners and learning* was nominated to the general concept of 'knowledge of learners', and to subordinate concepts of 'individual differences', 'learning styles', and 'aural, visual and kinaesthetic, indicated his growing concern for individual learners at the stage of his realization of individual practice. Commentaries from his TAP reiterated the

importance of establishing a knowledge base of students. This new awareness of knowing the cognitive and affective side of students was reflected in his VSR comments – there was a tendency for his students to be extrinsically motivated, even though they were an “extension” class, as well as a growing understanding of students at an individual level.

*Educational ends, goals, purposes and values*, also represented a significant change in Johannes’s conceptual structure of teaching. His concept map (Figure 28) indicated a broad range of outcomes that reflected specific syllabus requirements such as ‘scientific literacy’ and ‘scientific expertise’, as well as the broad goals of ‘science, technology and society’. Comments from his TAP reflected this latter concern of having students feel comfortable with scientific issues in society. Statements from his VSR indicated the value of students taking ownership of their education by being actively involved in constructing their own knowledge, and keeping students informed of where their daily learning fits in the overall objectives of the unit of work.

Although *behaviour management* was not part of Johannes’ conceptions at the stage of his developing thoughts on social science teaching, its identification at his initial experience of social science teaching and on realization of independent practice as a science teacher, indicated a measure consistency in his conceptual structure. His concept map (Figure 26) showed that ‘classroom management’ was nominated at the general concept level as was directly linked to *pedagogical content knowledge* and *classroom communication* concepts. He stated in his TAP and VSR that *behaviour management* policies should be a conduit to social constructivism, and used within the context of a supportive learning environment. Although ‘behaviour management techniques’ (Figure 28) was an embedded concept, comments from his TAP and VSR

indicated an application of his behaviour management practices, such as establishing routines and using voice modulation to gain attention, and the value of his school's behaviour management policy.

Johannes's *content knowledge* at the stage of his realization independent teaching practice indicated a broader understanding than at the point of his developing thoughts on social science teaching. The concept of 'disciplinary knowledge' indicated a general understanding of the role of content knowledge in teaching, while the concept of 'disciplinary knowledge', and 'content of science', 'scientific literacy', science, technology' and society' and 'scientific expertise' (Figure 28) indicated an understanding of content knowledge at both the general and specific levels of science. Whilst Johannes's TAP during his developing thoughts on teaching showed his concern to understand the origins and construction within a discipline, commentaries from his TAP and VSR at the realization of independent practice indicated an understanding of content knowledge as a means for students to make decisions, and of the teacher knowing the dangers of chemicals. Johannes's broad understanding of *content knowledge* was evident from his observations about the school's homework policy, and also an indication of his development during independent practice to make considered judgements about its efficacy that could not be done during his teacher education

*Pedagogical content knowledge* was a consistent component of Johannes's conceptual structure. His conceptual structure (Figure 26) at the stage of his initial experience as a social science teacher showed that *pedagogical content knowledge* had been nominated at the macro level of his concept map. His concept map also showed that *pedagogical content knowledge* had been nominated at the general concept level where it was and had input to the key concept as well as other general

concepts. Commentaries from both his TAP and VSR indicated the important role of *pedagogical content knowledge* in his constructivist approach to teaching. His concept map (Figure 27) at the stage of his developing thought on social science teaching showed that *pedagogical content knowledge* had been nominated at the macro level, to both general concepts, and at the subordinate level. Commentaries from his TAP indicated his continuing focus on constructivist approaches to teaching. His concept map on realization of independent practice showed that *pedagogical content knowledge* continued to play a central role on Johannes's map because it was identified at the macro level, and was part of both the key concept and two general concepts (Figure 28). He stated in both his TAP and VSR about the importance of reworking knowledge for student understanding.

Johannes's *pedagogical content knowledge* at the stage of his initial experience as a social science teacher indicated powerful process links to other aspects of social science teaching. The identification of 'pedagogical content knowledge' that directly linked the key concept and other general concepts on his concept map (Figure 26) showed its strong links to other aspects of social science teaching. The identification of 'constructivism', 'social constructivism', 'cooperative learning', 'processes', 'holistic understanding', and 'learner-centred', at the subordinate levels of her map and in the four hierarchies was also indicative of the strong links of *pedagogical content knowledge* in social science teaching. Johannes stated in his TAP that *pedagogical content knowledge* entailed constructivism, social constructivism, and the art of knowing. Commentaries from his VSR indicated his use of process teaching such as, the use of scenarios, use of gestures, generalizing, developing links in causal processes, his use of visual representations, and having students consider validity of

data. However, Johannes said he found it challenging to bridge the gap between his knowledge and students' knowledge.

Johannes developing thoughts on social science teaching showed that he continued to consider 'constructivism', 'social constructivism', 'pedagogical content knowledge', 'learner-centred approach', and 'cooperative learning environment' (Figure 27) as links to other aspects of social science teaching. 'Scaffolding' and 'positive learning environment' represented additional ideas to his conceptual structure, and 'pedagogical content knowledge' was embedded. Commentaries from his TAP indicated the importance of students learning cooperatively, and for the teacher to be able to relate academic knowledge to students. Johannes said he used scaffolding techniques to help students find links in information, but also pointed to the difficulties of scaffolding.

Johannes's *pedagogical content knowledge* on realization of independent teaching practice continued to indicate its strong links to other aspects of science teaching. Unlike his previous concept map (Figure 27), 'pedagogical content knowledge' was not embedded (Figure 28), but was central to effective science teaching, and to 'disciplinary knowledge' and 'knowledge of learners and learning'. Johannes's identification of 'scientific methodology' indicated the importance he placed on the processes of science teaching because it not only builds knowledge but also produces 'scientific literacy'. He stated in his TAP that scientific methodology was a process of investigation to allow students to construct their own knowledge. He also spoke of trying to bring his knowledge to bear on students through explanation, and scaffolding. Johannes commented in his VSR that *pedagogical content knowledge* involves challenging student preconceptions just enough for them to consider an alternate point of view. He also spoke about linking new knowledge with students'

prior knowledge – their everyday experiences, using real world examples, flow diagrams, and of processing knowledge from disciplinary knowledge. Despite Johannes's change from social science to science teaching, his emphasis on knowing the learner and the importance of establishing a supportive learning environment was key to his successful constructivist approaches to teaching.

## **LARA**

Lara completed her high schooling with Education Queensland where she studied Junior History from Years 8 –10, and Years 11 and 12 Ancient History. She had a lot of respect for her Ancient History teacher because she had a high level of subject knowledge, and had first hand knowledge of Egypt, a country she had visited on a number of occasions. Her teacher was also a respected member of the school community and an active participant of the Queensland History Teacher's Association.

### ***Lara's initial thoughts on social science teaching***

Lara's response to the initial focus questions emphasised that teachers should have a love of the subject, engage in student-centred approaches teaching that especially caters for individual differences. Students are likely to enjoy the social sciences if they are given the opportunity to negotiate the curriculum and if they are allowed to engage in the constructivist process.

Lara wanted to be a teacher because she regarded herself as organized and approachable, as well as having the skills of leadership. Furthermore, she considered herself as a person who can make a difference, who is enthusiastic for her subject and students, which in turn, should nurture the curiosity of learners as well as instilling a love for the humanities.

Lara enrolled in a Bachelor of Education program majoring in the Studies of Society and Environment (SOSE) and English. She spent her final professional practice teaching at an urban, coeducational state high school where she taught Ancient History and English. During this time a lesson to a class of Year 11 Ancient History students was videotaped for a stimulated recall interview. She received a Suitability Rating of '1', the highest, from Education Queensland.

She was appointed in a coeducational, ecumenical private school where she taught English to students in Years 10, 11 and 12. Lara did not have the opportunity to teach in her chosen second teaching area. Here a lesson to a class of Year 12 English students' was videotaped for a stimulated recall interview.

### ***Lara's initial constructs of social science teaching***

Lara's concept map shows a hierarchy of concepts, beginning with the most general concepts of 'teacher's love/passion for subject' (CK), 'negotiating the curriculum'(CK, TS), 'organized'(TS, BM, CC), 'student-centred learning'(PCK), and 'reflective'(PCK), leading through subordinate concepts to the core outcome concept of 'lifelong learner' (EEGPV) (see Figure 29). 'Branches' indicated her understanding of multiple knowledge bases within two hierarchies – 'reflective' and teacher's love/passion for subject', but there were no cross-links, thus indicating an "item stream" mode to her map.

The knowledge bases identified on Lara's concept map indicated a broad range of Shulman's categories. Her most prominent were: *teaching strategies; content knowledge; and, pedagogical content knowledge*. Lara's map shows *teaching strategies* were important because it ensures the 'promotion of critical literacy' (PCK), 'literacy' (CK) and 'numeracy' (CK); the 'enthusiasm/energy' (TS, BM, CC) that sustains the delivery of content knowledge; and the organizational skills required to have the correct resources (Curr K) at hand. The linking words, 'must involve' that link 'teacher's love/passion for subject' (CK) to the key concept indicated the importance of *content knowledge* in Lara's teaching. Her map also shows that 'professional development' (PL), 'high subject knowledge' (CK), and enthusiasm are the contributing factors in maintaining the passion for the subject that will lead to 'lifelong learning' (EEGPV). The nomination of *professional learning* to

‘professional development’ is significant because Lara was identifying something about working with others that extends Shulman’s categories that contribute to learning in class (Figure 29). As her concept map (Figure 29) showed, ‘professional development’ is a key link in extending Lara’s passion for social science and reaching her *educational ends, goals, purposes and values*. *Professional learning* is about the expectation of teachers who need to move outside the school boundaries to become part of a community of learners.

*Pedagogical content knowledge* was the most strongly nominated knowledge base on Lara’s map. For example, ‘Effective facilitating’ (PCK), ‘reflective’ (PCK), ‘student-centred learning’ (PCK), ‘promotion of critical literacy’ (PCK) were nominated by the researcher for *pedagogical content knowledge* because the concepts represent facets of constructivism that is essential in inquiry based teaching in the social sciences. The identification of ‘teacher’s love/passion for subject’ (CK), ‘preparation and planning’ (TS), and, ‘enthusiasm/energy’ (TS, BM, CC) indicated Lara’s understanding of *pedagogical content knowledge* at the macro level.

The focus of Lara’s Think Aloud Protocol (TAP) was on *content knowledge*, and *pedagogical content knowledge*, *teaching strategies*, and *knowledge of learners and learning*. ‘High subject knowledge’ (CK), according to Lara, will not eventuate if there is a lack of passion for the subject. Lara said that

*I feel really strongly about this...like...because...I find too many teachers ...who are ...over it... they don’t want to be there anymore ...and it reflects on their teaching and on their students...they don’t enjoy learning...*

As Lara pointed out, a passion for the subject is vital

*...because that will make you want to keep researching your subject ...and not just stay at the level of knowledge you’re at...keep on...top of your subject knowledge...*

And knowledge of your subject, Lara continued, relates to

*...knowledge of content...knowledge of what is happening in your field ...syllabus content material... umm... work programs...*

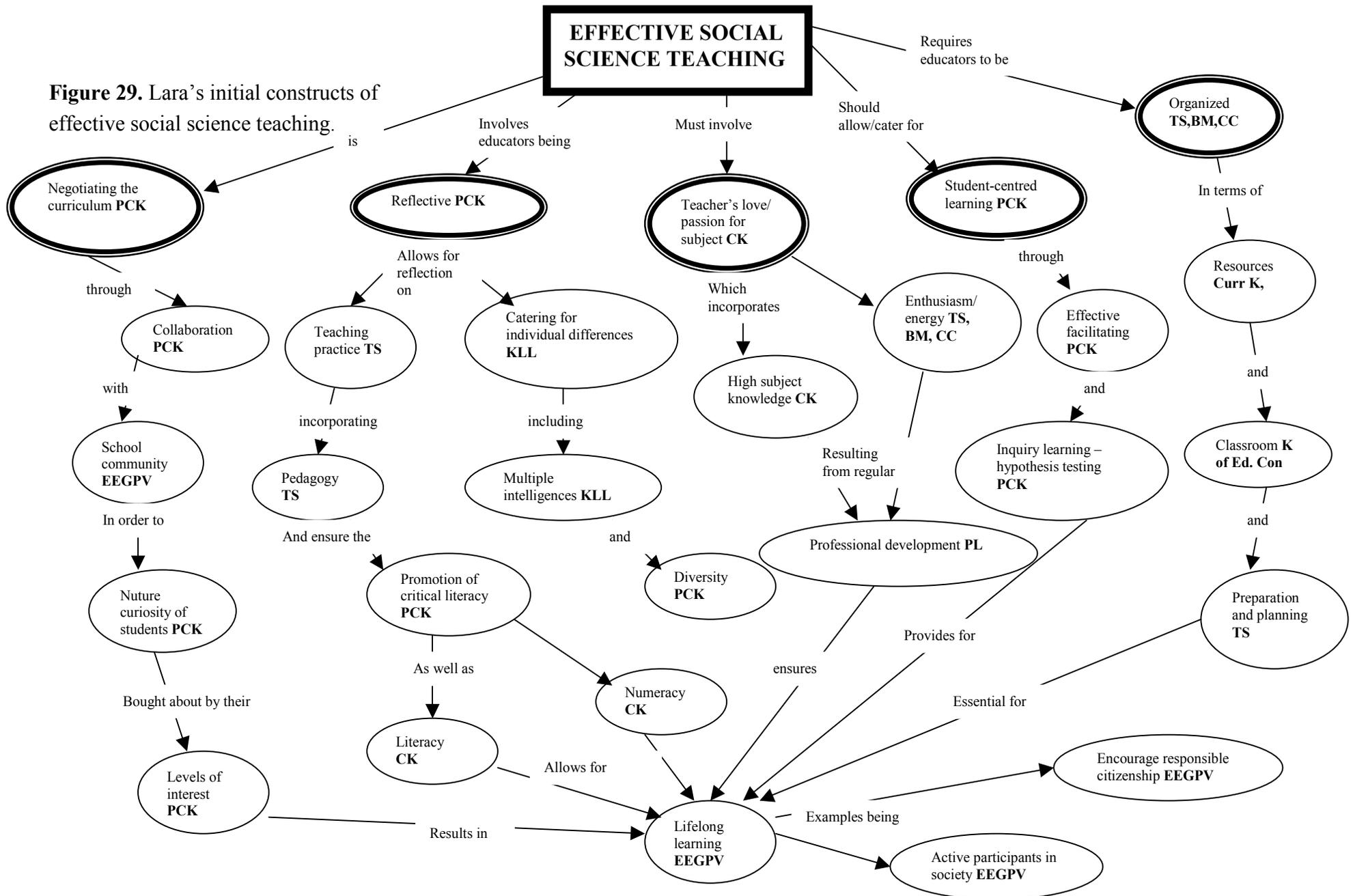
Lara raised three important points in this statement. The first, is “knowledge of content”, which according to Shulman (1987) involves, “the knowledge, understanding, skill, and disposition that are to be learned by school children” (p.9). Implicit in this statement is *knowledge of learners and learning*. It also requires an understanding of the structure of subject matter knowledge, that is, the principles of conceptual organization and principles of inquiry. The second point, “...knowledge of what is happening in your field ...”, is often the result of ‘professional knowledge’ (PL). For example,

*I am a member of...the QHTA...and just going to seminars... getting ideas...networking ...that sort of thing...so I think ... just keeping up your knowledge...*

As Cochran-Smith and Lytle (1994) note, professional development helps participants to “...question their own assumptions and reconsider the basics of their own...” *personal beliefs* and practices in *teaching strategies*, for example. (p.274). The final point, “Syllabus content material” is the “tools of trade”, or as Shulman (1987) expresses it, “the pharmacopeia from which the teacher draws those tools of teaching that present particular content...” (p.10). ‘Curriculum delivery’, added Lara, should involve the ‘negotiation of curriculum’ (PCK) between the teacher and students:

*...I’m looking at...saying to the kids... “Okay...we are going to be looking at...Ancient Greece...What parts would you like to study?... Where does your interest lie? ... How can we run with those ideas?”*

**Figure 29.** Lara’s initial constructs of effective social science teaching.



Lara also regarded negotiation of the curriculum as a means of collaboration, "... with your colleagues...and with administration ...parents ...". Social constructivism, according to Lara, provides the opportunity to stimulate curiosity among students:

*...I want to say that the reason we are doing because...  
Yes... they are curious...but also because they are interested  
...their interest led about to their curiosity...*

Lara's understanding of *pedagogical content knowledge* was also evident in her observations about student-centred learning

*....like inquiry...constructive...Yeah...like when  
you set them a hypothesis or make their own hypothesis...  
then they have to go about ...umm...using evidence to prove  
or disprove their argument...*

'Reflective' (PCK) is the concept that underpins effective social science teaching. Lara said "...I want to be reflective...look at my thoughts...and make sure that I'm doing that...practising that...". Reflection allows Lara to consider her teaching practices, including *pedagogical content knowledge*, that is, "...it's how you are teaching it ... which depends on a lot of things ...".

*Pedagogical content knowledge* was also apparent in Lara's statements about the importance of promoting critical literacy. Lara said that

*...it's the teachers role to promote that...what I mean is ...  
looking ...looking...being able to look at something ...  
eg a document ... a text...a media text...and be able to  
look at its biases...I think you need it...the kids...because  
we are surrounded by so many lies...*

With reference to Lara's concept of 'literacy' and 'numeracy', she states, "it is not so much numeracy...because we don't tend to use that in the humanities field", but she recognises that, "we use graphs...and tables ...", and "...they are trying to push more numeracy...but on the whole its more literacy".

In terms of *knowledge of learners and learning*, Lara said that 'catering for individual differences' (KLL) "...covers a lot in...in there we are talking about...

your ESL...minority ...”. The diverse nature of the class can be also seen in Lara’s concept of ‘multiple intelligences’, that is, the logico-mathematical, linguistic, musical, spatial, bodily kinaesthetic, interpersonal and intra-personal (Gardner and Hatch, 1983, 1996). Developing a knowledge base of learners starts

*... by just looking at the roll...umm...in regard to  
...umm...other than English ...their names...but also by  
speaking to other teachers...that have already taught them  
...like talking to students ...finding out ...the cultures within  
your classroom...*

### ***Lara’s initial knowledge in action and reflection***

Lara’s video stimulated recall was based on a lesson she had taught to her Year 11 Ancient History students about the Aegean Civilizations, with a focus on Minoan history. Lara used an overlapping teaching strategy of direct instruction and expert scaffolding, using the white board and overhead projector.

Lara stopped the videotape 10 times during the recall interview, and a total of 15 categories of teachers’ knowledge bases were identified by the researcher from her responses (See Table 15).

***Table 15: Breakdown of knowledge bases.***

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	2
-Teaching strategies	7
-Classroom communication	-
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	-
Knowledge of learners and learning	2
Educational ends, goals, purposes and values	1
Knowledge of educational contexts	-
Pedagogical content knowledge	2

Lara’s combination of *teaching strategies* was reflected in her following statement:

*I...tend to work the classroom, as I call it...as opposed to standing*

*out the front and preaching...just to check that (a) they are on task and (b) ...looking at their written work and picking up on any spelling mistakes, or that sort of thing. So, I really like to walk around ...umm...move in between desks and check everyone's work ...and just to make sure that they know that I'm not just to stay out in front and talk to them. I am going to move around ...and be on their toes.*

Students in this case were engaged in what Rosehine and Stevens (1986) refer to as 'independent work tasks', with some guidance and assistance from the teacher.

Towards the end of the lesson, Lara resorted to a more direct instructional approach, or from the students' point of view, 'guided practice activities' (Rosehine and Stevens, 1986). Lara explained that

*I decided to conclude my lesson by talking about the exam... and that is for tomorrow ... only because I was just going to briefly mention it, but we needed to go on a little bit more in depth than I thought we would ...because there were a few questions ...and they seem to be on the top of everyone's heads ...was the exam...*

Lara's *knowledge of learners and learning* was apparent when she noted that students were, "...stressing a little...I think they weren't prepared enough. So, I decided to spend...just talking about the exam ...". In other words, Lara had noted that in terms of *content knowledge*, students needed a little more time to prepare for the exam. Added to this was her desire to, "...try to learn pupils' names as fast as I can...because I find it's more personal than pointing at a student for an answer ...", demonstrated that, although Lara's practicum was brief, there was still this drive to broaden her knowledge of the social and cognitive aspects of learners. Knowing students' names also helped in her *behaviour management*: "...if I see a student talking... or off task...I will just say their name...So...yeah, I like to use names a lot".

She liked to use a variety of resources with her teaching to enhance her presentation in that

*I usually try to use as much visuals as I can...as from going from the OHP to the board...and to make the board writing a little bit more exciting...I try to use coloured chalk...*

Evidence of Lara's use of *pedagogical content knowledge* was apparent when she used

*flow charts or mind maps ...umm...or concept maps, because the students see where you are going as in the flow ...it is easy for students to distinguish...as in this case...Minoan and Mycenaean culture...and they can see the run...*

However, Lara expressed concern about other aspects of her teaching, such as,

*...when giving a task ...I...umm...need to work on my clarity I think. I got a lot of questions afterwards about the task... that I thought I answered, but obviously not. So, I think I need to work on my clarity in giving instructions... I ...need to check for understanding...I think more when I do tasks...even at the end of the lesson...I need to find more strategies... of doing that. I did it in my last class...with this class ... which was doing a time line ...which I found was a really good way of checking for understanding ...*

On another occasion Lara discovered that just before the lesson, the supply of overhead transparencies (OHTs) had ran out, so rather than cancelling that particular phase of the lesson, she made a decision to transpose the information from the OHT onto the blackboard. Lara said "... it was effective, but I think it could have been more effective if it...obviously was on the OHT...but that was thinking on your feet ...".

Whilst the evidence against transmissive teaching, especially in history, is overwhelming (Husbands, 2001), Lara justifies her occasional sessions of dictation to the class on the basis of a skills development exercise because

*...I found it a really effective tool for listening skills and their oral skills, too...to be able to write while I talk, because eventually most of them will go onto tertiary education and that's what they will need to ...so, I like to give them a little bit of practice at listening to me...and dictating from me.*

**Summary: Lara's initial experience as a social science teacher**

The two data sets elicited from Lara in May 2002 indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; *general pedagogical knowledge* focusing on *teaching strategies*; and, *knowledge of learners and learning*. The nomination of concept map 'student-centred learning' (PCK), 'effective facilitating' (PCK), and 'inquiry learning-hypothesis testing' (PCK), indicated a constructivist approach teaching that ultimately results in the core outcome of 'lifelong learner' (EEGPV). Commentaries from her TAP state that stimulating curiosity among students is a contributing factor in this process, while her VSR identified the importance of visual aids such as the overhead projector as a way of helping students link and acquire knowledge.

*Pedagogical content knowledge* featured strongly in the two data sets. Her concept map showed that *pedagogical content knowledge* was awarded at both the macro and micro levels, and in fact, was the most strongly nominated out of all her knowledge bases. The nomination of concepts for *teaching strategies*, *content knowledge*, *behaviour management*, and *classroom communication*, indicated Lara's understanding of *pedagogical content knowledge* at the macro level. Three general concepts, 'reflective'(PCK), 'student-centred learning' (PCK), 'negotiating the curriculum' (PCK) contained subordinate concepts such as 'collaboration'(PCK), 'promotion of critical literacy'(PCK), and "inquiry learning – hypothesis testing'(PCK), indicated the importance of *pedagogical content knowledge* in her concept map. She stated in her TAP that the constructivist approach helps students stimulate their curiosity particularly in the area of hypothesis testing. This process helps students "to internalise and reshape, or transform, new information" (Brooks & Brooks, 1998:15). The Studies of Society and Environment Syllabus (QSA/QCSS,

2000) states that the learner-centred approach provides “opportunities for students to practise critical and creative thinking, problem-solving and decision making” (p.8). Such an approach should “consider knowledge as ever- changing and built on prior experience” (p.8). According to Thornton (1994), teaching critical thinking involves linking students’ prior experiences to curriculum, giving them opportunities to construct knowledge in class, expect that they will leave the classroom with their own interpretations, and not allowing them to take the world for granted. Lara also spoke of the important role of negotiation of the curriculum. *Effective Pedagogical content knowledge* will result if students are given the opportunity to choose what they study, within their existing curriculum, and “then problems of motivating students may be mitigated” (Thornton, 2001b, p.240). She also commented on social constructivist process as means of students interacting with the teacher and their peers during a group discussion.

The promotion of literacy and numeracy was also important in Lara’s teaching. As Kress (1985) notes, students must become ‘resistant’ readers so that they can challenge a variety texts, especially in the Social Sciences where there are a number of distinct linguistic difficulties (Husbands, 2001). The Studies of Society and Environment Syllabus (QSA/QCSS,2000:6) recognises the value of literacy and numeracy in terms of cross curricular priorities; the Senior Modern History Syllabus (QSA/BSSSS, 1995:8), identifies the importance of literacy and numeracy in its “Language Education Statement”; and Senior Geography (QSA/BSSSS,1999) has statements about literacy and numeracy in “Language Education” and “Quantitative Concepts and Skills”.

Lara regarded the act of reflecting as key to refining her representational repertoires, because “...I want to...look at my thoughts... and make sure...I’m

practicing that...” According to Dewey (cited in Groundwater-Smith et al. 2001) reflective teaching involves three attitudes – open-mindedness, responsibility, and wholeheartedness, while Shulman (1987) regards reflection as part of the cycle of pedagogical reasoning. Her VSR commentaries identified flow charts, mind maps, and concept maps as tools to assist students “...get a grasp of what we are looking at ...”.

*Content knowledge* emerged in the two data sets. It featured in both general and subordinate concepts of her map. The knowledge base of ‘teacher’s love/passion for subject’ (CK) and ‘high subject knowledge’ (CK), were critical components in ensuring the core outcome. The power of the linking words, ‘must have’, indicated the vital role of ‘teacher’s love/ passion for subject’ in her teaching. Her TAP stressed the passion a teacher must have for subject matter because it “...will make you want to keep researching your subject...” and “...keep on... top of your subject matter knowledge...” She noted in her VSR that whilst the processes of learning underpin her constructivist approach, assessing student knowledge of content in social sciences is also a requirement of the syllabi.

*Teaching strategies* featured in the two data sets. Lara regarded the subordinate concept of ‘enthusiasm/energy’ on her concept map as a critical and complementary concept of passion for subject. The powerful linking word, ‘is’, that links the key concept with ‘negotiating the curriculum’ indicated that the latter was seen as synonymous with effective social science teaching. She stated in her TAP that her teaching practices would depend on the diverse nature of the student population in class and on professional development. Commentaries from her VSR indicated an element of direct instructional teaching during a whole class review for an examination.

The two data types converged to show that *knowledge of learners and learning* were important in Lara's teaching. Her concept map showed the critical importance of having knowledge of the learner – cognitively and emotionally, if the teacher is to effectively cater for individual differences. Her TAP discusses the individual learner in terms of the diverse nature of students in class. Commentaries from her VSR demonstrated her desire to acquire the most rudimentary but nevertheless knowledge of her learners, such as their names, "...because I find its more personal than pointing at a student". She also empathised with students when they expressed concerns about a forthcoming exam.

Lara's conceptions as a social science teacher at the first stage of this data collection indicated a constructivist focus to her teaching. However, she acknowledged that there is also room for the direct instructional approach to teaching. She strongly advocated that teachers should have a passion for their subject matter, and that giving both students and the broader school community opportunities to negotiate curriculum topics, will empower students to have a more active role in their learning. She also stated the importance of having knowledge of learners and their characteristics, to optimise learning outcomes. Overall, Lara displays a strong sense of democracy based on the attributes of lifelong learning where the cross-curricular priorities of literacy and numeracy, and active citizenship are key to learning.

### ***Lara's maturing constructs of social science teaching***

A six month time lapse indicated a refinement in terms of 'general concepts', 'subordinate concepts', 'relationships', 'branches', and 'hierarchy levels' (Figure 30). It was also noted that her map also showed little development of knowledge bases across the categories when compared to her first map (See Figure 29). There was one cross-link that linked the two general concepts of 'facilitator' and 'time management

skills', indicating that more thought has been given to the integration of segments of knowledge domains in other hierarchies.

*Teaching strategies* continued to be strong focus of Lara's concept map. The general concept of 'time management skills' (TS) indicated an additional consideration to her teaching, while 'planning' (TS) continued to be a focus of her *teaching strategies*. 'Lifelong learner' (EEGPV) and 'informed and active citizens' (EEGPV) continued to be the focus of her *educational ends, goals, purposes and values*, while 'active investigator' (EEGPV) was a new consideration on her map. *Classroom communication* was a new focus on her map, beginning with the general concept of 'communication' (CC) and all subordinate concepts nominated for *classroom communication* as well, indicating a new direction in Lara's teaching. *Behaviour management* was also a new focus of Lara's second concept map. The hierarchy starting with 'behaviour management' (BM) is almost devoted to various aspects of *behaviour management* such as regular reviews of the program to maintain effectiveness, and negotiation with students to determine policies at the beginning of each semester and year.

The nomination of 'behaviour management' (BM), 'classroom communication' (CC), 'planning' (TS), and 'content' (CK) indicated that Lara had an understanding of *pedagogical content knowledge* at the macro level of her map. 'Facilitator' (PCK), 'student centred classroom focus' (PCK), and 'be flexible' (PCK) were nominated for *pedagogical content knowledge* because the concepts represent aspects of constructivism in the inquiry process of the social science syllabi. Pedagogical content knowledge was not as strongly focused as it was in her first map (Figure 29).

Lara's Think Aloud Protocol (TAP) shows a focus on *pedagogical content knowledge, teaching strategies, classroom communication, and behaviour*

*management.* Lara stated that the *teaching strategies* of “...planning and preparation for you as a teacher” is dependent upon time management. She explained that

*...once I find out where I'm going and what I'm teaching and have a look at a work program I'll be planning for my first term if not semester, if I can. And then preparation I think is...umm...almost a week by week thing but if you can prepare as much ahead as possible that's obviously what you want.*

By preparation Lara meant

*...in terms of resources...umm...whether it be going to the library or actual books that the kids have to use, whether it be a video or...umm...assessment items that have to be done. You're the one sitting back and laughing in the end.*

Her observations during her professional practice teaching show how the school's focus on at meeting target dates can actually reduce the importance of planning and preparation

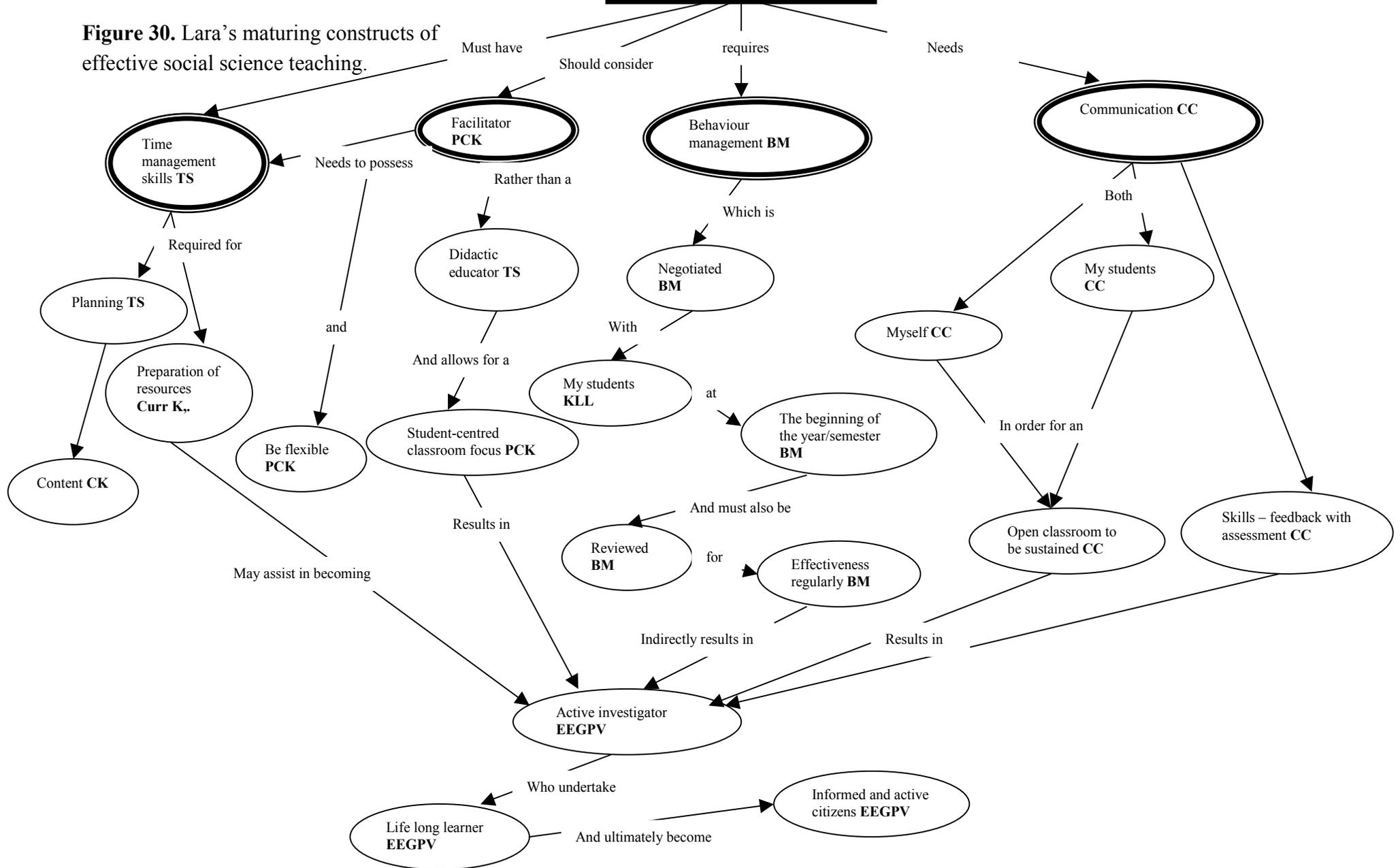
*...I found this a big issue at \_\_\_\_\_ ...umm...in particular...They don't care about what is being taught, they just cared about the time frame...and this had to be done by this and it was just all four weeks you got to teach that no matter where you'd come to or they finish or not...you've just got to keep moving on ...*

In terms of classroom teaching, Lara stated that the “...facilitator needs to possess both time management skills yet be flexible...umm...in their approach to teaching”. Her understanding of *pedagogical content knowledge* is reflected in her commentary about the teacher as a facilitator outlined in the Studies of Society and Environment Syllabus (QSA/QCSS, 2000). Lara explained that

*What I mean by that...umm...well new...but not so new Soc syllabus...has this whole section on teachers not being didactic ...umm...style of teaching any more and teachers need to assess the value of it if they are didactic, the value of that teaching...and if it works for them...fine but the Soc. syllabus suggests that it doesn't work for a lot of kids and that being a facilitator rather than being chalk and talk ...teacher actually helps the students a lot more in their learning and basically you're leaving the learning up to them, and just guiding them...umm...gently, might be the word...umm...to*

**EFFECTIVE SOCIAL SCIENCE TEACHING**

**Figure 30.** Lara’s maturing constructs of effective social science teaching.



*...umm...to let them find out what they want to ...umm...to a degree like run with certain, whatever you're studying at the time ...But yeah...I think that an effective Social Science teacher ...umm...has to be a good facilitator...umm...may not be all the time but at least attempt to be a facilitator.*

However,

*...I've seen a lot of social science teachers that aren't that way inclined...umm...so it is a personal...umm...my decision will likely be equally right to teach that way and whether you can control the class more so with that open learning and learning environment are a challenge in themselves.*

Hence, the significance of the connecting words, “should consider” instead of “must have” in the linking arrow between effective Social Science teaching and the general concept of ‘facilitator’, because she regarded the latter as too emphatic. This is in contrast to the connecting words of “must have” Lara uses to link with effective Social Science teaching to the general concept of ‘time management’, because it is essential to have time management.

In order to develop and sustain her *pedagogical content knowledge* base, Lara discussed the importance of *classroom communication*. She said that

*... both myself and my students need to be effective communicators for things to run smoothly and for them to feel comfortable to share things with me ...umm...whether it be problems they have in the class. This makes life easier I think ...umm...being open with your students and being able to get across your message effectively and hear their's as well and take that on board*

Lara points out, however,

*...that the skills of being an effective communicator might need to be taught to our students ...also...umm...you might find you are lacking, unable to get what their problems or work strengths or weaknesses are.*

She also identified a number of specific *classroom communication* skills (Groundwater –Smith, Cusworth and Dobbins, 2000) the teacher needs to have, such as

*...skills in body language, being able to put forward you body language and read other as well as just being able to put your point of view forward...perhaps more eloquently than...umm...you have before and being able to speak to me on a range of different levels.*

“Feedback” is another important skill in the *classroom communication* domain. As

Lara explains,

*What I mean by feedback is...this year I did a position paper on my ideal assessment practices...umm...and I found that feedback after some research was under-rated one might say...umm...on its value because although a lot of kids... ”Give me the mark, give me the mark... ”...umm...I think with effective feedback ...a teacher actually taking time to write...umm...constructive criticism of the strengths and weaknesses of the students...*

Effective *behaviour management* also requires channels of communication to be open from both the students’ and teacher’s point of view, and

*...it absolutely needs to be negotiated because the kids will feel they’re in some sort of ...umm...or have a tyrant which I want to start out as....I don’t think I can let them have the run of it because then what’s the use, we might as well not have any behaviour management...But behaviour management which is ...umm...which is to be negotiated with my students at the beginning of the year or semester or term...whatever it may be, and that needs to be ...umm...what’s the word...looked at every once and a while too.  
Reviewed.*

### **Summary: Lara’s developing thoughts on social science teaching**

Data elicited from Lara at the conclusion of Bachelor of Education studies present a focus on two of Shulman’s categories: *pedagogical content knowledge*; and *general pedagogical knowledge* focusing on *classroom communication*, *teaching strategies*, and *behaviour management*. The nomination of concepts for *content knowledge*, *behaviour management*, *classroom communication*, and *teaching strategies* indicated an understanding of *pedagogical content knowledge* at the macro level of her concept map. Her general concept of ‘facilitator’ reinforces the constructivist role in the

hierarchy with its linking words of ‘rather than a’ that linked it to ‘didactic educator’. The concept of ‘student-centred classroom focus’ is further reinforces the facilitator’s role of the teacher, and her understanding of *pedagogical content knowledge* at the micro level, that ultimately results in the core outcomes. As she comments in her TAP, “... being a facilitator rather than being chalk and talk ... actually helps the kids a lot more with their learning ...”. However, she qualified this observation by stating that the extent of constructivism in the classroom may depend on the makeup of its student population. This statement is reflected in her choice of linking words, ‘should consider’ that link ‘facilitator’ with the key concept, which suggests the optional status of constructivism. The concept of ‘flexible’ adds cautionary note to the facilitating role of the teacher

*Classroom communication* featured in the data. The nomination of *classroom communication* at the general concept level and subordinate levels on her concept map indicated the regard she had for *classroom communication* in the teaching and learning process. She considered both ‘myself’ and ‘my students’ as key players in developing and sustaining an open classroom. Feedback from assessment has also been nominated as an essential component of *classroom communication* that results in core outcomes. As she explained in her TAP, feedback is not just returning assessed and corrected items to students, it also involves giving “... constructive criticism of the strengths and weaknesses of the students...” In broad terms, Lara defined effective *classroom communication* in terms of verbal and non-verbal, and the responsibility of both the teacher and students.

*Teaching strategies* emerged from the data. ‘Time management skills’ on her concept map was regarded as crucial for effective social science teaching, because of the mandatory nature of the linking words, ‘must have’, that link it to the key concept,

and also because of the cross-linking words, ‘needs to possess’, from ‘facilitator’ indicating that successful constructivism is dependent on ‘time management skills’. Her TAP indicated that planning and preparation is dependent of time management because it can allow the teacher to effectively apportion time so that “...you can prepare as much ahead as possible ...”.

*Behaviour management* featured in the data. It featured at both the general concept level and subordinate levels of her map, thus the importance of this knowledge base in her teaching. The concept ‘negotiated’, indicates behaviour management strategies that are proactive and democratic, but also it a document that needs to be regularly reviewed. Lara stated in her TAP that it was important to keep the channels of communication open, otherwise students would feel isolated and resentful of the teacher.

Lara’s conceptions of social science teaching at the conclusion of her Bachelor of Education studies, indicated a continuing theme of facilitating student-centred learning. However, she also added that this approach to teaching may not be suited to all students and so teachers need to show flexibility in their teaching strategies. She stated that effective time management is a crucial factor in the constructivist approach to teaching, as is effective communication since it provides opportunities for an open classroom. Effective classroom communication was also the basis for sound behaviour management practices. Overall, Lara displays a strong sense of democracy based on a flexible approach to teaching that produces students with lifelong learning skills who are informed and active citizens.

### ***Lara's constructs of English teaching on realization of independent practice***

Lara's teaching appointment at her new school did not include any social science subjects, so English was used. Lara's third concept map construction about effective English teaching, indicated a hierarchy of concepts beginning with knowledge bases of 'relationships' (CC), multiple knowledge bases to 'professional development' (PL), 'love of subject' (CK), 'student-centred learning' (PCK), and, 'exceptional time management skills' (TS) that lead to 'lifelong learning' (EEGPV) (See Figure 31).

The power invoked by linking words 'must involve' that link the general concept of 'professional development' (PL) with the key concept demonstrated the importance of this concept in her teaching. Similarly, the linking word, 'demands' that links the general concept of 'exceptional time management skills' (TS) with the key concept implies a greater importance over other general concepts on her map. 'Lifelong learning' (EEGPV) continued to be a focus of Lara's *educational ends, goals, purposes and values*. Classroom communication continued to be a focus on her concept map. The nomination of *classroom communication* for all the concepts in the one hierarchy, indicated the continuing importance Lara placed on this aspect of her teaching. The linking words, 'requires the creation of one-on-one' reinforces the idea that successful relationships are based on the teacher relating to individual students. Lara used such concepts as 'sense of humour', 'tolerance', and 'approachable and available' as essential components in successful *classroom communication*. The nomination of 'love of subject' (CK) and its immediate subordinate concept of 'enthusiasm and devotion' (KLL, CC) indicating a refocusing of *content knowledge* in her teaching that was not present in her second map (Figure 30). Whilst *behaviour management* was a strong focus of Lara's second map it was not nominated in her final map (Figure 31).

The identification of ‘professional development’ (PL) indicated changing focus of Lara’s teaching that elaborates on Shulman’s categories, that show a desire to look at outside sources of *professional learning* to inform her on teaching and learning in the classroom (Figure 31). ‘Cooperative planning’ (CI) and ‘meeting school community expectations’ (CI) are additional knowledge bases that elaborate on Shulman’s categories. Lara’s knowledge *community integration* shows that she regarded collaboration within school and out of school as important to enhance the quality of learning. These new knowledge bases reflect the changing climate and expectations of schools and teachers.

*Pedagogical content knowledge* was identified at both the general concept level and subordinate levels of her map. ‘Student centred learning’ (PCK) and ‘facilitator’ (PCK) were consistently nominated throughout the three concept maps, thereby indicating her strong conceptions for these form of constructivist teaching. However, Lara showed that she had a better understanding of the processes for effective pedagogical content knowledge in her third map with the inclusion of knowing your students’ abilities’ (KLL), building on their ‘prior knowledge’ in order to create what Lara calls, ‘premium learning’ (PCK). The identification of ‘relationships’ (CC), ‘exceptional time management skills’ (TS), and, ‘love of subject’ (CK) indicated that Lara possessed an understanding of *pedagogical content knowledge* at the macro level of her map.

The focus of Lara’s Think Aloud Protocol (TAP) was on *professional learning*, *pedagogical content knowledge*; *content knowledge*; *knowledge of learners and learning*; *classroom communication*; and, *educational ends, goals, purposes and values*. She stated that the pivotal role of *professional learning* is a means of



*...keeping up with...any changes in you syllabus...if schools are doing marvellous things...with a certain genre...and you could maybe take on their ideas ...that's fantastic...I don't think you should be stuck ...in your own little world ...and be oblivious to everyone else outside ...I think we need to share ideas...see what works and what doesn't...work in the classroom...Umm... professional development also helps create ...networks...*

Professional learning at her school seemed to offer unlimited opportunities for teachers to broaden their educational horizons. She explained that

*...professional development ...at this school...every meeting we have...is got something to do about professional development...If you want to do a seminar that goes on outside the school...that goes for a half a week...then the school will pay for you and also...cover your lessons and everything...So...yes it is very important...both for me at the college ...that it should enhance both yourself and your learning...*

Lara's following statements are classic examples of *pedagogical content knowledge*. She said teaching involves student-centred learning, that is, "...catering for student needs...as best as you can...guiding..." so that they can "...construct their ideas...by creating activities that incorporate...a premium learning environment...where they are learning ...with their own styles ...". Furthermore, Lara stated that

*...I'm trying to draw on their background knowledge...where I can...there is a term...prior knowledge...today I used an example...when I found analogy for the Globe...Theatre...I used to draw on something that I know...that they would know about...and that's when I used the analogy of the concerts they go to... and how the more you pay...the closer you sit up the front...the better the view...So...I built on that prior knowledge ...try to draw on that they have got something that they can...umm...go back to ...and understand...*

Lara's *knowledge of learners and learning* also extends to the affective domain of her students. For example,

*...we have this girl ...ice skating in America...at the moment...I so...I mean they are very ...very talented ...children...I have...A student telling me yesterday ..showed me his band on the internet that he had created...and they've got songs...and they are No.4 on*

*the charts ...at the moment...So...I'm blown away by all that talent... and they appreciate it when you appreciate it...to take the time to spend with them...and look at things like that...*

Her *knowledge of learners and learning* is closely linked with her nominated knowledge base of *classroom communication* in which she stated that

*...you need to have good personal relationships with children...to get anywhere with them...requires the creation of one-to-one relationships...with students...This may be achieved by being approachable ...available...to use humour as much as possible ...If you stay impersonal ...with that child... "I'm the authority figure...you are here to..." ...you know...the didactic style of teaching... "I'm here to teach...you are here to learn..." ...that's as far as it will go...*

However, Lara also points to the challenges of being on the same “wave length” as her students, in order to stay connected with her students as a process that involves the need

*...to be 'with it' ...a lot of my boys are 'with it' ...and you need to be on your toes to keep up with them...I come home...not physically exhausted but mentally...because they are onto your brain all day...every day...trying their tricks...*

In terms of *educational ends, goals, purposes and values*, Lara wanted to develop lifelong learning, especially in critical literacy as it

*...is a major part of the new syllabus we are working in...because we basically need to introduce critical literacy...into our schools because there are so many lives in the world... and the students can't tell ...if its on television...if its on radio...if its on the internet...its all true...they don't question the authority...*

Students, then, also need to have a *content knowledge* base of issues before they can question and challenge these “accepted truths”, but first of all Lara stated that “...as a teacher...I need to have a good knowledge of what I am teaching...and the students need to obviously get something out of it...” In fact, she stressed that

*...you need to have a love of your subject...If you don't...that comes across to your students... If you don't want to be there...then you've got ...no chance... of inspiring them...you need to be devoted to what you do...*

### ***Lara's knowledge in action and reflection on realization of independent practice***

Lara's video stimulated recall was based on an English lesson she taught to her Year 12 students earlier on the day. The students were studying Shakespeare's Elizabethan England and this lesson was designed to give a cultural context for their assignment, that is, they had to prepare a report about the relevancy of Shakespeare in contemporary western society. Her lesson was mainly student-centred, with students working independently on activities using their own lap top computers.

Lara stopped the videotape 24 times during the recall interview, and 35 categories of teacher's knowledge bases were identified from her responses (See Table 16).

**Table 16: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	5
-Classroom communication	1
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	5
Knowledge of learners and learning	11
Educational ends, goals, purposes and values	5
Knowledge of educational contexts	1
Pedagogical content knowledge	3

Lara's knowledge of *educational ends, goals, purposes and values* was evident in her comments about the task for the lesson, that is, of what was to be done by the end of the lesson. Her comments about 'playhouses in Elizabethan England' and 'the clothing they wore ...', indicated her *content knowledge*, while the activities in the lesson such as 'the time line' and 'the worksheet', indicated her *teaching strategies* for the lesson. As she explained

*The students were asked to complete four activities...these being (1) on the time line ...that they had to construct for themselves ...in any form...based on the information given on the worksheet...activity (2)*

*was the module task...activity (3) was looking at playhouses in Elizabethan England...and the last activity ...was on Elizabethan England...and it was set in the cultural context in regard to the clothing they wore...*

The module task referred to the joint planning by the English faculty that created a unit of work, that was then loaded onto what Lara called a ‘share point’

*...which is a website where students can get in and download that information ...and we do that at the beginning of the term so that they can utilise that information and complete those activities during the term...umm...the term...in order to successfully complete their tasks...*

Lara explained that students had to use their ‘laptops’ for three of the four activities in order to access information. An *educational ends, goals, purposes and values* knowledge base was also nominated for her comments that students were allowed to use their laptops to listen to music, “...providing they have headphones and have permission...that’s their learning styles”

Her *curriculum knowledge* relating to computer technology was essential since it was mandatory for all students to have one because

*They have to use the internet...which students have unlimited access to...at this school we have wireless internet connection...which means they need not have any sorts of chords...or plugs...*

Lara also commented on the skills that students have in computer technology may not always be in the best interests of their learning since

*...they can hide...when they are on the internet...by minimizing their task bar...or they are on micro soft outlook...if they are emailing each other*

Her *knowledge of learners and learning* was reflected in her comments regarding the two assessment items students had already completed, “...so I’ve basically got a good idea where students are at academically...”. Lara also spoke about the work ethic of her students “...who took it upon themselves to write notes off the

blackboard...”, and those students who set their own homework without prior instructions.

Lara’s *knowledge of learners and learning* extended to her observations of individual students in her class. She said that she spent a lot of time with this particular student

*...because she is a Horizon student...which means ...she is doing Year 11 and 12 over three years...because she has basketball commitments ...she is a very independent learner...and will chase me up ...for help...which is wonderful...and I like helping her because she is helping herself*

She spoke of other students who had learning difficulties, and how she had provided assistance to one of them. Lara explained that

*...Tamara has confidence issues...in both herself and her work...she is very shy... and terrified of doing orals...her work is never good enough...she thinks that she is a failure...I proceeded to take her to the blackboard ...because she is struggling with the assessment task...and she is also struggling with where she should start...with assessment tasks ...So...I broke it down for her as much as I could...until she could understand why we were doing this...and how it fitted in with the assessment task...*

Lara’s *knowledge of learners and learning* also focused on the activities of three boys who were working in collaboration, and

*...usually seat together ...and they are inseparable...in class and out ...and one of the activities called for...creating a timeline...and instead of using their computers...they decided they were going to use a sheet...and organise it in chronological order...and surprisingly this was not an aspect I thought of...but they had their own resources...which was surprising for Year 12 boys in carrying around scissors...and glue...and they did this...and it was effective ...for them in their learning styles...*

In terms of her *pedagogical content knowledge* base, Lara used pictorial examples as a means to give students a

*A visual concept of what Elizabethan England looked like...in terms of looking at the actual movie...Shakespeare in Love...just to give them a cultural context...and looking at things like costumes...and*

*the setting...to see how it is constructed so they can get an idea  
...and they can build on that idea...*

She said that students "...were struggling with the idea of where people would sit in the Globe..." in terms of their social standing

*So I used the analogy of their time...when you go to the concert  
... "Where are the most expensive seats?" ...and they said "Up the  
front..." and I said... "Where are the cheap seats?" ...so to  
speak...and they all, said ... "Up the back" and I said "Well...the  
same would happen in the Globe"...the more your social  
standing...the more wealth you had in the community ...you would  
sit at the top...because they were the best seats...and those who  
were the peasants...or the lower classes who could not afford  
...such seats...would be standing in the pits ...so to speak...So...I  
just kind of used that analogy to say...the best seats were at the  
top...and the poor seats were at the bottom...and it is the same  
today...*

Another example of her *pedagogical content knowledge* base required students to then manipulate paper cut-outs of the Globe theatre, analyse the different structures, especially

*...who would sit where and why...to give them the context of how  
important plays were at the time...most students liked this task  
because none of them had seen a playhouse before...*

### **Summary: Lara's realization as an English teacher**

The two data types elicited from Lara in May 2003 show that her focus on English was on three of Shulman's categories: *educational ends, goals, purposes and values*; *pedagogical content knowledge*; and *knowledge of learners and learning*; *Educational ends, goals purposes and values* were identified in the two data sets. Her concept map indicated that the subordinate concept 'lifelong learning, specially critical literacy, informed and critical citizen' was nominated for an *educational ends, goals, purposes and values* knowledge base, the importance of which was reflected in her TAP comments about producing critically literate students. Commentaries from her VSR support the importance of 'cooperative planning' as a means of establishing

common goals in the Year 12 English program. Lara also spoke of students using their laptops to access a “share point” in order to answer three of the four questions in class.

*Pedagogical content knowledge* featured in the two data sets. The nomination of *classroom communication*, *teaching strategies* and *content knowledge* interacted to contribute to Lara’s *pedagogical content knowledge* at the macro level. The identification of ‘student centred learning’ at the general concept level and subordinate concepts within the hierarchy indicated that Lara had developed a more sophisticated understanding of *pedagogical content knowledge*. She stated in her TAP that *pedagogical content knowledge* required the teacher to draw on students’ background knowledge when using analogies. She commented in her VSR that she used visual stimuli as a means of providing a cultural context to her lesson on Shakespeare’s England.

*Knowledge of learners and learning* emerged strongly in the two data sets. Her concept map showed that *knowledge of learners and learning* featured strongly, especially as a precursor for utilising students’ prior knowledge in order to engage in student-centred learning. *Knowledge of learners and learning* was’ nominated for ‘knowing your students’ abilities’ because without knowledge of students, in order to create effective *pedagogical content knowledge* and hence, realize the core outcomes. Her TAP stated the importance of knowing the affective domain of learners as a way developing a holistic understanding of students. She stated in her VSR that she had already possessed a good idea of where students were academically, and that she had also developed a knowledge base of individual students’ characteristics as learners and their extra curricular activities.

Lara 's conceptions of English teaching indicated the importance of technology in the teaching and learning process. She stated that the key for successful cooperative planning was regular professional development that also helped teachers come to terms with themselves, to know their learners, and ultimately their learning environment. Teachers could then engage in student-centred learning to create what Lara calls "premium learning" thereby creating the best opportunities for students to become critically literate and informed citizens. Overall, Lara's philosophy of teaching is based on a supportive and caring learning environment where constructivism underpins student learning in an age of computer technology.

### ***Discussion: charting Lara's development***

Lara's conceptions of effective English teaching at the third stage of the data collection in May 2003 reveal both consistency and change. Lara's initial experience of social science teaching indicated a focus on four of Shulman's categories: *pedagogical content knowledge; content knowledge; general pedagogical knowledge* focusing on *teaching strategies*; and *knowledge of learners and learning*. Data elicited from Lara at the stage of her developing thoughts on social science teaching indicated a focus on two of Shulman's categories: *pedagogical content knowledge*; and *general pedagogical knowledge* focusing on *classroom communication, behaviour management* and, *teaching strategies*.

Although Lara was only teaching English as a graduate teacher, the study identified again three of Shulman's categories: *pedagogical content knowledge; knowledge of learners and learning*; and *educational ends, goals, purposes and values*.

*Knowledge of learners and learning* represented a change in her conceptions of teaching, although it was a focus of her initial experience as a social science. Both concept maps (Figures 29 and 31) show that it was important to have knowledge of

the learning abilities of students, while comments from both her TAPs show a concern for the diverse interests of students and knowing the affective domain of students.

While comments from her first VSR at the stage of her initial experience of social science teaching indicated her desire to know students names, statements about students' academic performances and their extra curricular activities from her second VSR on realization of independent teaching indicated a broader knowledge base of her learners

Lara's focus of *educational ends, goals purposes and values* on realization of independent teaching practice represented further change. Her concept map (Figure 31) indicated that 'lifelong learning, especially critical literacy, informed and critical citizen' was the core outcome of her conceptual structure of social science teaching. The inference that can be drawn from this core outcome is that Lara would like to see learners embrace the attributes of lifelong learning, where they possess the capacity to discern, to be critical, and filter information. Lara said in her TAP that a major aim of staff cooperative planning was to introduce the concept of critical literacy as espoused in the new English Syllabus. Comments from her VSR were focused on students' laptops – an important learning tool for students to access a "share point" in order to complete set tasks.

*Pedagogical content knowledge* was a consistent focus of Lara's conceptual structure at the three data collection points. *Pedagogical content knowledge* was identified at the macro levels of Lara's three concept maps. Her concept map (Figure 29) at the initial stage of her experience as a social science teacher also showed that *pedagogical content knowledge* was nominated to three general concepts, and was present at the subordinate level in four of the five hierarchies – a strong indication of *pedagogical content knowledge* in Lara's teaching. *Pedagogical content knowledge*

was part of a variety of knowledge bases such as *educational ends, goals, purposes and values, teaching strategies, content knowledge, and knowledge of learners and learning*. Comments from Lara's TAP indicated her desire to engage in learner-centred teaching, while she spoke of importance of using visual representation in her VSR for student understanding. Her concept map (Figure 30) at the stage of her developing thoughts on social science teaching indicated a refined presence of *pedagogical content knowledge* to only one hierarchy, but it was also a component of *teaching strategies* at the general concept level, *educational ends, goals, purposes and values*, and *teaching strategies* at the subordinate levels of the concept map.

Commentaries from her TAP indicated the importance of having good *classroom communication* skills in order to develop effective *pedagogical content knowledge*. Lara's concept map (Figure 31) upon realization of independent teaching practice showed that *pedagogical content knowledge* continued to be present both the general and subordinate levels of her map, and was part of *professional learning, personal beliefs, content knowledge, and knowledge of learners and learning*. Lara stated in her TAP that it was important to create a learning environment that catered for individual learning styles, commentaries from her VSR continued to stress the importance of visual representation. Lara also spoke of using analogies to give students a social and contextual understanding of historical evidence.

Lara's initial experience of social science teaching identified 'negotiating the curriculum', 'collaboration', 'nature curiosity of students', 'levels of interest', 'reflective', 'promotion of critical literacy', 'diversity', 'student-centred learning', 'effective facilitating', and 'inquiry learning – hypothesis testing' (Figure 29) as *pedagogical content knowledge* links to other aspects of social science teaching. Lara reiterated the importance of learner-centred teaching in her TAP specifically referring

to the inquiry process of hypothesis testing. Lara spoke about the importance of negotiating the curriculum between the teacher and students in a social constructivist environment, and also with other staff and the administration. She also spoke of promoting critical literacy and above all, being reflective on all aspects of teaching. Commentaries from Lara's VSR showed that she used concept maps to help students distinguish and establish links between topics.

Lara's developing thoughts on social science teaching showed that she considered 'facilitator', 'be flexible', and 'student centred classroom focus' on her concept map (Figure 30) as process links to other aspects of social science teaching. She spoke of the importance of establishing effective classroom communication as the basis for getting the message across to students.

Lara's consistent identification of 'student-centred learning' and 'facilitator' throughout her three concept maps was indicative of her desire to promote a constructivist approach to teaching. Her identification of 'prior knowledge', 'create premium learning', and 'capitalizing on this knowledge' (Figure 31) on realization of independent practice was further indication of her understanding of *pedagogical content knowledge* and its links to other aspects of English teaching. Lara stressed the importance of student-centred learning in her TAP as a means of creating an environment that caters for students' learning styles. Lara said she used pictorial examples in her VSR to give students a visual concept of their topic, and she had students manipulate cut outs to analyse various structures of medieval buildings. Lara also spoke of using analogies to give students a social and contextual understanding of history. Although Lara's last video stimulated recall interview was conducted in English, it was in an historical context of Shakespeare, and so *pedagogical content knowledge* bases were intertwined. Overall, Lara shows she has been able to

comfortably move from social science to English classroom because she knew the importance of knowing her learners as the basis for effective teaching.

## **SAMANTHA**

Samantha attended a Queensland secondary high school for girls where she studied Junior History, Junior Geography and Senior Modern History. She enjoyed her Modern History because her teacher was focused on student-centred learning, and encouraged her students to feel passionate about history.

### ***Samantha's initial thoughts on social science teaching***

Samantha's response to the initial focus questions were generally in accordance with her Modern History teacher – a good balance of classroom discussion led by an enthusiastic teacher who loves working with young people. Samantha wanted to be a teacher because she felt she could help young people to become lifelong learners. She stated that

*There is so much pressure on young people today- to make decisions...the media that promotes the stereotypical youth of the 21<sup>st</sup> Century...looking good...all that sort of thing...and then there are the wars...the pressure is crushing...I like to think that I can make a difference...*

Samantha said students are more likely to enjoy social science if the teacher establishes a good relationship with students, makes the topic relevant, and avoid talking at students all the time.

Samantha enrolled in Bachelor of Education program at a Queensland university, majoring in History and English. Her final professional teaching practice was at a suburban, coeducational high school in Queensland where she taught a Year 12 Modern History class that was videotaped for stimulated recall interview. She received a Suitability Rating of '1', the highest, from Education Queensland.

She was appointed to a coeducational, suburban state high school at the beginning of the school year in 2003, where she taught Years 8, 9 and 10 English (2 classes),

and two Year 10 Studies of Society and Environment (SOSE). She taught a Year 10 SOSE class that was videotaped for a stimulated recall interview.

### ***Samantha's initial constructs of social science teaching***

Samantha's concept map shows a hierarchy of concepts, consisting of general concepts, subordinate concepts, outcome concepts, and relationships. The lack of cross-links (and branches), indicated a concept map that was linear or in 'item stream' mode. Her map also showed that knowledge bases were nominated to most categories, except in 'personal beliefs', 'curriculum knowledge', and 'knowledge of educational contexts' (See Figure 32).

Samantha's map indicated that the linking words, 'requires effective' that links 'teaching strategies' (TS) to the key concept is pivotal to effective social science teaching. However, 'effective teaching strategies', according to Samantha, is also determined by the teacher's 'sufficient knowledge of topic' (CK) and 'keeping up to date with current affairs' (CK), and maintaining 'effective behaviour management' (BM). Her *behaviour management* strategies were based on negotiation and mutual respect. The identification of 'active' (EEGPV), facilitate student-centred, inquiry based learning' (EEGPV), 'independent learners' (EEGPV), and 'making social science relevant to the present and therefore interesting' (PCK, EEGPV) indicated the importance Samantha placed on cognitive and affective outcomes in teaching.

The nomination of 'sufficient knowledge of topic' (CK), 'teaching strategies' (TS), 'negotiation of class rules' (BM), and 'mutual respect and fairness' (CC) showed that Samantha had an understanding of essential relationships that contribute to *pedagogical content knowledge* at the macro level of her concept map. 'Samantha's map also showed that she recognised that teachers require more than just having 'sufficient knowledge of topic' (CK), they must also be able to 'transfer this

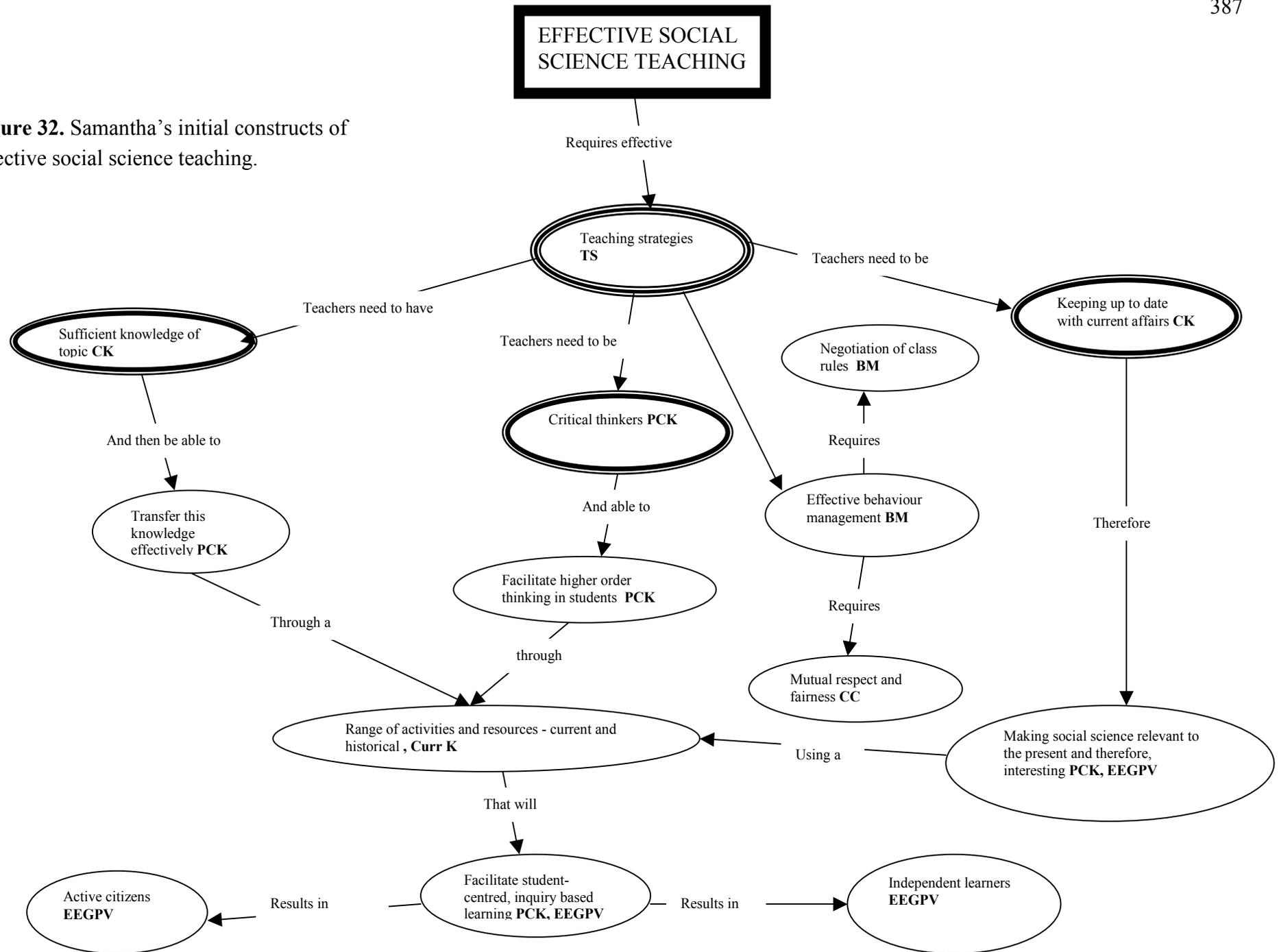
knowledge effectively' (PCK) in order to 'facilitate student-centred, inquiry based learning' (PCK, EEGPV) in students. 'Transfer this knowledge effectively' (PCK) infers that there has been what Shulman (1987) refers to as "a model of pedagogical reasoning and action". Whilst 'sufficient knowledge of topic' refers to the ideas *comprehended* by the teacher, the next phase of the model, that of *transformation* involves the what, why and how of teaching, before the instructional phase takes place. Closely allied to *instruction* are *evaluation*, *reflection* and *new comprehension*. An inability to 'transfer this knowledge effectively', means that Samantha's knowledge of teaching might as well be inert. The identification of 'critical thinkers' (PCK) in order to 'facilitate higher order thinking in students' (PCK) also indicated the importance of the teacher's role in providing challenging opportunities for students

The focus of Samantha's Think Aloud Protocol was on *content knowledge*, *pedagogical content knowledge*, and *behaviour management*. Samantha's knowledge base of *pedagogical content knowledge* was evident in her statement regarding 'critical thinking' (PCK) by teachers as a driving force of effective social science teaching because it facilitates higher order thinking in students:

*I think teachers need to be **critical thinkers**...and then I think they need to be able to **facilitate** that critical or **higher order thinking in students** ...*

'Higher order thinking in students' (PCK), according to Samantha, effectively means that students can engage in the following taxonomies; analysis, evaluation, interpretation, and decision-making. Furthermore, she does not place these levels of thinking in a linear, rigid hierarchy of difficulty, rather, the type of activity to be

**Figure 32.** Samantha’s initial constructs of effective social science teaching.



performed by students will determine the taxonomy to be used. "...different things will come with different activities...".

A further prerequisite for effective social science teaching is the *content knowledge* base of teachers in keeping pace with current affairs, because it provides opportunities for students to relate to issues in contemporary times. Samantha said that

*I really want them to see the relevance of...umm... Social Sciences... through their knowledge of Social Sciences ... for understanding the way the world is today ...*

The success of this process will depend on the concept of 'range of activities and resources – current and historical'. Samantha wants the sorts of knowledge delivery, which will facilitate a student centred, enquiry based learning:

*...that's pretty important...I want students to do inquiry based ... not me up the front ...talking all the time... I like students to question things... not just accept things in the world '*

... Samantha was advocating a *pedagogical content knowledge* approach to her teaching where learners work in a self-regulated environment, and construct new knowledge with their prior knowledge (Brooks & Brooks, 1998).

'Active citizens', was a core outcome of Samantha's effective social science teaching, and a direct result of her *pedagogical content knowledge* approach to teaching. Samantha's other core outcome of "independent learners" reflects a key attribute of a lifelong learner – a reflective and self-directed learner, in which the learner develops an awareness of his/her own thinking, learning style, behaviours, and performance, and plans and monitors goals to be achieved (Studies of Society and Environment, QSA/QSCC, 2000).

Samantha's *behaviour management* varied. At one stage she discussed the 'negotiation of class rules' and 'mutual respect and fairness' in terms of a constructivist, student-centred democratic theme:

*I would start off by asking them ...what they think...  
umm... they think they should be behaving in the class  
...and what they think is appropriate ... and polite behaviour  
...and ...umm...get them to tell me...*

However, Samantha also expressed an interventionist approach as well:

*I just basically emphasise the fact that...umm... I will  
respect them as mature human beings...( ) they got  
to respect me in what I'm doing...and I expect certain  
manners ...umm...appropriate behaviour ...and if that  
doesn't happen...then...umm...consequences...*

Despite this uncertainty, Samantha *behaviour management* policy does not stand alone, but links in with *teaching strategies*. Samantha's approach to *behaviour management* may eventually reflect one or a combination of approaches/models identified by Groundwater-Smith et al (2001) and Edwards (2000), all of which have their strengths and limitations.

### ***Samantha's initial knowledge in action and reflection***

Samantha's video stimulated recall interview was based on a review of the Russian Revolution she had taught to her combined Year 11 and 12 Modern History class the previous day. Her teaching strategies involved a combination of direct instruction and scaffolding, using a variety of resources including, an OHP, a whiteboard, a VCR, and posters.

Samantha stopped the videotape 24 times during the recall interview, and 38 categories of knowledge bases of teaching were identified from her responses (See Table 17).

**Table 17: Breakdown of knowledge bases.**

Knowledge base	No.
General pedagogical knowledge	
-Behaviour management	9
-Teaching strategies	12
-Classroom communication	-
-Personal beliefs	-
Content knowledge	5
Curriculum knowledge	-
Knowledge of learners and learning	7
Educational ends, goals, purposes and values	-
Knowledge of educational contexts	2
Pedagogical content knowledge	3

Samantha's relationship with her students was something she had been able to develop during her Tuesday visits. She said that built up a relationship with them

*... from my observation days... because I was helping them out a lot ...umm...when their teacher was away. And...I've doing on my Prac...since I've been teaching them ...I've done a lot of activities with them... that I don't think they've been doing like that before ...umm...a lot of group work...and playing songs... like music...and doing posters and doing different things ... and ...umm...they've enjoyed it...and we've got a really good relationship...*

However, it was precisely because of this “really good relationship” and “because they are seniors” that her *behaviour management* policy was generally ineffective because

*I'm hesitant to discipline them...and sometimes when I should and so they...when they are doing an activity like this where they have to read and write...they end up...umm... talking instead ...and not focusing on the task ... I should be stricter with them...*

But when Samantha tried to use a behaviourist model of teaching, the students found it too restricting, particularly during reading and writing tasks where, “...you have to be on them all the time”.

Samantha used ‘eye contact’ to some success, “...I can wait there...only have to be ...maybe thirty seconds...if that...and the kids will know

*“Well, okay...you know...I’ll just sit down ...and do whatever I want to do...and do whatever you want to do...and we’ll come back at lunchtime ...we’ll have the lesson then. And... eventually ...some kids will tell the other kids to shut up...”*

During group activities, Samantha separates two students because “ they sit there together and do nothing”.

Samantha summed up *behaviour management* at her school in a historical, whole school community context, in what Groundwater-Smith et al (2001) refers to as an enactment of personal theorising, of deconstructing the school.

*...with Grade 11 and 12 ...their behaviour is ...umm... are a reflection ...somewhat of the administration ...umm...politics that was going on in the school... Umm...just got a new principal last year whose trying to pull the school together ...But before, they had... a deputy ...they continually fought in their office.... They use to have 1400 kids in the schools...now they have 400...and ...you know... parents don’t want to send them there ...*

In terms of *knowledge learners and learning* in her Modern History class, Samantha already knew that in a cognitive sense, students do not like reading and writing, so at one stage she divides the class up into groups of two, so students can help each other in answering questions from the text. As noted earlier, Samantha has done a number of other class activities with her students that do not entail much reading and writing, and the students responded positively to that. She also displays a good understanding of a number of individual students, “ Deborah in Year 11...she’s quite studious...James just doesn’t do anything...And then there’s Ryan ...really intelligent...”

The behavioural challenges Samantha experienced, seems to have had a natural flow on effect in the teaching and learning process because

*...you know...I’m not asking them to even write a lot...they are really resistant towards ...writing...you know when I’m walking around ...a lot of the students ...just wont write*

*the answers ...a lot of students will say, "Well...what's the answer to this one?" ... And they want you to point to exactly where it is...*

The frustrations in teaching this Modern History begin to show on the videotape.

Samantha was trying to develop some structure in student thinking by listing some long term and short term causes of the Russian Revolution on the whiteboard so students could answer the questions from their textbooks. Samantha said that

*...even when I put that up on the board... 'The Failure of the ... Provisional Government...kids still...asking me...' So, hat are we putting up there? ... Where are we getting the information from?' I'd put it up there...plain as daylight...and that was in their textbook...I don't know what I should be doing different...*

Samantha questioned her own *teaching strategies*, noting her disorganised state at the beginning of the lesson, "I need to spend a few minutes before the lesson...just to make sure where we were up to...but I didn't do that ...". She later admonishes herself for spending too much time on some tasks, explaining, however, that students had to know particular content, hence the length of time on these tasks.

Samantha probably summed up the frustrations of other teacher education students when she explained the difficulty of representing knowledge to students, which is at the core of *pedagogical content knowledge*, because she did not know all her students' cognitive abilities, their emotional backgrounds and prior experiences.

*...sometimes I assume that students know...certain or things ...that they don't know...like ..just for instance this lesson... 'dictatorship'...I was using that word...and ...umm... without realizing that some of the kids didn't know what I was talking about...and then...when I did realize ...I had to ...sort of say... "What does that mean"? ... so easy to assume that they have got some ...knowledge...on the spot...you've got it in your mind... and it is hard to sort of...put into their terms...so that they can understand it...*

Nevertheless, there are other examples that show that Samantha had success at *pedagogical content knowledge*, in that she

*... had to explain what propaganda was to the students... a couple of them...like Ryan...and Hayley...sort of knew...and Kate knew what I was talking about already. So, with their help... was good...I could use what they were saying...and build on what they were saying ...to tell other students...putting it in their terms...*

In another example of *pedagogical content knowledge*, Samantha was trying to connect back to the previous lesson:

*...so I started this unit on the Russian Revolution...a big group activity on communism, capitalism, and socialism. We watched a video and then they ..had to do posters...and that worked well ...the understanding of that ...good medium...in every lesson I am reinforcing stuff from the previous lesson...so that was the connection back there...the original activity...activity we did at the start of the unit.*

### **Summary: Samantha's initial experience as a social science teacher**

The two types of data elicited from Samantha in May 2002 indicated a focus on three of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; and, *general pedagogical knowledge* focusing on *behaviour management*. The two types of data revealed that Samantha preferred a learner-centred approach to teaching in an atmosphere of fairness and mutual respect. Her concept map suggested that critical thinking is the key for successful teaching and learning. Comments from her TAP supported this assertion that critical thinking facilitates higher order thinking in learners. The VSR cited an instance where Samantha used explanation in transforming knowledge to students.

The two data sets also showed a strong presence of *pedagogical content knowledge*. The nominated knowledge bases of *content knowledge*, *teaching strategies*, *behaviour management*, and *classroom communication* indicated that Samantha understood *pedagogical content knowledge* at the macro level of her map. The nomination of 'transfer this knowledge effectively' (PCK), 'critical thinkers' (PCK), facilitate higher

order thinking' (PCK), and 'making social science relevant to the present and therefore, interesting' (PCK, EEGPV), indicated Samantha's understanding of pedagogical content knowledge at the micro level. These concepts also represent facets of constructivism that are key to the inquiry process of the social sciences.

Samantha's TAP commentaries stressed the importance of learners constructing knowledge in a self-regulated environment. The Studies of Society and Environment Syllabus (QSCC, 2000:8) make this point unequivocally, "Learner-centred approaches to learning and teaching view learning as an active construction of meaning and teaching as the act of guiding and facilitating learning". The alternate approach Samantha said, was "...me up front...talking all the time", reflects the recitation/lecture approach in what Hahn (1994) calls the 'closed classroom climate', where students passively hear about issues in history and society. Exposing students to more social science content will not necessarily result in a more active citizenry. When students are taught in an environment that, "...reflects the ideal of democratic discourse and open inquiry, they are more likely to develop attitudes that will incline them more towards active citizenship" (Hahn, 1994:204). In other words, when students are given the opportunity to engage in the same way as public issues are democratically resolved, they will develop the will to participate in civic life. She spoke of teaching students to think at different levels. Students who think at different levels is an attribute of a lifelong learner, especially as a complex thinker. "Students use critical and creative reasoning to recognise the tentative nature of conclusions and to challenge conventional practices" (Studies of Society and Environment, QSA/QCSS, 2000:4).

Samantha commented in her VSR about connecting information to previous lessons, and of using explanation as a means of transforming knowledge – a task that

was not always easy, especially when she did not have a knowledge base of students' cognitive abilities. The students' understanding or lack of understanding of the word 'dictatorship' was a case in point. Shulman (1986) stated that *pedagogical content knowledge*, "also includes an understanding of what makes the learning of specific topics easy or difficult" (p.9). Students bring to class preconceptions and misconceptions of a topic, so it up to the teacher to have a knowledge of strategies so they can reorganise the understanding of learners, "because learners are unlikely to appear before them as blank slates" (p.10). Samantha identified assumptions she made about her own content knowledge that was not in accordance with that of students and hence, her challenge to explain knowledge in ways for student understanding, but "...often the words just don't come out right".

*Content knowledge* bases were also consistent throughout the two data types. Two general concepts of 'sufficient knowledge of topic' and 'keeping up with current affairs' in her concept map strongly suggest the integral nature of content knowledge in social science teaching. Her TAP stated that social science teachers should maintain currency with current affairs, not only as a means of justifying the importance of social science but as a way bringing relevance to students' understandings of the contemporary world. Whilst keeping abreast with current issues may not be absolutely vital when teaching students of Senior Ancient History, it is necessary in Studies of society and Environment Syllabus (QSA/QCSS, 2000).

*Behaviour management* featured in the two data sets. Her concept map shows that *behaviour management* is subsumed into *teaching strategies*, inferring that sound management practices comes from effective teaching practices, and not the other way around. Samantha expressed both democratic and interventionist approaches in her TAP commentaries. These approaches were also reflected in her VSR commentaries –

with mixed success. Part of Samantha's problem may be due to the mixed signals she was giving to her students. On the one hand she was displaying what Cole and Chan (1987) call "the personality characteristics model – warmth, understanding, genuineness, consideration – idealised expectations of teachers at the best of times. But when she tried to use interventionist strategies, students' responses were not immediate. However, Samantha experienced a degree of successes in applying "eye contact" and "I-messages" to classroom teaching. At another stage of the lesson, Samantha used and powerful hints to request desired behaviour.

Samantha's conceptions of social science teaching indicate that the central role of the teacher is to facilitate higher order thinking in students in a supportive and caring environment. She highlighted the crucial role of teachers as having to be critical thinkers in order to develop student-centred, inquiry-based learning. Whilst her concept map suggested that effective behaviour management is a naturally occurring outcome of her teaching strategies, both her TAP and VSR commentaries depicted otherwise. Overall, Samantha advocates the *pedagogical content knowledge* base of constructivism in teaching where learners are regarded as unique individuals capable of independent thinking in the spirit of active citizenship.

### ***Samantha's maturing constructs of social science teaching***

Samantha's concept map construction six months later indicated change towards greater conceptual complexity than her previous map, although the lack of cross-links, indicated the same 'item stream' of concepts as her first map structure. Her map continued to show a three hierarchical structure but there were more subordinate concepts and outcomes concepts (Figure 33).

Her map also showed greater development of knowledge bases across all categories except 'personal beliefs'. *Content knowledge* continued to be a focus on Samantha's

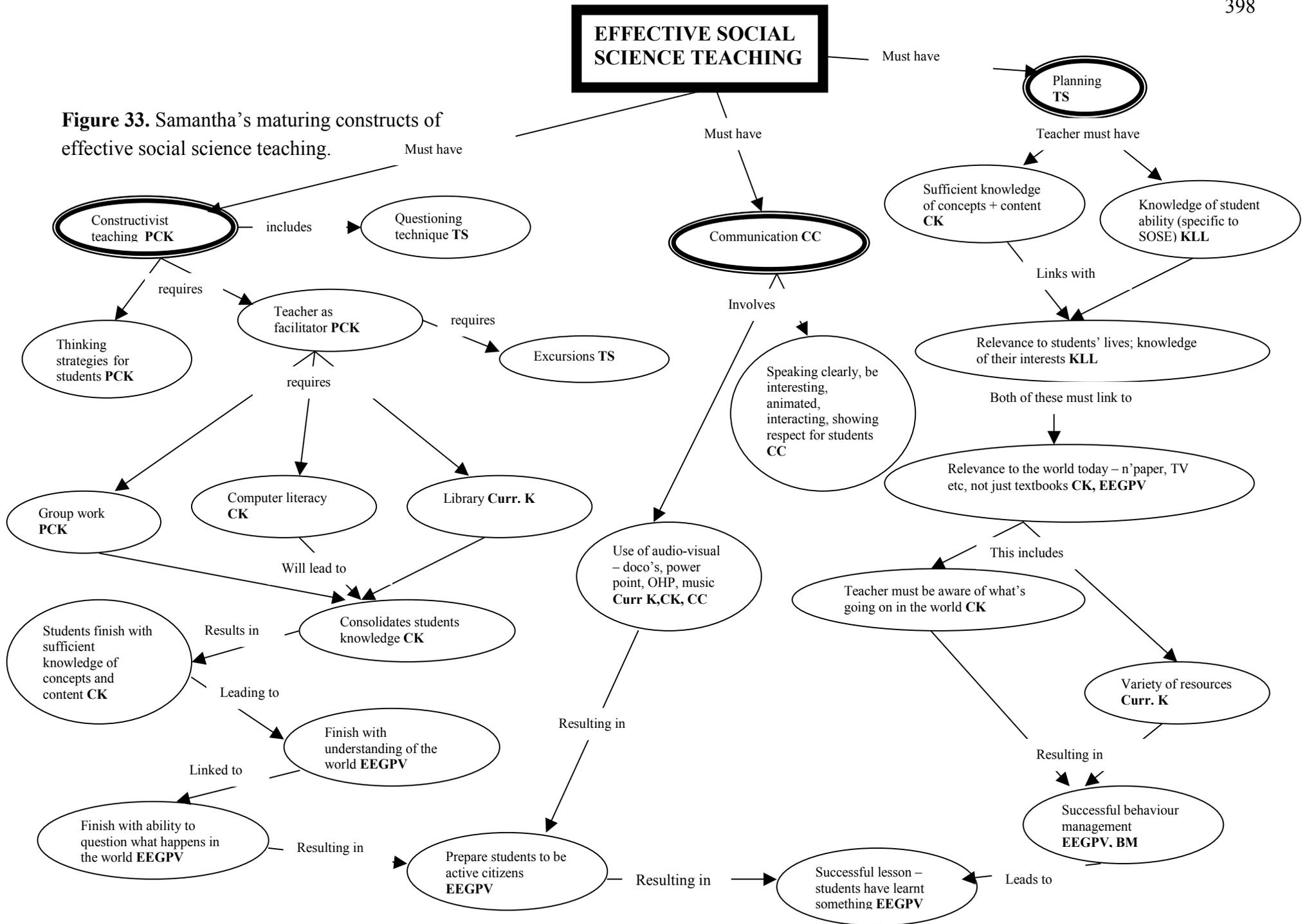
concept map, although the concepts are embedded, that is, they are located within the hierarchies, unlike the two general concepts that were nominated for *content knowledge* in her previous map (Figure 32). The location of ‘successful behaviour management’ (EEGPV, BM) on Samantha’s map indicates more of an outcome as a result of ‘planning (TS) that incorporates an understanding of content knowledge, resources, and a *knowledge of learners and learning*. The continued nomination of both cognitive and affective outcomes indicated Samantha’s broad understanding of *educational ends, goals, purposes and values* in the social sciences.

The identification of ‘questioning techniques’ (TS), *classroom communication* for ‘communication’ (CC), ‘successful behaviour management’ (BM), and ‘computer literacy’ (CK), indicated that Samantha continues to show an understanding *pedagogical content knowledge* at the macro level. Pedagogical content knowledge was nominated to ‘teacher as facilitator’ (PCK), ‘constructivist teaching’ (PCK), and ‘thinking strategies for students’ (PCK) because they are key aspects of the inquiry approach in the social science. The facilitating role of teachers and thinking strategies for students were similar themes in her previous concept map (Figure 32).

The focus of Samantha’s Think Aloud Protocol (TAP) was on the *teaching strategies, pedagogical content knowledge, knowledge of learners and learning, content knowledge, classroom communication*. *Pedagogical content knowledge* was evident in her statement on constructivism. Ultimately Samantha wants students to consolidate their knowledge, and

*...to have a solid understanding because they have actually done it themselves...you know...through what the teacher has done but not the teacher just telling them everything ...umm...which results in students hopefully finishing with sufficient knowledge of concepts*

**Figure 33.** Samantha’s maturing constructs of effective social science teaching.



*and content...leading to an understanding of the world which is linked to the ability to question what happens in the world. Hopefully it will result in students being active or at least aware citizens and worldly citizens. I think all my things are wanting to lead to this outcome.*

Furthermore, “...if ...all that planning goes perfect...well not perfectly ...but goes well then you’ve got a successful lesson ...I believe...where students have at least learnt something”. While Samantha stated that *behaviour management* is not an outcome, good lesson planning, and “...if you know your students really well...” will result in successful *behaviour management*, that is, “...if you have done all this planning ...you should not have too many behaviour management problems and that’s what I found in my prac anyway”.

*Teaching strategies* in her planning phase also should make the topic relevant to “...students lives like knowledge of their interests”. As Samantha explained, planning is a process of

*...connecting their interests, and their knowledge and their lives too, especially with history and geography and that...umm...to the world today like on a global scale ...you’ve got to link that to their individual lives but also linking it to the world today because it might be a historical concept that you’ve got to bring it into what’s happening today...you know documentaries, videos, not just your text book, you know, your computer, everything that’s going on now, that might connect to the history...*

Making a topic relevant means having a *knowledge of learners and learning* that allows the teacher to get

*...to the students’ level wherever they’re at ...and be able to transmit the knowledge... knowledge of their ability... knowledge where they’re at...umm...I suppose ...yeah...their reading ability...their writing ability...their ability to ...umm...do all the things you have to do in Social Science ...like research, to critically analyse, to question, to recall knowledge ...*

Planning also requires of *content knowledge*. As Samantha explained, “...you need sufficient knowledge of historical and geographical...the teacher needs to be able to

actually plan lessons and units”. Furthermore, teachers must have the knowledge to best utilise “... newspapers articles, TV programs, documentaries, internet ...”, in order to know what is going on in the world.

Importantly, studying social science is “... not just about learning the historical; facts...” but also about constructing knowledge (Brooks & Brooks, 1999). As

Samantha’s explains,

*...I think maybe a big one for me is ...constructive teaching ...I suppose I was really trying to avoid the whole rote learning ...and World War Two was...you know... 1939-45 and all the rest of it...umm...I’d rather students actively seeking or discovering the knowledge themselves ...so like you need to be...I prefer like a brief teacher talk...you know...at the beginning of the unit ...you know what I mean...I don’t want the whole thing to be teacher talk...that traditional kind of teaching ...*

Samantha’s *pedagogical content knowledge* practices were apparent in her understanding of the importance of group work, because she saw it as a means of facilitating knowledge construction. For example,

*...they did visual displays, they gave feedback from different groups like that, they had to do OHTs and give feedback, they had to do posters...umm...they had to do a role play...like they had to be characters from the Russian Revolution...and they did a debate ...and like...I led the debate ...but I didn’t say much ...I was the facilitator of learning really...*

A constructive teaching approach also

*...help students to really get into it, it helps them to enjoy it and it helps them because they are enjoying it...they really get into the unit you’re doing, it helps them to...umm...I think it helps them to do the higher order thinking, it helps them to do the questioning and the critically analysing because they get really familiar with the knowledge because they are doing things...they consolidate the knowledge...*

Consolidation of student *content knowledge* will also come about by the teacher providing opportunities to access computer technology and field excursions.

Samantha explained that

*...I've got here computer literacy...so integrating that within social science like ...umm ...the internet, PowerPoint, the CD Roms, like the Grade 8s ...we had the Aboriginal...umm... computer thing on indigenous ...it was on indigenous peoples and all their characteristics of their culture and that sort of thing and also...umm...I had Grade 8s and the Grade 11 and 12s doing Power Point...helping their research skills and also that comes into questioning like, everything ...especially on the internet, you know you can't trust everything you read and they've got to look at what sites are valuable and where the information is coming from...getting out of the classroom...if you can incorporate an excursion, if you can practically, you know...I think that's a really good thing for social science as well.*

Samantha identified questioning technique as another essential component to constructivist teaching because,

*...especially history, its not all black and white and so to avoid the rote learning thing...I always question the students...why this...why that...what does that mean, how do you think that relates to this ...like those kind of questioning techniques, and linking it to previous units, linking it to a newspaper article, linking it all the time to ...umm ... you know the things that are relevant to them ...*

Classroom communication was also an important feature of Samantha's teaching, which

*...involves speaking clearly, being animated, being interesting, so I suppose physical aspects of teaching ...which is general to all subjects... Yeah...that's sort of big...showing your respect of students so that then you get the respect back. So that comes into that...like as in...you know...their points of view...rather than just shutting them down.*

### **Summary: Samantha's developing thoughts on social science teaching**

Samantha's conceptions of effective social science teaching at the conclusion of her Bachelor of Education studies show a focus on four of Shulman's categories: *pedagogical content knowledge, content knowledge; knowledge of learners and learning, and general pedagogical knowledge* focusing on *teaching strategies and classroom communication*. The data elicited from Samantha indicated that she was

strongly focused on learner-centred teaching. As she noted in her TAP, constructivism is “...a big one for me...constructive teaching... I’d rather students actively seeking...knowledge themselves...” Her concept map also showed greater structural development, and there were more nominations of knowledge bases.

*Pedagogical content knowledge* was present in concept map – the identification of concepts for *teaching strategies*, *classroom communication*, *behaviour management*, and *content knowledge* attest to her understanding the macro level, while ‘Constructivist teaching’ was one of three concepts nominated for *pedagogical content knowledge* at the micro level. The linking words, ‘must have’ that linked ‘constructivism’ to the key concept, indicated the importance Samantha placed on constructivism in social science teaching. The subordinate concepts of ‘thinking strategies for students’ and ‘teacher as facilitator’, give further support to this constructivist approach. Subordinate concepts further down the hierarchy show how this was to be achieved, that is, via group work, computer technology, library resources, and excursions, so that students would then have the knowledge to investigate national and global, and to question accepted truths. Her TAP stated that studying social science was not just about the accumulation of facts by a passive audience, but about students constructing knowledge “...and it helps them because they are enjoying it...”

*Content knowledge* featured in the data. Whilst it was not nominated as a general concept, its role was still significant in the constructivist process. As noted earlier, acquisition of knowledge by students was an essential component of Samantha’s constructivist approach to teaching. Her concept map also stated that knowledge of discipline and of world affairs was imperative for the teacher, while her TAP stressed the need for “...sufficient knowledge of historical and geographical ...” topics.

*Teaching strategies* knowledge base planning' featured in the data. She identified 'planning' as a general concept in her concept map diagram that was to incorporate knowledge of students' abilities, teachers' disciplinary knowledge, and relevance of topics for lesson success, including behaviour management. As she states in her TAP, "... if you have done all the planning...you should not have too many behaviour management problems ...". In broad terms, her TAP sums up planning as a process of "...connecting their interests and their knowledge ...with history and geography..."

*Classroom communication* was nominated in both sets of data. Her concept map portrayed *classroom communication* on two levels; one that referred to the interpersonal skills and the other that related to technological expertise. Her TAP also pointed out that *classroom communication* should involve respect from the teacher "...so that you get respect back".

*Knowledge of learners and learning* emerged from the data. Samantha's concept map states that the planning process must also consider students' cognitive abilities as well as the relevance of the topics to their lives. As she points out in her TAP, "...you've got to link that to their individual lives ...".

Samantha's conception of social science teaching at this stage is strong on the teacher as a facilitator in a constructivist, learning environment. However, there is now greater emphasis on teachers' subject matter knowledge, their knowledge of world affairs, and students' knowledge base. Whilst she still regards behaviour management as an outcome of effective teaching, she now puts more emphasis on relationships and knowing the students as a means of providing an improved learning environment. She is also more strongly focused on planning as a way of incorporating relevance, variety of resources, and abilities of students in the learning process.

Overall, Samantha displays shows a strong sense of democracy in her classroom that

is based on a learner-centred approach to teaching where students are regarded as capable of acquiring a body of knowledge that allows them to think independently in preparation for active citizenship.

### ***Samantha's constructs of social science teaching on realization of independent practice***

Samantha's concept map construction six months after independent teaching practice indicated a hierarchy of concepts beginning with 'being able to relate concepts to the real/outside world' (PCK) and 'trying to increase higher order thinking' (PCK), 'know what you're talking about' (CK), and 'behaviour management'(BM), all of which ultimately led to 'being more aware/involved citizens' (EEGPV), 'being critical thinkers' (EEGPV), and 'a classroom that is well managed and controlled'(EEGPV) (See Figure 34). The hierarchies continue to be in item stream mode, thereby indicating limited integration of knowledge bases across the hierarchies. Although Samantha's map shows greater development at the general concept level than her second construction, her third map was less complex at the subordinate concept level.

Unlike her previous maps, *behaviour management* played a greater role in Samantha's third concept map. Effective *behaviour management* is not simply an outcome as depicted in her second map (Figure 33), but the result of a combination of making learning interesting, having the appropriate resources, and 'knowing your students well" (KLL). The power of the linking words, 'requires strong' that linked 'behaviour management' (BM) with the key concept indicated the great importance of effective behaviour management in Samantha's teaching. Samantha also spoke of a class that is 'well managed and controlled' (BM) rather than using negotiation in behaviour management practices as she had indicated in her first map (Figure 32).

The linking words ‘requires you to’ that links ‘know what you are talking about’ (CK) to the key concept, indicated the importance of *content knowledge* in Samantha’s teaching, as depicted in her first concept map (Figure 32). The nomination of *educational ends, goals, purposes and values* across a broad range of cognitive and affective concepts indicated the continuing importance Samantha placed on outcomes based education. The identification of ‘update own knowledge and professional development’ (PL) indicated that Samantha regarded professional programs within and out of school as importance to her classroom (Figure 34). The identification of *professional learning* also a knowledge base that elaborates Shulman’s categories, and recognises the changing environment and expectations placed on schools and teachers.

The nomination of ‘know what you are talking about’ (CK), ‘need different/variety of teaching strategies’ (TS), and ‘behaviour management (BM), indicated Samantha’s understanding of *pedagogical content knowledge* at the macro level. The identification of ‘being able to relate concepts to the real/outside world’ (PCK) and ‘trying to increase higher order thinking’ (PCK) at the general concept level, indicated the increased importance of *pedagogical content knowledge* in her teaching. ‘Being able to relate topics to students interests and prior knowledge’ and ‘being able to relate topics to students and prior knowledge’ (PCK), showed Samantha’s understanding of *pedagogical content knowledge* at the micro level. This process is also a key component of inquiry-based approach to teaching in the social sciences.

The focus of Samantha’s Think Aloud Protocol (TAP) was on: *knowledge of learners and learning; behaviour management; curriculum knowledge; educational ends, goals, purposes and values; and, pedagogical content knowledge.*



Samantha's experiences as a first year teacher were summed up in the school's induction program for new teachers. So far she has had only

*...one meeting...a briefing...about being a first year...but that's it. I haven't had any other kind of support ...like as far as meetings go with administration...I have had a lot of support from a couple of teachers...And heads of departments...when I go asking them ...they'll support me ...but they're really busy...so really...its just get thrown in there ...and learn as you go...*

Her *knowledge of learners and learning* were reflected in her comments about the low motivation levels of students at school and how it had impacted on her teaching practices. She said

*...You know...I was really getting depressed...I had these really high expectations of what I wanted to do...and what the students could be achieving...and it just wasn't happening...And so ...you have to lower your expectations...and realise that...well...for one...they're not very academic here...and...yeah my expectations are probably too high anyway...*

Samantha spoke of students rejecting the Studies of Society and Environment (SOSE) subjects in terms of "...what's the point ...why are we doing this...?", and said that it was like "...hitting a brick wall every time you try and do something...". Most students, Samantha admitted, were "...better at more... hands-on sort of things...", a conclusion she had reached after observing the activities in manual arts and art. But in SOSE

*...it's really hard to do hands-on things...that's been pretty much impossible up till now...but just trying to make things interesting in a way...anyway...I suppose you do that through knowing your students as well as you can know them...the strengths of what their interests are...That's a big challenge because you've got so many students...*

*Behaviour management* has been another challenge for Samantha. She said that university had not prepared her to work with six classes of one hundred and eighty students, and "...all the things you talk about at uni just aren't physically possible...".

Samantha said that "...just disciplining the children...like being stern..." was not easy. She spoke of how reputations of schools can be misleading because

*...because you come into a school...thinking...that the behaviour is really good because its got a really good reputation ...but its pretty much the same as any other school that's got a really bad reputation...So there's really no difference except their uniforms looks a bit better...*

In terms of the *behaviour management* of her own students, Samantha acknowledged that they "...are nice and there's no real problem...they don't often sort of abuse...or haven't abused me anyway...". However, if she had to start with the same classes at the beginning of the year

*...I'd do things differently...yeah ...I would be stricter...I would have done things differently...like make them line up... little things like that ...just like they were still at junior school...I'd probably give them a list of rules ...and then I'd probably say to them... "Do you understand...do you agree?"*

She also wanted to improve students' *curriculum knowledge*, especially in the area of computer technology because there had been problems in the computer laboratories last term. She explained that

*...Its really hard because you go there and often ...you get a lot of computers...that aren't working and kids can't log in...so sometimes it does put you off going especially this last term... We had a whole new system going in...so hopefully ...this term ...it will be better...*

In terms of *pedagogical content knowledge*, Samantha said she wanted to relate topics to real world situations, and

*...part of that is being able to relate topics to students interests ... students' knowledge... This involves a variety of teaching strategies that allows students to construct their own knowledge...such as inquiry-based activities... to increase higher order thinking...*

Samantha's *educational ends, goals, purposes and values* knowledge base reflected her desire of having students to become critical thinkers and thereby, prepare students

for the real life issues in society. There were also her affective outcomes that included becoming more aware and involved citizens, and

*...having a classroom that is well managed ...and controlled...and then hopefully...it will lead to these things happening...critical thinking ...and being more aware and involved citizens...*

### ***Samantha's knowledge in action and reflection on realization of independent practice***

Samantha's video stimulated recall interview was based on a lesson about Mt Tamborine that she had taught to students of Year 10 Studies of Society and Environment (SOSE) earlier on in the day. This was a pre-excursion lesson in which students were required to answer background questions on Mt Tamborine, before going on excursion to Mt Tamborine at the end of the week to collect primary source data. Samantha's approach to teaching was primarily learner-centred, using such resources as the whiteboard, overhead projector (OHT), and excursion booklets.

Samantha stopped the videotape 22 times during the recall interview, and 37 categories of knowledge bases were nominated from her responses (See Table 18).

**Table 18: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	4
-Teaching strategies	3
-Class room communication	3
-Personal beliefs	-
Content knowledge	2
Curriculum knowledge	3
Knowledge of learners and learning	10
Educational ends, goals, purposes and values	8
Knowledge of educational contexts	2
Pedagogical content knowledge	2

Samantha's knowledge of *educational ends, goals, purposes and values* indicated a lack of flexibility towards lesson and unit planning in her Social Science Department.

She said that

*...it's very hard for me to change what we do in lessons because most of it is prescribed lesson by lesson...there's not much room for change...So...if you think something is not suited to a class...its very hard to change it...*

The excursion to Mt Tamborine, for example, along with a workbook was a regular feature on the yearly school calendar. She explained that

*...There is a pre field excursion workbook that they have to have several pages filled before they go on the excursion ...So ...at the start of the lesson...I was just outlining the two pages that had to be completed...*

Samantha said that "...This lesson wasn't all teacher standing up the front..."

because students had to fill out their booklets individually, and because it was the last two periods of the day "...They lose their focus... so there's only a little bit of teacher talk ...". She also distributed the booklets herself because

*...it means I can go through the rows ..check...you know...what students are doing...make sure that they get settled and answer any of their questions...individually...So ...rather than getting someone else to hand them out...that's sort of a way of talking individually to some of the kids...*

The purpose of filling out the booklet was to familiarise students with Mt Tamborine before they went there "...so the students don't go in their totally ignorant about the place ...". However, transmitting knowledge "...to thirty students who are all at different levels..." provided Samantha with one of the biggest challenges to her knowledge of *classroom communication* in her first year of teaching. She explained that

*...you've got heaps who won't listen to you...or don't understand what you are saying...because they are at such different levels...we've got kids who work really hard...and as I said...know that they are doing...and others who are way behind...*

Furthermore, her lack of *content knowledge* in statistics and a class of students who were also unfamiliar with statistics, meant that her *pedagogical content knowledge*

was ineffective because some students understood her explanation while "...others wanted me to just put the answer up on the board..." Samantha acknowledged that statistics "...can get a bit confusing ...with all the different figures...and so many lists in the tables ...", and suggested that next time she would use an overhead projector to highlight "...what I was talking about ...".

However, there was evidence of effective *pedagogical content knowledge* in her teaching during other phases of the lesson. Samantha said that she used explanation with the aid of an OHP to help students answer the questions in their booklets. She also spoke of how she tried to get students to think about the issues on the international front and how they impact on domestic tourism. She explained that Australia and indeed, Mt Tamborine were

*... becoming more popular destinations for people to go to...and I tried to link that...you know...not as many people going overseas...because of the SARS virus...and the war going on...and the terrorism...and so more people are opting to do the local things...*

In terms of her *knowledge of learners and learning*, Samantha said "...students here are not very academic..." and were inclined to respond much better to individual explanations because "...a lot of them find things hard to understand ...". She described their achievements in SOSE as "...generally ...fairly low ...", and pointed to their poor results in a recent examination

*...and I was surprised at how badly the kids did do...but then looking back at their Grade 8 and 9 results...because I have two Grade10 classes... they're marks are also fairly bad for Grade8 and 9 as well as well...*

Samantha also said that her students were characteristically "...unmotivated and uninterested..." in SOSE. She said that those students who were interested in the social sciences usually did either history or geography

*...and then those kids who do Soc ...which is about four classes ...I think...are those kids who aren't interested in Soc...at all and they have to do it...They don't chose history...they don't choose geography because they don't like it...So they get thrown into the Soc classes...because they will have to do Soc up to Grade 10...*

Another factor in their low motivation was the paucity of technological resources, which Samantha regarded as one of her biggest challenges, because when students

*...go home...they are on their Sony Play Stations...or their Nintendos ...or they are using... their mobile phones...or they are on the computer...They are watching ...you know...DVDs ... downloading music from the internet...then you go into the classroom...and the best thing you've got is an overhead...*

She cited the last twenty minutes of the day as a period when students "...struggled to stay focused...". She used the carrot of returning their exam papers as a means of encouraging them to "Keep going...keep going...just finish this page and then...you get your marks back...".

Despite Samantha's concern about their work ethic, she said the students were not a *behaviour management* problem. Apart from one student who was

*...sorted out through the deputies.....and talking with parents and that sort of thing...but mainly in this class...the kids are not too bad...there's probably two or three, however, who will just be happy to sit there and do nothing...*

Nevertheless, she had instituted a seating plan at the beginning of the term as part of a new *behaviour management* strategy because she wanted to separate those who were "...really chatty ...", especially for periods seven and eight "...even though that takes a long time...its worth it in the end ...". However

*...four of the kids in the front row got up and shuffled...well...two swapped...and then another two swapped...I tried to make them move back ...but they wouldn't...and rather than make an issue out of this...I just let it go...because otherwise...it would have drawn the whole class into that problem...*

### **Summary: Samantha's realization as a social science teacher**

The two data sets elicited from Samantha in May 2003 indicated that the focus of her teaching was on four of Shulman's categories: *pedagogical content knowledge*; *educational ends, goals, purposes and values*; *knowledge of learners and learning* and, *general pedagogical knowledge* focusing on *behaviour management*. Her concept map diagram showed that *pedagogical content knowledge* was nominated to those concepts that related knowledge to students' interests and prior knowledge and to the real/outside, and to 'trying to increase higher order thinking'. The identification of concepts for *content knowledge*, *teaching strategies*, and *behaviour management*, showed Samantha's understanding of *pedagogical content knowledge* at the macro level. She stated in her Think Aloud Protocol (TAP) that *pedagogical content knowledge* "... involves a variety of teaching strategies that allows students to construct their own knowledge..." Samantha commented in her video stimulated recall (VSR) about her efforts to link different knowledge sources so students could make connections and draw conclusions.

*Educational ends, goals, purposes and values* featured in the two data types. Her concept map showed that 'being critical thinkers' was most significant in her *educational ends, goals, purposes and values* knowledge base because it was the result of three of the four hierarchies of knowledge bases, and because the logical, cognitive concept of 'trying to increase higher order thinking' was nominated at the beginning of a hierarchy. Other nominated *educational ends, goals, purposes and values* reflected the affective domain of citizenship awareness, preparing students about real life issues, and a well managed classroom. Comments from her TAP echoed both the cognitive and affective concepts on her map. She said in her VSR that it was difficult to inculcate her own *educational ends, goals, purposes and values* on

lesson planning and units of work because they had been prescribed by the Social Science Department.

*Knowledge of learners and learning* emerged in the two data types. Her concept map showed that *knowledge of learners and learning* was nominated to those concepts that explicitly stated a knowledge base of students, that is, 'knowing your students well' and 'making learning as interesting as possible'. She said in her TAP that to know her individual students strengths and weaknesses was a big challenge because of the large number of students in her classes. Her observations of students to date indicated a group of students who were not highly motivated, and who were inclined to work best with hands-on activities, but unfortunately there were few opportunities to do this. She commented in her VSR that her students were not academically inclined and many of did SOSE because they had to.

*Behaviour management* featured in the two data sets. Her concept map indicated that an effective *behaviour management* program depended on having interesting learning experiences, *knowledge of learners and learning*, and having the appropriate resources such as computer technology. She commented in her TAP that students in her class were not a *behaviour management* problem, but if given the opportunity to start with her classes again, she would implement different strategies. Commentaries from her VSR showed that students were generally well behaved, but she had instituted a seating plan as a way of trying to separate the talkative students.

Samantha's conceptions of effective social science teaching after six months at her newly appointed school indicated a desire to implement a variety of teaching strategies that encouraged students to become critical thinkers. She spoke of teaching students real life issues, and of knowing your students well in order to relate topics to their interests and prior knowledge. She said that establishing a knowledge base of her

learners was one of her biggest challenges in teaching, and to motivate students who were not academically inclined. She concluded that effective behaviour management is dependent on not only establishing sets of rules, but also in knowing her students, providing interesting learning experiences and appropriate resources. Overall, Samantha's philosophy of teaching is based on developing an open and supportive learning environment where students are encouraged to become critical thinkers.

### ***Discussion: charting Samantha's development***

Samantha's conceptions of effective social science teaching upon her realization of independent teaching practice reveal consistency as well as change. Samantha's initial experience as a social science teacher indicated a focus on three of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; and, *general pedagogical knowledge* focusing on *behaviour management*. Samantha's developing thoughts on social science teaching showed increased focus to four of Shulman's categories: *pedagogical content knowledge*; *content knowledge*; *knowledge of learners and learning*; and, *general pedagogical knowledge* focusing on *teaching strategies* and *classroom communication*. Samantha's teaching on realization of independent practice indicated a focus on four of Shulman's categories: *pedagogical content knowledge*; *knowledge of learners and learning*; *educational ends, goals, purposes and values*; and *behaviour management*.

*Educational ends, goals, purposes and values* represented a change in Samantha's conceptions of effective social science teaching. Her concept map (Figure 34) showed Samantha was keen to promote both cognitive ('being critical thinkers') and affective ('being more aware/involved citizens') outcomes in 'a classroom that is well managed and controlled'. Commentaries from Samantha's TAP expressed a desire for students to become critical thinkers and active citizens, as well as prepare students for real life

issues, and have an effective behaviour management policy. However, Samantha stated in her VSR that the prescriptive nature of the units of work in her social science department had made it difficult to realize these goals.

*Behaviour management* was a component of Samantha's conceptual structure at the initial stages of her experience as a social science teacher and on realization of her independent teaching practice. Her concept map (Figure 32) showed that *behaviour management* was directly linked to teaching strategies, in which 'effective behaviour management' was based on 'mutual respect and fairness' and 'negotiation of class rules'. Commentaries from her TAP indicated a combination of both democratic and interventionist approaches. Statements from her VSR indicated mixed results of the democratic and interventionist strategies. Samantha's concept map (Figure 34) at the realization of her independent teaching practice showed that *behaviour management* was identified at both the general concept and subordinate concept levels. The linking words 'requires strong' that links 'behaviour management' with the key concept indicated a more important role in her conceptual structure of social science teaching than previously. Although, Samantha expressed a need for strong *behaviour management*, she also acknowledged that the success of a program would be based effective *curriculum knowledge* and *knowledge of learners and learning*. Samantha stated in both her TAP and VSR that students in her class were not a behavioural problem, but if given the opportunity to start with the same classes again, she would have used different strategies.

*Knowledge of learners and learning* was a focus of Samantha's conceptions in the final two data collections. Samantha's developing thoughts on social science teaching indicated that planning and preparation should take into account students' cognitive abilities and relevance in their lives (Figure 33). Samantha stated in her TAP that it is

important to link topics to students' lives. Her conceptions of *knowledge of learners and learning* on realization of independent practice indicated the importance of knowing the student and providing interesting learning experiences (Figure 34). However, she pointed out in her TAP that knowing the individual strengths and weaknesses of students was not easy, although she felt that most students in her class were more suited to hands-on activities, but unfortunately there were few resources to accommodate these learning styles. Samantha commented in her VSR about students' lack of motivation in SOSE, and that many were doing the subject because they had to.

*Pedagogical content knowledge* was consistently identified at the macro levels of Samantha's three concept maps. Her initial experience of social science also showed that *pedagogical content knowledge* was identified at both the general concept and subordinate concept levels of the concept map (Figure 32) where it was part of *teaching strategies, curriculum knowledge, content knowledge, and educational ends, goals, purposes and values*. Commentaries from Samantha's TAP indicated her desire to have students learn in a self regulated environment, while she spoke of the importance in her VSR of having a *knowledge of learners and learning*. *Pedagogical content knowledge* continued to be identified at the general and subordinate levels of concept map (Figure 33) at the stage of her developing thoughts on social science teaching, where it was part of *teaching strategies, content knowledge, and curriculum knowledge*. Samantha spoke of the importance in her TAP of students constructing knowledge. Samantha's *pedagogical content knowledge* on realization of independent practice continued to show that it was identified at both the general and subordinate levels of her concept map (Figure 34). Her concept map showed that was integrated to *educational ends, goals, purposes and values, and teaching strategies*. Commentaries

from both Samantha's TAP and VSR indicated the continuing theme of a constructivist teaching approach.

Samantha's *pedagogical content knowledge* at the initial stages of her experience as a social science teacher showed that she identified 'critical thinkers', 'transfer this knowledge effectively', 'making social science relevant to the present and therefore, interesting', and 'facilitate student-centred, inquiry based learning' (Figure 32) as process links to other aspects of social science teaching. Samantha stated in her TAP about having students construct knowledge in a self-regulated environment, and teaching students to think at different levels. Her VSR referred to the process of transforming knowledge for student understanding, but this cannot be done until the teacher has a knowledge base of students' cognitive abilities.

Samantha's developing thoughts on social science teaching showed that she considered 'constructivist teaching', 'teacher as facilitator', 'thinking strategies for student', and 'group work' (Figure 33), as *pedagogical content knowledge* links to other aspects of social science teaching. The power of the linking words, 'must have' that links 'constructivist teaching' with the key concept indicated the importance of constructivist approaches to Samantha's teaching. Samantha said in her TAP that studying social science was more than just acquiring a body of knowledge but also about learners constructing knowledge - and enjoying the process.

Samantha's *pedagogical content knowledge* on realization of independent teaching practice indicated a continued link to other aspects to social science teaching.

Samantha's identification of 'being able to relate concepts to the real world' and 'being able to relate topics to students' interests and prior knowledge' (Figure 34) showed that she continued regarded the transformative process as key to her teaching. Samantha also identified 'trying to increase higher order thinking' as another

important factor in social science teaching. Commentaries from her TAP and VSR indicated the continued importance of having student construct their own knowledge by using a variety of sources to make connections and draw conclusions. Overall, Samantha's knowledge base of teaching shows greater understanding of the dynamics of classroom behaviour in the learning process, and a willingness to extend and challenge students' capacity to think critically.

## WINONA

Winona attended a Queensland state high school where she studied History in Year 8–9, and Geography from Years 8–12. Her experiences with her social science teachers were mixed: “...My teacher could not stand me and he would never give me good grades for my assignments and exams ...”, but she remembers “...the good ones ...”. In fact, they were so inspirational that she wanted to be like them, “...and make a difference in the lives of kids”.

### ***Winona’s initial thoughts on social science teaching***

Winona’s response to the initial focus questions showed that she believed that teaching is more than a career – “...it’s a lifestyle”. She also stated that teaching involved relationships as well as content, and that the school years were a “...time of social and personal growth. Teachers can play a huge role in this growth”. She wanted to be a living example and a good role model for her students, and her desire to be a teacher was based on her belief that she could make a difference “...to the lives of young people and have a satisfying career”. Winona also believed that students would embrace the social sciences if she showed commitment to the subject, and

*By involving them in classroom decisions about what we will learn and how we learn it (curriculum negotiation). By establishing a friendly classroom environment where students feel that they can be themselves in my class and be loved and respected for who they are.*

Winona enrolled in the Bachelor of Education (secondary) program majoring in Studies of Society and Environment (SOSE) and English. She spent her final professional practice teaching at a coeducational, suburban state high school where she taught SOSE and English. A lesson to students of a Year 8 SOSE class was videotaped for a stimulated recall interview.

Winona completed her preservice education at the end of the *first semester*, 2003. She received a Suitability Rating of ‘1’, the highest, from Education Queensland. She was appointed to large, regional, coeducational state high school where she taught Year 8 SOSE, Years 9, 10, and 11 Geography, and Years 8 and 9 English. A Year 11 Geography class was videotaped for a stimulated recall interview.

### ***Winona’s initial constructs of social science teaching***

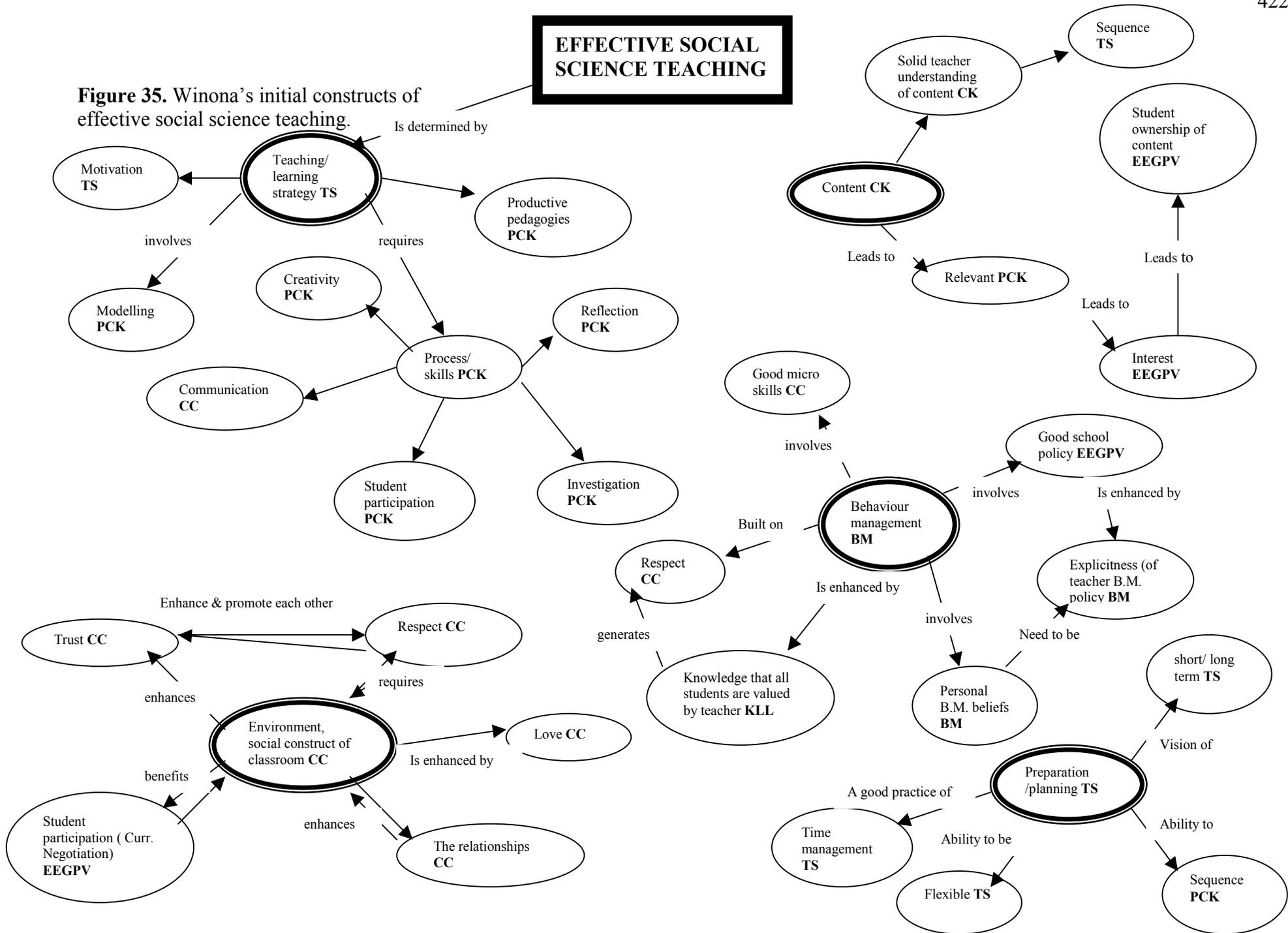
Winona’s map was structurally not fully integrated. It showed multiple branches from the individual general concepts, but few relationships between subordinate concepts or between the key concept and general concepts. In fact, general concepts and their related subordinate concepts on her map appear as knowledge domains that operate independently of each other (see Figure 35).

Knowledge bases have been noted for most of Shulman’s categories. The identification of ‘teaching/learning strategy (TS) and ‘preparation/planning’ (TS) at the general concept level; and the concepts that form the propositional relationships, indicated the importance of *teaching strategies* in Winona’ concept map. Classroom communication was a strong focus of her map. The identification of ‘environment, social construct of classroom’ (CC), trust (CC), ‘the relationships’ (CC), ‘respect’ (CC), ‘love’ (CC), ‘good micro skills’ (CC) indicated the importance of the affective side of *classroom communication* in Winona’ teaching, while the nomination of ‘communication’ (CC), showed its importance in the cognitive aspect of her teaching. Winona’s concept map also indicated the importance *content knowledge* because to here it meant knowing relevant knowledge to generate student interest, thereby giving ‘student ownership of content’ (EEGPV).

*Pedagogical content knowledge* was a strong focus of Winona’s concept map diagram. The nomination of ‘teaching/learning strategies’ (TS), ‘behaviour

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**Figure 35.** Winona's initial constructs of effective social science teaching.



management' (BM), 'environment, social construct of classroom' (CC) content' (CK), indicated an understanding of *pedagogical content knowledge* at the macro level of her map. The nomination of 'creativity (PCK), 'modelling' (PCK), 'productive pedagogies' (PCK), 'reflection' (PCK), 'investigation' (PCK), 'process/skills' (PCK), 'student participation' (PCK), 'relevant' (PCK), and 'flexible' (PCK), indicated Winona's understanding of *pedagogical content knowledge* at the micro level.

The focus of Winona's Think Aloud Protocol was on a *classroom communication, behaviour management, pedagogical content knowledge, and teaching strategies*. In terms of which major category is most important, Winona comments, "...It's hard to ...say what's more important because...all of them come together ...and one can't really exist without the other ...".

However, she conceded that 'Environment, social construct of classroom' may have the edge on the others because

*...personally ...I think the environment of a classroom...is pretty pivotal...that the kids know they can trust...me...that they can respect me...and have reasons to respect me...because the way they see me act ...and because they want to...and that that they can have positive relationships with each other...and that they are actually loved in my classroom...Umm...and for that...without that...I wouldn't enjoy my job...So...that's why I think its important...but then I know that other classrooms function...with a very negative classroom environment...and learning still happens...but I wouldn't like to be a part of that...So ...to me it's important...*

Winona considered the specific concepts surrounding the social construct of classroom as the values that contribute to effective *classroom communication* between the students and the teacher . That is to say, "...everybody feels that they are part of the learning process...like ...no kid...their opinion isn't valued...by everybody". She also placed importance on the linking words as a way of emphasising the connection between environment and related specific concepts. For example,

*...'requires' ...sort of implies that kids will know...already know how*

*to do that thing...whereas ...love is a big one...love in the classroom ...isn't one that...a lot of teachers would think is important...I do... but some kids don't how to love...their teacher... Well...I think they should ...but a lot don't...because they've never been taught that that is important ...So...I wont put 'requires' on all of them because...it just...is enhanced by...love...Umm...environment ...is enhanced...again...by positive relationships...not all classrooms have positive relationships between teachers and students...Umm...positive classroom environment ...umm ...enhanced again...Student participation...don't know what word to link with that...I don't think all students will necessarily participate...but I think it's beneficial...if they do...maybe the environment...benefits...if all students participate...*

The kind of atmosphere Winona sought to engender in her classroom, that is, the importance of love (Edwards, 2000) based on positive relationships through teacher-student, teacher-class, student-class, and student-student interactions (Groundwater-Smith, et al., 2001), should ensure minimal *behaviour management* problems.

Effective behaviour management, according to Winona is further determined by a

*...good school policy...the whole school...and all the students understand this...Umm...explicitness...for teachers and students understanding...what] the policy is...and what processes that policy follows...that is...an overarching knowledge of...the policy...and then there's consequences...for not following the policy...a good policy...is a forward...responsible... thinking program...and that's great...kids know it works...*

She also defined explicitness of the school policy as one that is a living document, “...not just a document...that lies in the headmaster's...filing cabinet...”. Other importance features of Winona's *behaviour management* policy are,

*...good micro skills...they are the kinds of things you work on...you draw on...when...the policy...umm...beliefs...don't seem to be having an effect on students... You just draw on your micro skills...the way you relate to students...its not...as if you get up in class on the first day ...”Well...I do ...this ...and this...and if you don't do this...this is what I do” ...Like...you don't say, “...I really understand where you guys come from...because I'm only a few years older than you...” You know...its unnecessary ...until its called on...and you need to act ...in that way...*

Another vital component of Winona's *behaviour management* policy, and this is related to Edwards's (2000) 'love deprivation', is the knowledge that all students are valued by their teacher, “...like I'd like to think...I love everybody...and even the

rattiest kid in my class...I'd like him to know...that despite the way he acts...I still care for him..." Effective behaviour management, according to Winona, is critical in the classroom if teaching and learning is to occur.

Winona stated that *teaching strategies* "...is what makes it enjoyable for the kids...and me ...". She explained this in terms of relevance of *content knowledge* and the teacher's *pedagogical content knowledge*, "...which causes students to take ownership...that they can learn something from the teacher...because they know a lot about it ...". Winona said that

*...solid teacher understanding...of content... is pretty pivotal  
...having full understanding ... means you are going to know the  
sequence ...from which they will learn about things...*

She gave the following example of *pedagogical content knowledge* in her teaching practices. For example,

*...you could look at child labour...in medieval times...and ...  
talk about whether we think that that is... the right thing to do...and why  
isn't child labour practised today...in Australia...or why is it still  
practised in Taiwan...umm...so its drawing something out of history  
that happened...and looking at the question...does it happen today...  
Now every Aussie kid would say, "...No...of course...it doesn't...or my Mum  
makes me wash up...but I wouldn't call it child labour...and it brings the  
Two times together...and makes it relevant*

She also identified negotiation of the curriculum as another contributing factor to enjoyment of learning,

*...you explain to students ...you give them a background...Say a... a  
possibility for one of our learning areas was ...medieval history...I  
would propose that we learn about medieval history to students and say  
..."Are you interested in this? ...What do you already know about it? ...  
And that helps in the ownership process...*

Winona considered her planning and preparation as the determining factor in her *teaching strategies* because

*Preparation and planning ...involves short and long term planning...  
being able to see short and long term goals...of learning...umm...goals  
of sequencing...of learning experiences...and flexibility to change the*

*direction...if it needs to...like things might crop up...that you didn't expect ...For example...if you assume students would understand one concept...And as you go along teaching...you realize they don't have a clue what it is ...and you need to get off that little program...you've planned...and go back and cover that thing they don't understand... time management...making sure you don't spend too much time... doing these things...because you can prepare and plan forever...but you will kill yourself...*

### **Winona's initial knowledge in action and reflection**

Winona's video stimulated recall was based on a review of a lesson she had taught to her Year 8 Studies of Society and Environment about the life and character of Ramses II in Ancient Egypt. She used the *pedagogical content knowledge* base of constructivism in which students took on the roles of curators and Egyptologists during their group investigation of historical records of Ramses II. The core learning outcomes came from *Time, Continuity and Change* (Studies of Society and Environment Syllabus, QCA/QCSS, 2000), which involved students: collaborating to locate information about the contribution of people from diverse settings; explaining how governments have brought about change in particular groups of people; and, identifying values inherent in historical sources and how they impact on various groups. Winona used a variety of resources, ranging from worksheet, a National Geographic magazine, and the whiteboard.

Winona stopped the videotape 23 times during the recall interview, and a total of 27 categories of knowledge bases were identified from her responses (See Table 19).

**Table 19: Breakdown of Knowledge bases**

Knowledge base	No
General pedagogical knowledge	
-Behaviour management	3
-Teaching strategies	3
-Classroom communication	3
-Personal beliefs	-
Content knowledge	1
Curriculum knowledge	-
Knowledge of learners and learning	10
Educational ends, goals, purposes and values	2
Knowledge of educational contexts	-
Pedagogical content knowledge	5

The importance of *educational ends, purposes and goals and values* to Winona's lesson when she spoke of working

*... through the questions ...and to...umm...and I sort of gave an idea of what we might be able to do...if we have more time in the future. Umm...I'm really into goal setting ...umm...done a little bit of research into it ...and I, if students have a specific goal to work towards...they are more likely to achieve it.*

However, as she pointed out, setting goals by using the word “outcomes” at the conclusion of activities has not been entirely accepted by learners in this class because

*...they had a bad experience last time I did an outcome. Umm... they didn't get it done in time...and they started to fear getting these learning outcomes sheets...because they thought they were like an exam. And they are not. They are nothing to be feared. They are just a class activity. So, for those who perchance turned it around and saw it on the other side...umm...that's okay, but I didn't see them all looking at it...because they would all be cringing...and thinking they couldn't do it. Umm ...some kids turned around and said, “Oh ...Ms ...are we being assessed on an outcome here?” ...and I said, “Yes”. And discussed...how, and told them not to worry...because I did start to get worried...and I said, “Don't worry about it...its just an activity...just do the best you can”. And that...sort of calmed them down a bit.*

Establishing effective *classroom communication* with her learners where “...the atmosphere of the classroom...of love and of good...you know...respect and things like that ...”, is vital. Winona did this through her “body language and facial

expression ...”, which demonstrated to “...the kids that I’m excited about learning about Ramses...” and perhaps, “...they’ll feed off my enthusiasm”, and second, by

*...walking around with the 3D thing. Umm...here I’m making good use of one-to-one time...and I’m trying to connect with students...as they got the glasses on...I’m holding the book, so you’ll see with basically every student...I moved the picture around and held it up to their noses...and just smiled at the kids...I’m setting up good relationships ...*

An example of her *pedagogical content knowledge* was the use of the 3D picture of the ‘mummy’ as a motivational tool, “...just another visual for the visual kids and something that makes it fun...because Egypt’s fun...and so, I was using that ...to stir them on ...”. Their roles as “curators” and “Egyptologists”, however, required more explanation, “Because, especially with Grade 8s ...you tell them what to do...and two minutes later...they are putting their hands up... So, I’m kind of ...breaking it into bits for them”.

Winona’s *knowledge of learners and learning* was expressed in the following way.

*They are a very good class...umm...( ) stream their classes... and this is one of the better Year 8 groups. Umm...I find there aren’t ...any behavioural problems in this class...really. I got...basically... only, only one boy who just likes to talk a lot...The class takes a lot of pride in their work. Umm...they get frustrated when they don’t feel I’ve given them enough time, because they want to do the best quality work they can...So...yeah they are a lovely group...and this sort of activity is a dream to do with them, because you basically know they are going to respond well.*

Even when she had difficulties responding to a question, “...because my knowledge was a little lacking ...”, the students “...stayed quiet while I stumbled through an explanation...”.

Winona also demonstrated her *knowledge of learners and learning* on an individual basis. She said that

*The girls I’m talking to over there...are great workers...and they take a lot of pride in their work, but management is a problem. So...at that point in time I was really...umm...encouraging them in their work*

*progress ...because they actually got a lot of work done in a short amount of time, which is not characteristic of them.*

She described a different situation confronting two other learners

*...who are basically the ones left with no partners...and there's a boy and a girl...and the girl in particular is not happy ...about being left to work with this boy. And its sad...because they are both nice students ...I was a bit worried...And they ended up having a good strategy that meant they didn't have to talk much...umm...as they found an answer, they were both the scribe, and as they found an answer, they both took a piece of paper and wrote...the answer down...which means no team work basically...I think they coped with it well...*

It was within this context of teamwork (Brooks & Brooks, 1998) and Winona's *pedagogical content knowledge* approach to teaching that students investigated the life and times of Ramses II. Winona explained that

*...students are given the information...and construct their own meaning...umm...from that. Now...as a teacher, I've provided a lot of scaffolding ...for them...I don't stand at the front and tell them very much at all...about what Ramses did. It's in their information and their partner in collaborative work...umm... allows them to feed off each other's knowledge. One person might see something that another person doesn't...And so the collaborative aspects...creates the students thinking...gives it a very much student directed learning experience.*

Winona's use of *pedagogical content knowledge* was also apparent in a concept mapping exercise she used to explain to students the justification for investigating Ramses and not Tutankhamen. She compared the representative government in Australia with the types of government under the pharaohs, "... so they can see ...the difference ...umm...how abstract the way Egypt operated..." Finally, Winona used the National Geographic as not only a motivational tool, but as a way of using the multiple intelligences,

*...and responding to kids who...umm...learn virtually and ... those who learn in the written form. So...umm...a lot of pictures in their envelopes that they had...and they could interpret them however they wanted...and some of the more artistic kids did that very well...and benefited from that.*

### **Summary: Winona's initial experience as a social science teacher**

The two data types elicited from Winona in May 2002 indicated a focus on three of Shulman's categories: *general pedagogical knowledge* focusing on *classroom communication* and *behaviour management*, *content knowledge*, and *pedagogical content knowledge*. Her concept map nominated 'The relationships' as one of a number of concepts within the knowledge base of *classroom communication* that leads to effective social science teaching. Commentaries from her TAP state the importance of love as a key to establishing a positive learning environment. She stated in her VSR that the teacher's general enthusiasm in class is a significant factor in motivating students to learn.

*Classroom communication* featured strongly in the two data sets. Her concept map nominated the general concept of 'environment, social construct of the classroom', as classroom communication base that engages in a two way process with the branches of the general concept. 'Respect', according to Winona, is both a product and contributor of the social construct of the classroom. Linking words, such as 'requires' and 'enhance & promote each other' indicate the degrees of dependency propositional concepts have on each other. She stated in her TAP that these surrounding concepts are the values that contribute to stable relationships between the teacher and students. She reiterated these kinds of values in her VSR when she stressed the importance the importance of establishing and maintaining a caring environment with her learners.

Her two data types stated the importance of effective *behaviour management* as a conduit of *classroom communication*. Her concept map identified *behaviour management* as a general concept that related to respect, good micro skills, and a policy that reflects the school-based policy. She defined the explicit nature of *behaviour management* in her TAP as one that is functional or a "living" document in

the school. She further stated in her TAP that every student should be valued by the teacher "... even the rattiest kid in my class ...". Commentaries from her initial VSR showed that she pursued a social constructivist approach when helping students overcome disputations in activities involving group work, otherwise there were few *behaviour management* problems in her class.

Her two data sets also indicated the consistent theme of *content knowledge*. Her concept map indicated that whilst the teacher must have a 'solid understanding of content', it is equally important for students to have ownership of content. As she stated in her TAP, solid teacher understanding of content "...is pretty pivotal...", so that the teacher can, for example, sequence her understanding of subject matter for student understanding. However, her VSR commentaries identified the challenges of imparting knowledge in the entangled environment of teaching, primarily "...because my knowledge was a littler lacking".

*Pedagogical content knowledge* emerged in the two data sets. Her concept map showed that Winona had an understanding of it at the macro level, as a result of the nomination of *teaching strategies*, *behaviour management*, *classroom communication*, and *content knowledge*. *Pedagogical content knowledge* at the micro level had been nominated to those concepts that indicated a constructivist approach to teaching, such as, 'investigation', 'student participation', and 'reflection'. This was emphasised in her TAP when she stated that all students are part of the learning process, and that negotiation of the curriculum is a major contributing factor. Her VSR commentaries identified the use of concept maps as a way of linking knowledge. She discussed the group work activity in terms of students constructing their own meaning through peer collaboration that "...allows them to feed off each other's knowledge ...".

Winona's initial conceptions of social science teaching indicated a strong focus on classroom communication and behaviour management. The key to establishing a caring environment is the value inherent in love, trust and respect. She believed that classroom management would only be effective if the school policy is viable and if there are consistent behaviour management practices throughout the school. Teacher knowledge of content, Winona contends, serves little purpose if students cannot have ownership, and this is most effectively done through a constructivist and collaborative approach to teaching. Overall, Winona displays a strong sense of social justice, peace, and democracy in her classroom teaching, based on a desire to produce learners who have the ability to actively investigate phenomena and develop an awareness of their own thinking and learning style.

### ***Winona's constructs of social science teaching on realization of independent practice***

A six-month time lapse indicated that individual aspects of Winona's map structure had changed towards greater conceptual integration, with a refinement of concepts and relationships identified in her map construction. This particularly occurred in her discussion on relationships, where there are now linking arrows and their respective linking words between the key concept and all other general concepts (Figure 36). A cross-link that links 'preparation and planning' with 'pedagogy/teaching skills' indicates some consideration has been put into integrating knowledge bases across the hierarchies

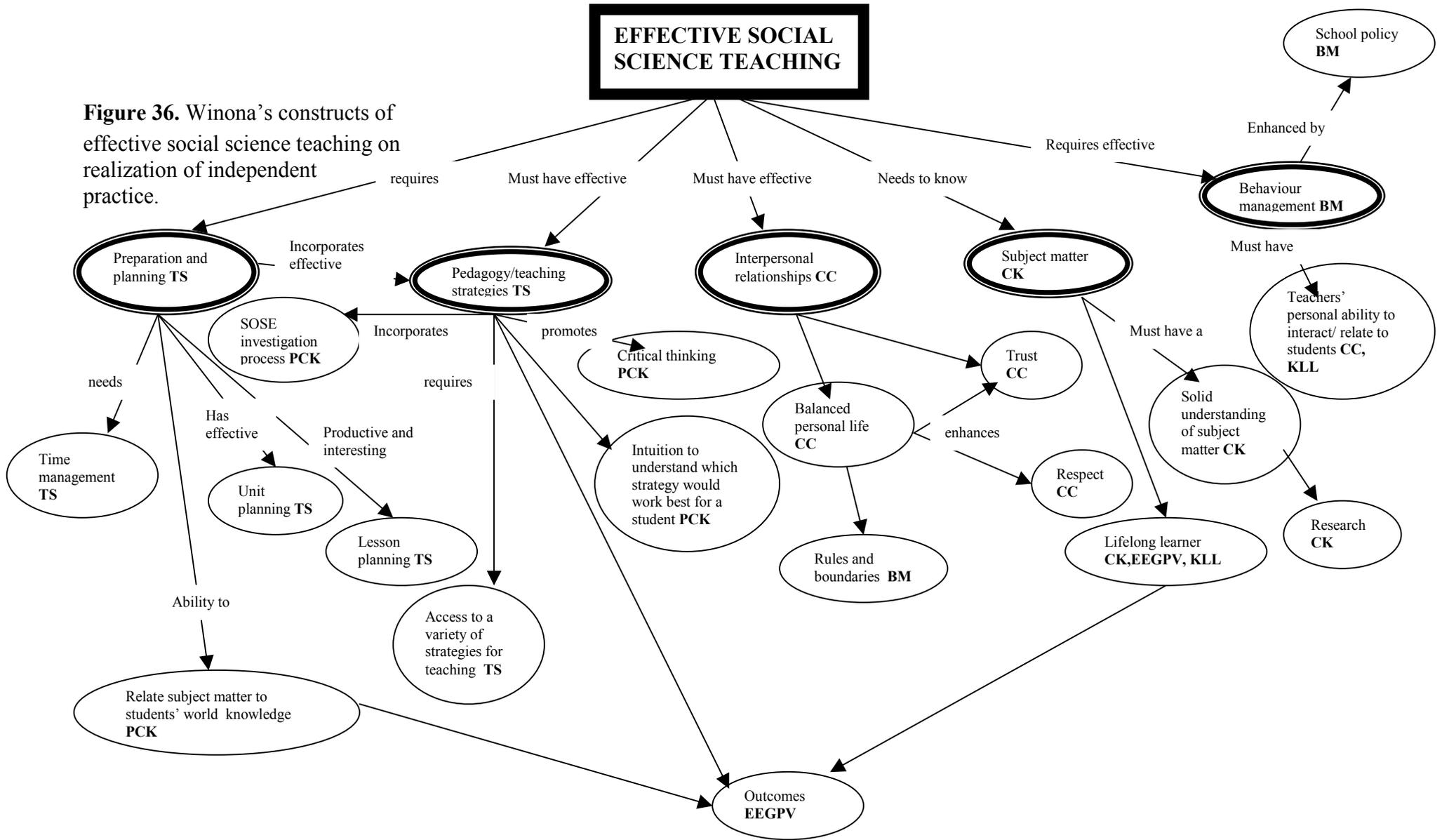
Knowledge bases had been identified for the same categories as her first map, and *teaching strategies, classroom communication, content knowledge, and behaviour management* continue to be the focus of her concept map. The identification of 'preparation and planning' (TS) and 'pedagogy/teaching strategies' (TS) at the

general concept level is an indication of Winona's continued focus on these aspects of her *teaching strategies*. The linking words, 'requires' and 'must have effective' further reinforces the importance of these two general concepts in her concept map. 'Unit planning' (TS), 'time management' (TS), and 'lesson planning also continue to be focus areas within 'planning and preparation' (TS). The nomination of 'interpersonal relationships' (CC), 'trust' (CC), 'respect' (CC), and 'balanced personal life' (CC) indicated Winona's continuing focus on *classroom communication*, but with an emphasis on the affective of teaching. The power of linking words, 'must have effective' that links 'interpersonal relationships' with the key concept, is an indication of the vital role of *classroom communication* in Winona's teaching. The nomination of 'subject matter' (CK) and its direct link to 'lifelong learner' (EEGPV), along with 'research' (CK), indicate both continuity and change in her conceptions of *content knowledge* in teaching. The identification of *behaviour management* at both the general and subordinate levels of her map also indicated Winona's continuing focus on this aspect her teaching.

*Pedagogical content knowledge* continued to be a focus of her map. The knowledge bases of 'preparation and planning' (TS), 'trust' (CC), 'behaviour management' (BM), and, 'subject matter' (CK), indicated Winona's understanding of *pedagogical content knowledge* at the macro level. The identification of 'relate subject matter to students' world knowledge' (PCK), 'intuition to understand which strategy would work best for a student' (PCK), 'critical thinking' (PCK), and 'SOSE investigation process' (PCK) are key factors in constructivism, and an indication of Winona's thinking about making subject matter understandable for students.

# EFFECTIVE SOCIAL SCIENCE TEACHING

**Figure 36.** Winona's constructs of effective social science teaching on realization of independent practice.



*Behaviour management, classroom communication, teaching strategies, and pedagogical content knowledge* were the focus of Winona's Think Aloud Protocol (TAP). Winona regarded effective *classroom communication* as essential because

*...I always said to myself that teaching is about relationships and if you have good relationships with the students ...the you can do so much...and that was called into question a lot of times ...but ...if you are a well balanced person...and have the ability to be good with others...then I think this is the most important area...for me...as a social science teacher...Part of what makes good relationships is...respect...respect for the teacher...and the respect the teacher has for the students...Trust...umm...the students need to trust the teacher...then that makes for a very positive classroom environment...*

But,

*...obviously ...if you are no good at pedagogy...or subject matter...well then ...it negates the goodness...*

Winona highlighted the importance of a stable, balanced personal life because

*...I found that when I started teaching...that's all I did...all I did was school...I started...I got to school at 7am...sometimes I left at 11pm...and I had no other life...I found that I was very... very... umm...incapacitated ...in my beginning...umm... month of teaching ...because I was stressed out...I was burnt out ...and I lost all my creativity ...I lost my ability to be reasonable in the classroom...because I didn't have a balanced personal life...and I think teachers need to have time to ...umm ... grow other areas of their life...to be happy people...because that's what students need to see...happy...happy teachers...*

Part of the solution lies in having what Winona regarded as having "...an ability to cultivate yourself outside the realm of teaching..." that is, "... to go roller-blading ... along the Strand...and to have dinner with friends ...". However, such was Winona's personal life that "...I couldn't even relate to my friends very well...I would go to their house...and I would just not say anything ...". In terms of support from the school staff during this period of personal crisis, Winona was circumspect and asked, "...what could they do ...really?"

She expressed the same sentiments for *behaviour management* because

*“...at the end of the day ...umm...you still have to be yourself...and what another does...wont necessarily work for you...”*

While Winona acknowledged support from individual staff members, *behaviour management*,

*...at the macro level is...umm...is enhanced...by good school policy ...umm...K\_\_\_\_\_ doesn't have it...that's for sure...there is basically ...a non-existent school policy...like at M\_\_\_\_\_ ...excellent school policy...and the kids knew the processes was if...they did the wrong thing ...at K\_\_\_\_\_...the school is way too big... umm...its certainly not impossible to set up procedures like that... but you don't have the deputy support...you don't have the HOD support...or the principal support...that you get in the smaller schools ...umm ... because if you started sending kids out of the classroom...there would be just way too many...up at the office...but I think its essential no matter how big the school is...*

She acknowledged, however, that her school has a procedure where

*they say... "You manage it yourself..." ...and then you contact parents ...and then send them to the HOD...and then the HOD can send them to the 'support room' ...which is like ...sort of solitary confinement...at K\_\_\_\_\_ ...and the principal ...deputies ... etcetera ...but it is so time consuming...*

Winona's doubts about what constitutes effective *behaviour management* was reflected in her philosophical stance about group dynamics in class (Porter, 2000), but she also conceded (implicitly) that her assumptions were naïve. Winona explained that

*...effective behaviour management...umm...is influenced by the teacher's personal ability to interact with and relate to students ...so ...umm...that's your ability to handle difficult situations in the classroom ...because they crop up all the time... like in my mind I had a concept of how students should act in my classroom...I just thought that this would come in naturally ...that I would walk in ...and people would do what I wanted them to do...and in my mind I had a concept appropriate behaviour and inappropriate behaviour ...and I believed that ...if you are in my classroom...your behaviour should be appropriate...*

The reality of the classroom, however, was different. Her statements indicated a teacher in crisis, one who is angry and hostile but at the same time, realizes that her

ideas about what is appropriate and inappropriate do not necessarily equate with the entangled environment of the classroom, and admitted that

*...I found that I...umm...made a lot of mistakes...in the classroom in that area...and I'm slowly learning...what to do...and what you don't do...I used to be really reactive...I would get angry...I was furious that people thought that they could do that in my classroom ...and I realized that was a very unrealistic attitude...to have ...and you have to work with students ...where they are at ...I...I didn't realize I was doing that for a long time ...and then I stopped doing ...anything ...as far responding to student behaviour...for a couple of weeks...*

Her temporary withdrawal from the *behavioural management* process in order to observe and analyse individual student behaviour, indicates a collapse in her previous beliefs about *behaviour management*, but she was also setting a dangerous precedent for herself as a novice teacher by allowing students to set their own behavioural agendas in class. She explains that

*...all I did was diagnose...like I knew my classes would become terrible...because I wasn't correcting ...but I would sit back and watch the behaviours unravel before me ...and I would try and diagnose why the students were doing what they were doing ...and that was really excellent...so getting to understand my students ...*

Winona's statements about producing the appropriate planning and preparation models in order to develop an understanding of her students were an indication her desire to develop effective *pedagogical content knowledge*. Winona said that

*...once you know what your subject matter is...that means...taking hold of it ...and working out a way that you can use it to benefit the kids most...knowing what is most important about that area that the students know...connecting it to the world around them... and putting that into lesson plans ...umm...that incorporate teaching strategies ...intuition to understand...which strategy would work best for students...*

Winona's effective use of *pedagogical content knowledge* was the result of good preparation and planning,

*...like last term... I was doing a ...umm...an international development unit for Year 10 Geography...and I was able to make*

*contact with an aid organization in Thailand... who were ...umm...running a program where they were getting girls... 12 year old girls ...who had been sold into sex slavery...out of prostitution and into school...and we set up email contact with this organization ...and we did fund raising for that organization...and sent money over at the end of the unit...*

### **Summary: Winona's realization as a social science teacher**

The data elicited from Winona after six months of teaching indicated a focus on four of Shulman's categories: *behaviour management*, *classroom communication*, *teaching strategies*, and *pedagogical content knowledge*.

Her concept map indicated that effective *behaviour management* practices are those that have individual classroom policies that are in accordance with the rest of the school, particularly one that encourages positive interaction with students. The latter requirement is mandatory according to the linking words of 'must have', while 'enhanced by' linking 'school policy' to behaviour management, indicates a less vital role, indicating that Winona felt that it was possible for teachers to privately cope with behaviour management issues in the solitude of their own classroom. Winona stated in her TAP that her present school did not have a functional school *behaviour management* policy. Instead, teachers are exhorted to "...manage it yourself ...", before going up the chain of command, a process which she regarded as time consuming. She stated that peer support was good but "...at the end of the day...you still have to be yourself...and what another does...won't necessarily work for you".

Her TAP commentaries further indicated the realities of classroom life where her conceptions of appropriate student behaviour were tested and found wanting. This stage of shattered images of her teaching was followed by an evaluation phase of her *behaviour management* policies, in which she tried to gain a greater affective understanding of her students, the results of which were "...really excellent ...".

*Classroom communication* emerged from the data. The nomination of ‘interpersonal relationships’ (CC) on her concept map indicated the same themes of ‘trust’ and ‘respect’ that was expressed in ‘Environment, social construct of classroom’ from her first concept map. She stated in her TAP that ‘interpersonal relationships’ are essential because “...teaching is about relationships ...”, and about being “...a well balanced person ...” who has “...the ability to be good with others...”. Her commentaries also highlighted the importance of teachers having balanced personal lives, because her initial experience of school life was very consuming one, to the extent that her effectiveness in all facets of teaching was undermined. Upon reflection, she realized that “...what students need to see is...happy...happy teachers ...”, and “...teachers need to have time to grow in other areas of their life ...”.

*Pedagogical content knowledge* featured in the data. Winona’s concept map showed that it was important to develop what she called, “intuition”, in her teaching strategies, and to relate knowledge to students’ prior knowledge. Commentaries from her TAP indicated the importance of getting students involved in activities, such as the program about Thailand as a means of developing real life experiences in their learning.

Winona’s conceptions of social science teaching after her first six months of teaching indicated a strong focus on *behaviour management* and *classroom communication*. Her commentaries show her drive to establish effective practices in both *general pedagogical knowledge* bases, but also exposed the challenges she faced and her subsequent reassessment of these practices.. An effort to lead a more balanced personal lifestyle was an outcome of this reappraisal. Her conceptions of effective *behaviour management* practices were shattered early but after a period of reflection

on the dynamics of her classes, she gained a better understanding and appreciation of her *behaviour management* policies that underpinned the importance of ‘teachers’ personal ability to interact/ relate to students’ on her concept map. However, the constant theme of ‘love’ at the stage of her initial experiences of social science teaching was not explicitly stated after her first six months of independent practice – an indication, perhaps, of her focus towards strategies of *behaviour management* that would ensure an effective learning environment. Nevertheless, there were indications that Winona was keen to develop effective *pedagogical content knowledge* practices in her teaching. Overall, Winona continues to display a strong sense of social justice and democracy, as well initiative and reflective practices in her classroom despite the challenges of her first six months of teaching.

### ***Winona’s maturing constructs of social science teaching during independent practice***

Winona’s concept map construction after *twelve months* of inservice teaching indicated a hierarchy beginning with ‘planning and preparation’ (TS), ‘teaching strategies’ (TS), ‘job satisfaction’ (EEGPV) and ‘behaviour management’ (BM), that, in the most, possessed subordinate concepts that were branches of general concepts. (Figure 37).

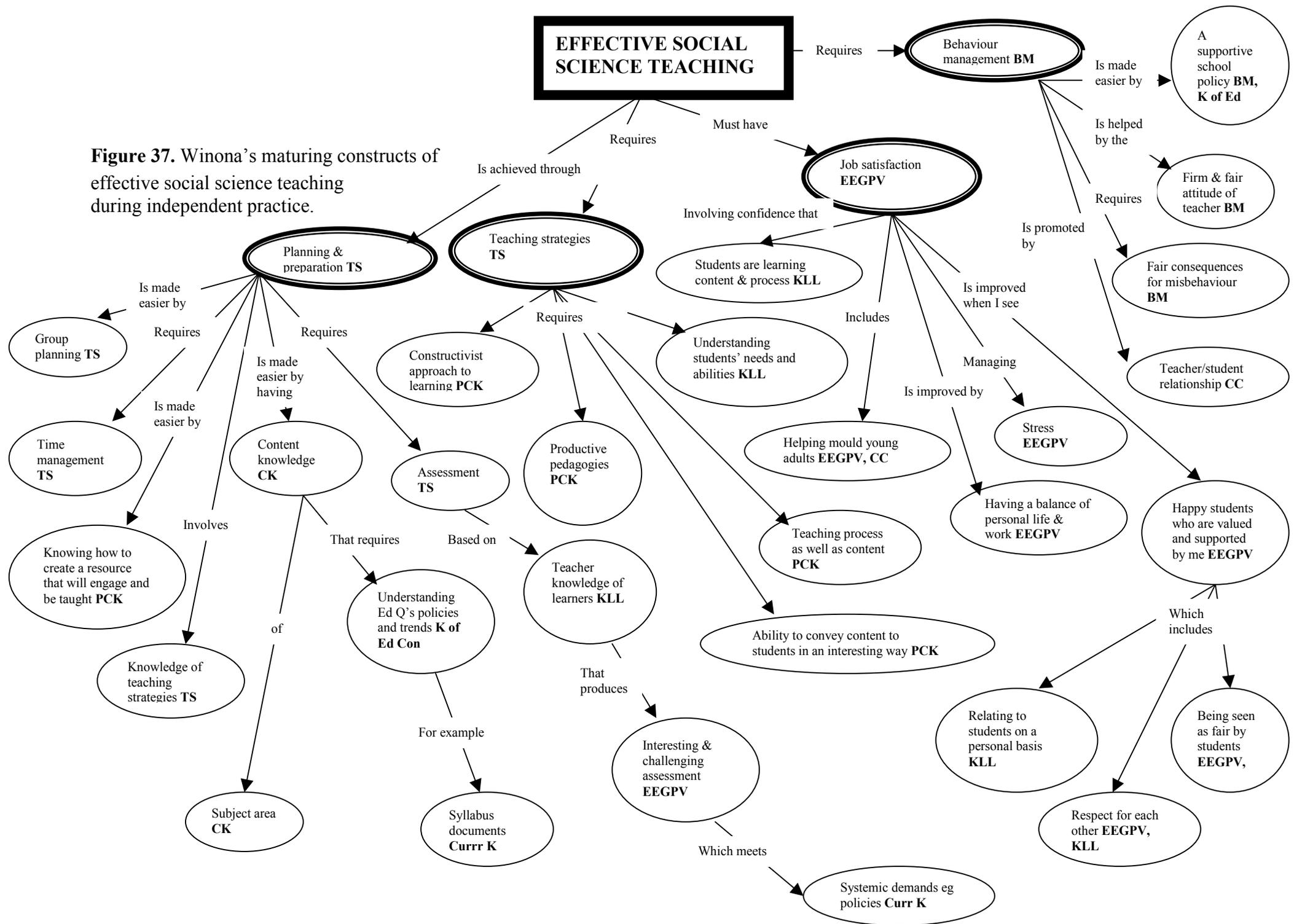
The identification of ‘planning and preparation’ (TS) and ‘teaching strategies’ (TS) at the beginning of the hierarchies indicated the continuing importance of *teaching strategies* in Winona’s concept map. ‘Time management’ (TS) was a feature of her teaching strategies in the three maps, while understanding ‘assessment’ (TS), educational policies, and ‘syllabus documents’ (Curr K) represented additional facets of Winona’s constructs of teaching. Unlike her previous map (Figure 36), *content knowledge* was embedded in the teaching strategies hierarchy of her third map.

*Classroom communication* was another knowledge base that lacked the strong focus of her previous two maps. The identification of *behaviour management* for concepts at the general and subordinate levels of her map, indicate the continuing focus of *behaviour management* in Winona's three concept maps. The subordinate concept of 'A supportive school policy' (BM, K of Ed Con) was also a consistent focus theme throughout her concept maps. The identification of (EEGPV), 'stress' (EEGPV), 'having a balance of personal life and work' (EEGPV) as the basis for 'job satisfaction' represented an additional focus to her concept map, and an indication of the realities of inservice teaching. 'Job satisfaction' would also achieved, according to Winona's map, by helping students develop cognitively and emotionally.

The identification of 'teaching strategies' (TS), 'behaviour management' (BM), 'teacher/student relationship' (CC), and 'content knowledge' (CK) indicated Winona's understanding of *pedagogical content knowledge* at the macro level. The nomination of 'ability to convey content in an interesting way' (PCK), and 'productive pedagogies' (PCK), indicated Winona's continued focus on unpacking knowledge for student understanding. 'Knowing how to create a resource that will engage and be taught' (PCK) indicated Winona's growing understanding of *pedagogical content knowledge*

The focus of Winona's Think Aloud Protocol (TAP) was on *teaching strategies; educational ends, goals, purposes and values; behaviour management; classroom communication; and, pedagogical content knowledge*. Winona stated that stress inhibited one's ability to be creative, especially in terms of effective *teaching strategies*. She said that

**Figure 37.** Winona's maturing constructs of effective social science teaching during independent practice.



*...I feel as though I have some sort of dyslexia with teaching strategies...whether I should put it on an overhead ... or make a group activity ...or whether I should have a series of questions to go with the resources...to get them to answer it...or whether we should have a substantive conversation...or a debate...or a 'venn diagram' ...or put it in a table...as opposed to putting it in a paragraph...umm...I feel as though I have this fuzziness in my brain that lacks the clarity ...to say... "This strategy will work best with this piece of information...for these students" ...I wish I had this big A5...A3 sheet on my wall...of all these teaching strategies I could apply...in fact...I should make that one day...*

Winona explained that her lack of innovative *teaching strategies* stemmed from her planning and preparation of which she had done a "...huge amount ..." but admitted that

*...I can sit here and say what good preparation and planning is ... but I am not very good at that ...I can sit ...with a piece of paper for hours...and not know a strategy to apply to teach that ...that's a real weakness of mine...*

She stated in her *educational ends, goals, purposes and values* knowledge base that she lacked the time to accomplish any school related activities to her satisfaction and in fact, all aspects of school life seemed insurmountable, even after six months of teaching. She said that

*I start work between 5.30 and 7.30 in the morning...and that I get home at 10pm a t night...regularly...and you never feel as though you are on top of it ...and that is really a dissatisfying feeling...this not the kind of job where you can ...never get to the point where you are really satisfied ...with...where you are at work...because there is always more that is pressing...to be done... you are never ahead ...And there are so many other jobs...where you...get your work ...and you can feel good...that you have accomplished ...what your job required...I don't think you ever get that here...job satisfaction comes from having a balanced work and personal/social life... and for the record...I don't have that...I have not reached that balance ...and therefore ...my job satisfaction levels are not as high as I would like them to be...*

She questioned the effectiveness of the school's *behaviour management* policy that lacked a supportive role for classroom teachers because teachers are "...left with a lot of the following up of *behaviour management* to do on their own ...". Winona

explained the concerns of her own *behaviour management* policy in terms of competencies or standards in *behaviour management*

*...as to where I should be ...my standards might be different ...another teacher might look ...into my classroom...and say... "She has really got good behaviour management strategies" ...umm... because that is their standard...or...another teacher might say... "She has got bad behaviour management" ...yeah...I found those things challenging...*

However, in terms of *classroom communication*, Winona cited an instance of success and more certainty in her actions at school with

*...one girl I taught last year...she sometimes comes to visit me to have a chat...because she likes talking to me...and she knocked on the door...she doesn't come that often.....but ...she...said ... "Hi Miss...how are you going ...I knew she was there to visit me...and I was busy...and she said... "Are you busy?" ...and I said... "Yeah... Megan...I'm busy today" ...and that's the first day that I have said "No...I'm busy..." and she about to go...and she looked like she was disappointed...that she felt like she needed to talk to me...and I put down my work...despite how urgent it was ...and talked to her ...and it was so fulfilling ...and on reflection...I just thought...man ...if I had let her walk...I would not have had that conversation with her that made the difference...and to me...like ...I was annoyed with myself that even I thought of not talking to her ... because that is one of the most important things to me is knowing that I am a role model...its not all about content*

Winona stated that content "...is the actual information..." while process is the *pedagogical content knowledge* base, or "...the way they acquire that information ...". She used the 'geographical inquiry process' by

*...introducing a new process or new content...to the students...I'll say... "Okay...this what we are going to be learning about...and this is how we are going to learn it" ...we asked a series of questions ...what is the issue? ... where is the issue?...who does the issue effect?...and what is being done and could be done to solve the issue? ...they see how I've broken down the big question down ...or one big topic down...into a series of different ways...of finding about the topic...So...that's the process we use ...to investigate it ...that's the difference between content and process...to convey content in an interesting way...*

### ***Winona's maturing knowledge in action and reflection during independent practice***

Winona's video stimulated recall interview was based on a lesson about 'interpreting the local landscape' that she had taught to students of Year 11 Geography earlier on the day. They were required: to establish the link between how managing the natural environment effectively requires accurate interpretation of it geomorphology; to visualise and interpret Townsville geomorphology; and to enhance their geographical skills of map reading. Winona adopted a mainly learner-centred approach to her teaching and used a variety of resources such as; 3D models of mountains, contour maps; a whiteboard, an overhead projector (OHP), a laptop, and a projector.

Winona stopped the videotape 35 times during the recall interview, and 47 categories of knowledge bases were nominated from her responses (See Table 20).

**Table 20: Breakdown of knowledge bases**

<b>Knowledge base</b>	<b>No</b>
General pedagogical knowledge	
-Behaviour management	1
-Teaching strategies	2
-Classroom communication	2
-Personal beliefs	-
Content knowledge	3
Curriculum knowledge	-
Knowledge of learners and learning	9
Educational ends, goals, purposes and values	14
Knowledge of educational contexts	-
Pedagogical content knowledge	16

Evidence of Winona's knowledge of *educational ends, goals, purposes and values* of the lesson were apparent when she commented on the clarity of the lesson in terms of the clear, visual representation of landforms in which students were able to respond to by answering related questions, and writing detailed notes on each landform. She stated that

*...a lot of the stimuli...and opportunities and strategies were made available to them...to be able to learn the information and really...I would say ...each kid would be able to understand what landforms were...and I'm pretty certain all of them have a general idea of where they were located in relation to one another...*

To make sure that students did not miss out on anything during the lesson, Winona placed a summary of the landforms on an OHT. The summary was also used to “...bring things together ...”, help students develop their skills of summarising, and to provide an easily read piece of information for review. Other statements concerning her *educational ends, goals, purposes and values* knowledge base relate to her drawing a table on the whiteboard in order to set the purposes for the lesson; the fact that this lesson in the unit “...fits in with the curriculum and syllabus documents ...”; setting students the task of having them write down the management issues associated with the landforms; using the power-point presentation so that students could think about the landforms and their different management issues, and to work out compass bearings; and, visiting locations “...really helps you understand where everything is positioned...”. She stated that a “...few blurby words...” at the beginning of the power-point was

*...just letting students know what we are focusing on... We are interpreting Townsville's natural environment...the next slide is giving them a purpose...why we are doing it...and then there are a couple of silly slides... these images were proudly brought to you by your crazy geography teachers” ...just an attempt to make geography sound fun...*

She stated that in terms of *behaviour management* “...this class are a real dream to teach...they get on so well with me...” She said that her enthusiasm for the topic had a flow on effect to the rest of the class so “...there is no real need to discipline students...”

Her *knowledge of learners and learning* was also apparent in her comments of the class as being “...a really supportive classroom ...” where there is reciprocal respect as instanced during one phase of the lesson. She asked them

*...if they would mind if I spoke while they were copying it down  
...and they said that...it would be irritating...they could not do both  
at once...so I complied with that one...and shut up while they were  
doing it...*

Her *knowledge of learners and learning* extended to individual students in the class such as those students who “...don’t have a previous knowledge of geography...so quite often I will spend a bit of time with them...just helping them out...”. She discussed the performance of a group of boys at the back of the class as “...a pretty switched on bunch of guys who are pretty quiet...they know the answers...”. They are

*...head up...head down...looking here ...there...all the different  
sources at once...trying to get it all in their heads...I’m very  
impressed with their work...*

She commented on the red haired boy in this group of boys “...as somebody I really enjoy having in the classroom...” because he is “...intelligent ...interested ...and very helpful with the answers...I learn a lot from him sometimes...” On the other hand there are the “...footy boys ...who kind of kick back...and spend a lot of time doing nothing...”, or the “...an intelligent young girl but she is always asking questions...”.

Her *pedagogical content knowledge* base was evident in her scaffolding strategies where she used a series of leading questions to help students understand the management issues of mountains. She spoke of explaining the cardinal points on a compass and then giving students the opportunity “...to work it out for themselves ...”. Although some misconceptions persisted about how to work out compass bearings, so she tried to “...break it down and look at particular landforms...or the landmarks...” and by using her finger to “...point out an actual landmark ...”.

Winona used *pedagogical content knowledge* at the introduction of her lesson by tying together work previously covered to link in with the lesson on managing the natural environment. She said she tapped "...into students' previous knowledge with landforms..." by asking students about their local knowledge of the Townsville landscape and then having them think about it "...at a higher level...their geographic level ...". She commented on her strategy of explaining how to do an activity by showing "...how to set to set it out in their books ...just making sure they understand ...". Winona spoke of how some students looked a bit lost

*...so I'm verbalising...it is an abstract thing that I am asking them to do...and I'm relating to real life a little bit...I'm saying... "I've got a terrible sense of direction...and doing things like this is sometimes challenging to me ...too...*

Winona used a variety of different technologies such as the overhead projector, the 3D model and the laptop/projector to help students in the scaffolding process. She used the 3D model of the mountain, for example, to teach them how to read the contour lines by "...showing them what the lines close together actually looks like ...". She also used visual representation as a means of helping students develop a

*...map in their minds where each of these landforms are...and what they look...one is a photograph...a literal representation of the landform...the other is a map...that allows them to picture it in their heads...where...each of the landforms are positioned in relation to one another...and the topographic map is similar to the map ...as well...it just allows them to visualise where each of the landforms are placed...*

### **Summary: Winona as a practicing social science teacher**

The two data types elicited from Winona after *twelve months* of teaching show that the focus of her teaching was on three of Shulman's categories: *educational ends, goals, purposes and values; pedagogical content knowledge; and, general pedagogical knowledge* focusing on *behaviour management*. Her concept map diagram indicated that effective *behaviour management* was dependent upon a

supportive school administration, teachers who were firm and fair, good teacher/student relationships, and fair consequences for misbehaviour. However, her comments in her Think Aloud Protocol (TAP) indicated an uncertainty of standards in effective *behaviour management*. Statements from her video stimulated recall (VSR) show that she had no *behaviour management* problems with her Year 11 Geography class. This was in contrast to her experiences after the six months as a graduate teacher when she encountered great difficulties with her students.

*Educational ends, goals, purposes and values* featured in the two data sets. Her concept map diagram indicated the general concept 'job satisfaction' and subsequent subordinate concepts as an important criterion for effective teaching. Other concepts that were nominated for *educational ends, goals, purposes and values* reflect the importance she placed on the affective domain of teaching such as 'helping mould young adults', 'relating to students on a personal basis', and 'having a balance of personal life and work'. She stated in her TAP that her job satisfaction levels were "...not as high as I would like them to be..." Commentaries from her VSR indicated a cognitive focus to her *educational ends, goals, purposes and values* knowledge base that spoke of the lesson being with the syllabus guidelines, and the task of the lesson was to have students identify the management issues associated with mountains.

*Pedagogical content knowledge* emerged strongly in the two data types. The nomination of *teaching strategies, behaviour management, classroom communication*, and *content knowledge* to concepts in her map, indicated an understanding of *pedagogical content knowledge* at the macro level. Her concept map indicated that 'constructivist approach to learning', 'productive pedagogies', 'teaching process as well as content', and 'ability to convey content to students in an interesting way', as concepts that were nominated for *pedagogical content knowledge* because

they conveyed the idea that knowledge should be represented in ways that would be understood by students. She explained this process in her TAP as the ‘geographical inquiry process’ in which students begin their investigation any topic by asking a series of standard questions. Commentaries from her VSR indicated that Winona used students’ previous knowledge, scaffolding, and a range of technologies and resources, to engage in representational repertoires for student understanding.

Winona’s conceptions of social science teaching indicated a strong focus on constructivist approaches to teaching where students were encouraged to develop systematic procedures of geographical inquiry, in order to meet the cognitive outcomes. She also spoke of the importance catering for affective domains of individual learners, and of her general goal of gaining greater job satisfaction from teaching. Whilst she was unsure of what constituted universally accepted behaviour management practices, her understanding of the criteria for effective behaviour was clear, and her experiences with her senior geography class were positive. Overall, Winona regards teaching as an act of facilitating students to explore, understand, and evaluate environmental issues in a caring and supportive classroom.

### ***Discussion: charting Winona’s development***

Winona’s conceptions of effective social science teaching after the third data collection in May 2003, reveal consistency as well as change. Winona’s initial experience as a social science teacher indicated a focus on three of Shulman’s categories: *pedagogical content knowledge*; *content knowledge*; and, *general pedagogical knowledge* focusing *classroom communication* and *behaviour management*. Data elicited from Winona on realization as a social science teacher indicated a focus on two of Shulman’s categories: *general pedagogical knowledge* focusing on *classroom communication*, *behaviour management*, and *teaching*

*strategies*; and, *pedagogical content knowledge*, while the focus of her conceptual structure as a practicing social science teacher focused on three of Shulman's categories: *pedagogical content knowledge*; *educational ends, goals, purposes and values*; and, *general pedagogical knowledge* focusing on *behaviour management*.

*Educational ends, goals, purposes and values* represented a change in her conceptual structure. Winona identified 'job satisfaction', managing 'stress', and 'having a balance of personal life and work' as important personal goals, while 'being seen as fair by students', 'happy students who are valued and supported by me', 'respect for each other', and 'helping mould young adults' (Figure 37) were important affective goals for her students. A cognitive goal, and an outcome of her planning and preparation was 'interesting and challenging assessment'. Commentaries from her TAP expressed a concern for her job satisfaction levels, while statements from her VSR indicated a lesson that was focused on land management issues, in accordance with the Senior Geography Syllabus (QSA/QSCC, 1999).

*Behaviour management* was consistent in Winona's conceptual structure throughout the three data collection phases. *Behaviour management* at the initial stages of her experience as a social science teacher showed that it was identified at both the general and subordinate concept levels (Figure 35), the effectiveness of which was based on good micro skills, respect, knowledge that students are valued by the teacher, personal commitment, explicitness of policy, and a good school policy. Winona spoke of the need in her TAP for a school *behaviour management* policy to be a functional and living document, and that every student should be a valued member of the class, even those who have an inclination to misbehave. Winona commented in her VSR on the importance of using non-punitive strategies in solving disputations between students.

Winona's *behaviour management* after six months of graduate teaching showed that it continued to be a component of her conceptual structure - at both the general and subordinate concept levels (Figure 36). Winona's ideas on *behaviour management* reflected similar sentiments of her previous map - an effective *behaviour management* policy that was enhanced by a school policy, as well as the teacher's ability to interact and relate to students, even though her conceptual structure was more refined than on her previous map. Winona said in her TAP that her school lacked a viable *behaviour management* policy, and although peer support was good, she acknowledged that the ultimate responsibility for *behaviour management* in her class was herself. She commented on the early failures of her *behaviour management* strategies before she was able to implement policies that were acceptable to students

*Behaviour management* at Winona's stage of practice as a social science teacher, that is, after twelve months of teaching, showed that it continued to be identified at both the general and subordinate levels of her map (Figure 37). Whilst the identification of 'teacher/student relationship' and 'a supportive school policy' were continuing themes in her *behaviour management* policy, 'Firm and fair attitude of the teacher' and 'fair consequences for misbehaviour' represented additional strategies and a refinement to her *behaviour management* program after twelve months of teaching. Commentaries from her TAP and VSR indicated Winona's continuing concern about the ineffectiveness of the school's *behaviour management* policy, although she pointed to her own successful *behaviour management* strategies in class.

*Pedagogical content knowledge* was a consistent component of Winona's conceptual structure. *Pedagogical content knowledge* was identified at the macro levels of her three concept maps. Winona's *pedagogical content knowledge* at the stage of her initial experiences of social science teaching showed that *pedagogical*

*content knowledge* was a component of *teaching strategies, classroom communication, content knowledge, and educational ends, goals, purposes and values* (Figure 35). Commentaries from her TAP and VSR indicated constructivist approaches to her teaching in terms of having good *content knowledge*, developing empathic understanding, and having students understand the context of history. Winona's realization of independent teaching practice, after six months of teaching, showed that *pedagogical content knowledge* was part of *teaching strategies* (Figure 36), while comments from her TAP indicated the role of *teaching strategies* with *pedagogical content knowledge*. After twelve months of practising as a social science teacher, Winona's *pedagogical content knowledge* continued to be closely aligned with *teaching strategies* (Figure 37). She stated in her TAP and VSR that she used both content and process in inquiry teaching, Winona spoke of using the 'geographical process of inquiry' in her TAP as a means investigation.

Winona identified 'creativity', 'modelling', 'process/skills', 'student participation', 'productive pedagogies', 'reflection', 'investigation', and 'relevant' (Figure 35) as *pedagogical content knowledge* process links to other aspects of social science teaching at the initial stage of her experience as a teacher. Winona spoke of the importance of relevance in her TAP as a way of students taking ownership of their learning, and of using analogies to give students an understanding of the context of history. Commentaries from her VSR indicated the use of 3D pictures as a motivational tool to inject more fun into students' studies. Winona explained the historical roles of various occupations as a means of developing student empathy, and she also commented how students conducted their investigation in collaboration with other students, but she also used scaffolding and concept mapping to help them in the investigative processes.

After six months of social science teaching Winona showed that she continued to regard ‘SOSE investigation processes’ as an important *pedagogical content knowledge* process link to other facets of social science teaching (Figure 36). The additional concepts of ‘critical thinking’ and ‘intuition to understand which strategy would work best for a student’ indicated a broadening of her process links. Commentaries from her TAP indicated a desire to connect knowledge to their interests and to activities that are directly linked to the community, using a variety of teaching strategies.

Winona’s conceptual structure after twelve months as a practicing social science teacher showed that ‘ability to convey content to students in an interesting way’ as an additional *pedagogical content knowledge* link, and a greater understanding of the processes of constructivist teaching (See Figure 37). Winona’s identification of ‘constructivist approach to learning’, ‘productive pedagogies’, ‘teaching process as well as content’, indicated her continuing desire to engage in constructivist teaching practices. Commentaries from her VSR indicated her deeper understanding of *pedagogical content knowledge* through use of scaffolding strategies, the use of explanation and gestures to show different landscapes on a map, the linking current lessons with previous work done, by drawing on students’ prior knowledge to engage in higher levels of geographical thinking, and by using powerpoint presentation, 3D models of landforms, maps, overhead projectors and the white board. Despite the difficulties Winona encountered in the early period of her classroom practice, her conceptions of teaching indicated growth, maturity and sophistication.

### **Summary of case studies**

Participants in the study indicated a growth in their knowledge base of teaching, some more spectacularly than others, especially in terms of their pedagogical content

knowledge. It was interesting to note that the case studies of participants show that a strong theme of democracy and social justice underlined their constructivist approaches to teaching. 'Democracy' and 'social justice' are part of the set of key values in the Studies of Society and Environment (SOSE) Syllabus (QSA/QCSS, 2000: 1-3) that teachers are expected to know and apply, in both a cognitive and pedagogical sense, so students can seriously take on board these values in their own lives.

Participants in this study expressed these values in a variety of ways. Peace spoke of the importance of developing a negotiated behaviour management program that is encompassed within her teaching practices. She was also keen to have students develop an awareness of the economic, business and political discourses in life. Antonio also spoke of the importance of negotiation in behaviour management, of instilling a sense of leadership in students, and encouraging students to set goals beyond their school years. Emily identified negotiation as a means of motivating students; a desire to make SOSE fun for students; keeping students informed of the goals and aims of tasks; and, viewing students as unique individuals who are capable of higher order thinking. Isabella also stressed the importance of students enjoying their learning; developing a rapport with students as key to behaviour management; and, of having students develop their own value systems. Jane's focus lay in the critical inquiry approaches to teaching such as the 'depth study' in order to develop students' action research skills, including negotiating a behaviour management policy with students. Jo spoke of keeping the channels of communication open with students; having a knowledge of students' cognitive and emotional backgrounds as the basis for effective behaviour management; and by empowering students to engage in inquiry based learning. Lara said that negotiation of the curriculum should extend to

members of the broader community as well as students; empowering students to have active roles in the school community; and, providing opportunities for students to become critically literate and informed citizens. Samantha spoke of the importance of having good relationships with students as a means of providing an effective learning environment. She also said that teachers must be critical thinkers in order to develop critical thinking in students.

Two participants stood out in this study. Winona placed a heavy emphasis in her conceptual structure that would promote a socially just classroom involving ‘love’, ‘respect’, ‘trust’, ‘student participation (curriculum negotiation)’, along with teaching and learning strategies including ‘productive pedagogies’ (see Figure 35). However, the evidence would indicate that after six months of teaching Winona’s dissatisfaction with teaching was linked to what she found as a particular misalignment of her personal goals and the limitations in which she worked that made her realize she might never reach these goals. A second mitigating factor was that Winona commenced teaching in July 2002, a difficult time for both her and her students because of the pressures of having to quickly adjust to each other after students had already experienced a number of teachers throughout the first semester of the year. Winona’s six months of teaching and her opportunity to reflect upon it over the Christmas break, plus starting with an equally refreshed and expectant group of students at the beginning of the first semester, 2003, indicated, a more confident and more aware teacher about the goals and expectations for herself and her students.

Johannes’s classroom practices provide a valuable insight into how constructivism and the core values of the SOSE Syllabus are inseparable. Johannes identified ‘cooperative learning’, ‘social constructivism’ and ‘supportive environment’ (Figure

26) as key planks in the constructivist process. The SOSE Syllabus endorses the creation of a supportive environment. For example,

Learning is most effective when it involves active partnerships focusing on students, with collaboration and negotiation with parents and carers, peers, teachers, school and community members. (QSA/QCSS, 2000:7)

He stated that teaching should be empowering, liberating, and to encourage community mindedness in students. To do this, according Johannes, social science should not be presented as absolute truths but as a way for students to process knowledge and to understand the concepts and values. Johannes said that this processing of knowledge involves constructing knowledge through collaboration in experiential settings. He spoke of students taking responsibility for their actions as the basis for an effective behaviour management policy. Johannes consistently identified pedagogical content knowledge as underpinning effective teaching. In the final chapter, the key findings will be discussed.

## CHAPTER FIVE: CONCLUSION

This study of ten novice social science teachers used concept mapping, Think aloud Protocol (TAP) and video stimulated recall (VSR) interviews to investigate the participants' knowledge growth, especially pedagogical content knowledge growth, over their final year of study and 1<sup>st</sup> Year as independent teachers. The study sought to answer the following questions:

1. What is the conceptual structure of effective social science teaching held by preservice and novice teachers?
2. To what extent is pedagogical content knowledge a component of this conceptual structure?
3. What is the importance of pedagogical content knowledge to preservice and novice teachers' conceptions of good practice?

### **The conceptual structure of effective social science teaching of preservice and novice teachers.**

The study shows that participants experienced knowledge change in their conceptual structure over a twelve-month period, using Shulman's (1987) framework of

- general pedagogical knowledge, the components of which are behaviour management, teaching strategies, classroom communication, and personal beliefs;
- content knowledge,
- curriculum knowledge,
- knowledge of educational contexts;
- knowledge of learners and learning;
- knowledge educational ends, goals, purposes and values; and,
- pedagogical content knowledge.

All discussed a range of Shulman's categories on each occasion, as has been discussed in the case studies. The study shows that pedagogical content knowledge, behaviour management, and content knowledge were the focus for a majority of participants at the initial stage of their experience as social science teachers (see

Appendix L). Participants' conceptual structure at the stage of their developing thoughts on social science teaching showed an additional focus of classroom communication as well as content knowledge, pedagogical content knowledge and behaviour management.

However, participants' conceptual structure on realization of independent teaching indicated a change that focused on: educational ends, goals, purposes and values; knowledge of learners and learning; but with a continued focus on behaviour management; and, pedagogical content knowledge.

Educational ends, goals, purposes and values represented a focus for all participants' conceptual structure on realization of independent teaching practice. This was in stark contrast to the conceptual structures presented twelve months before as preservice teachers, when only two participants indicated these concepts as a focus of their conceptual structures.

The outcomes and purposes indicated by participants' concepts, were, commonly, the development of higher order thinking/critical thinking. 'Active citizenship/informed citizen' was most frequently cited by participants as desirable values or affective outcomes for school students, on realization of their independent teaching practice. Participants' comments endorsed the statements on lifelong learning in the SOSE Syllabus (QSA/QSCC, 2000; 1-2). Other educational ends, goals, purposes and values that reflected participants' individual conceptual structure on realization of independent practice included promoting diversity in class, skills in the use of laptops, setting standards for students, keeping students informed, students' understanding of the action research process, lessons according to the syllabus, and effective behaviour management processes. Critical literacy, scientific literacy, and a need for guidelines and procedures in laboratories, were indicative of educational

ends, goals, purposes and values of English and Science that were taught by three of the participants as graduate teachers.

As noted in the case studies, a number of participants spoke of personal ends, purposes and goals, including making teaching fun, of job satisfaction and managing stress, and maintaining a balance between school and personal life, while others were keen for students to enjoy their lessons and their unit of work, and for the subject to provide happy memories for both students and teachers. Two of the participants said their attainment of particular educational ends, goals, purposes and values was hampered by a lack of current syllabi and restrictive departmental policies.

The second knowledge base common to most participants on realization of independent practice was knowledge of learners and learning. This was in contrast to their initial experiences and developing thoughts on social science teaching when only a minority number of participants indicated a focus on knowledge of learners and learning. Their comments regarding the cognitive and affective domain of learners reflect the statements in the SOSE Syllabus (QSA/QCSS, 2000:7-8). They spoke of the importance of having a knowledge of learners; knowing the individual differences of learners; knowing the learning abilities of students; and, of learning experiences that take into account the learners' prior knowledge their interests, personal backgrounds, and how they relate to their peers; building on prior knowledge; and being flexible. Participants identified planning and preparation that incorporate *variety* as a means of catering for the class and individual students at both a cognitive and affective level (Bergen, 1999). Two participants spoke of the pleasure of working with their students, and of allowing students to work in their friendship groups because this encouraged collaborative learning, which assisted some specific students. Some participants showed detailed knowledge of students. They spoke of their

students' abilities in terms of their visual, aural and kinaesthetic skills, and of students preferring 'hands on' type activities, but expressed frustration at the lack of resources in school to accommodate these learning styles. One participant said that students in his class were inclined to be 'extrinsically motivated', while another identified the difficulty of getting to know her students' strengths.

The inclusion of educational ends, goals, purposes and values and knowledge of learners and learning with participants' other focus knowledge bases on realization of practice, rather than during training indicated that perhaps participants were no longer constrained by preservice life, especially when on professional teaching practice. They were teaching students on a full time basis, and purposefully developing a knowledge base of both their students' cognitive and affective domains that was critical in terms of outcomes based education. Additionally, participants' planning and preparation that included developing daily lesson plans, reviewing and updating units of work and work programs in collaboration with their peers, gave them that sense of purpose in their teaching, not just of short term goals as characterised by a four week professional practice. Both knowledge bases had become prioritised in their conceptual structure.

Behaviour management, on the other hand, was strongly identified in the participants' conceptual structure at each of the three data collection points, although especially on realization of independent practice. One participant, however, did not identify behaviour management as part of her conceptual structure on realization of independent practice because she stated that it was not necessary in her classes. Other participants spoke of the difficulties of implementing any behaviour management program during their professional teaching practice because of the short duration of their practicum and because supervising teachers already had policies in place, but

once on independent practice they were able to implement their own approach. Participants engaged in what Groundwater-Smith et al. (2001) called proactive behaviour management practices, and sought to incorporate a climate that allows for all aspects of learning (Cole & Chan, 1994). One participant spoke of using behaviour management within the context of a supportive learning environment, while another used constructivism based on cooperative learning, such as the 'plus minus interesting' (PMI) strategy to help students learn and to minimise student misbehaviour. Other participants based their behaviour management on planning and preparation that used a variety of teaching strategies and interesting content to enthuse their students. Another participant, who echoed the sentiments of Cothan et al. (2003), said the key to effective behaviour management was good student/teacher relationship, negotiating rules and being consistent. Participants spoke of using voice modulation to gain attention; establishing routines, clear boundaries and clear goals; and, being a firm and fair teacher. Others questioned the validity of school behaviour management programs such as 'responsible thinking processes' (RTP) or the general ineffectiveness of whole school policies as programs that were either ineffective, or perceived as ineffective in the case of RTP, and acted as impediments to those who wanted to develop their own models of behaviour management.

Educational ends, goals, purposes and values and knowledge of learners and learning represented significant changes in participants' conceptual structure over the duration of this study. These changes not only indicated a growing maturity in the participants' conceptual structure but also an endorsement of the social science syllabi. In contrast, behaviour management indicated consistency in participants' conceptual structure where it was predominantly used in a proactive way. The participants' conceptual structure in terms of educational ends, goals, purposes,

values, knowledge of learners and learning, and behaviour management on realization of independent teaching indicated a greater sensitivity to the needs of learners as well as laying the foundation for a better understanding of pedagogical content knowledge.

Despite the similarities in the focus of participants' knowledge bases, the concept maps in particular provide evidence that conceptually the participants are different. It is in the structural makeup of each map that the difference in terms of development and complexity across participants emerges. For example, Winona identified 'love' as an important facet in her *classroom communication* (Figure 35) while 'mutual respect and fairness' was important in Samantha's *classroom communication*. The complex nature of the relationships between and among concepts within and across hierarchies on the maps is a reflection of their different conceptual structures. Their differing conceptual makeup was also apparent in Think Aloud Protocol, although participants may have commented on the same concepts, their thoughts about the significance of that concept and how it relates to their conceptual structure were different. For example, Antonio spoke of *content knowledge* in terms of having the

*...passion...and the initiative...all that nitty gritty...domain specific knowledge... background knowledge...that anecdotal stories...*

Johannes comments on *content knowledge* reflected the move away from specific subject areas. He said that

*...you need to be able to not just rely on being a Geography teacher or a History teacher...you need to see the value and power of integrated...rather than reducing it to a simplistic sort of understanding through one discipline...*

Commentaries from their video stimulated recall interviews are further evidence of the uniqueness of their conceptual understandings of the knowledge base of teaching. Pedagogical content knowledge in Winona's teaching, for example, was about helping students develop a

*...a map in their minds...where one is a photograph...a literal representation of the landform...the other is a map...that allows them to picture it in their heads...*

Lara, on the other hand, used an analogy about wealthy patrons and the seating arrangements in a typical theatre. She asked students

*... "Where are the most expensive seats?" ...and they said ... "Up the front" ...and I said... "Well...the same would happen in the Globe"...*

The second research question investigated the extent to which Shulman's pedagogical content knowledge is a component of this conceptual structure.

### **Pedagogical content knowledge as a component of participants' conceptual structure.**

Pedagogical content knowledge was the most prevalent component of participants' conceptual structures. This was evident in the identification of pedagogical content knowledge at the macro levels of all participants' concept maps, and at the micro levels where it was often identified at both the general and subordinate levels. One participant explicitly identified pedagogical content knowledge as a concept on his three maps, and on two occasions it played a central role in his conceptual structure because it was part of the key concepts and general concepts (Figures 26, 27 and 28).

Pedagogical content knowledge was also shown to be a component of participants' conceptual structure at the micro levels of their maps where it was part of a multiple of concepts that included behaviour management, content knowledge, curriculum knowledge, knowledge of learners and learning, knowledge of educational contexts, teaching strategies, and classroom communication (Figure 8). In the case of Figure 15, pedagogical content knowledge was only a part of content knowledge.

Participants' concept maps indicated some common concepts that were identified as pedagogical content knowledge, such as learner-centred teaching, teacher as guide and facilitator, and constructivism. But the vast majority of other pedagogical content

knowledge concepts and especially commentaries from their TAPs and VSRs showed that pedagogical content knowledge was a construct unique to each individual participant. One participant used the analogy of the importance of rules in venues outside the school context to give students a broad understanding of why rules are just as important in the school situation. The same participant spoke of using modelling as a means of establishing links between lessons, the importance of the relationship between knowledge and experience, and understanding the context of history.

The uniqueness of participants' pedagogical content knowledge was shown in other ways. One participant spoke of the importance of establishing relevance and empathy, while others spoke of students working together in terms of social constructivist activities, that is, working in collaboration, group work, peer team teaching, and class discussion. Participants also said that having knowledge of learners and learning allowed them to successfully transform knowledge in interesting ways, to engage students in social constructivist activities, to create a learning environment that catered for individual learning styles.

The study showed that participants had a procedural as well as substantive understanding of pedagogical content knowledge. They spoke of knowing 'what' was involved in a variety of inquiry approaches to teaching and 'how' to implement these processes specifically in the classroom. For example, a number of participants spoke of the 'depth study' where students are expected to identify a problem in history, formulate a hypothesis, test it, and reach a conclusion (Modern History Syllabus, QSA/BSSSS, 1995). Other participants identified and explained how they used variations of the depth study such as the 'the action research process' where students (in collaboration) were required to identify problems of multinational corporations, research the impact of those problems on receiver societies, and present their findings

to the class, and of the ‘cycle of history’ –a model which students use to help them understand how history repeats itself. Another spoke of using the ‘geographical inquiry approach’ (Senior Geography Syllabus, QSA/BSSSS, 1999) with her students when they examined the landforms of the local area. Other participants referred to inquiry teaching in more general terms such as the processes of teaching. Participants also spoke about analogies, and how they used them to explain geographical coastal landforms, that is, a story about a sand pebble to illustrate ‘long shore drift’, and the seating arrangements of playhouses in Shakespearian days of theatre and in contemporary theatres. Their substantive and procedural framing of pedagogical content knowledge was also evident in their discussions of facilitator and/or guide as a metaphor for teaching; the use of wall maps, white board/OHT illustrations, concept maps, and gestures.

**The importance of pedagogical content knowledge to preservice and novice teachers’ conceptions of good practice.**

Participants used pedagogical content knowledge as a link to other aspects of social science teaching. One participant identified pedagogical content knowledge as the central link between the key concept and other general concepts on his concept maps (Figures 27 and 29). The power of the linking words, ‘must have a clear understanding of’ that links pedagogical content knowledge to the key concept was indicative of its central role in his conceptual structure (Figure 27). A number of participants’ pedagogical content knowledge bases consistently showed direct links with the same knowledge base over the three concept mapping exercises. For example, the direct link of pedagogical content knowledge to content knowledge (Figures 8, 9 and 10); the direct link to teaching strategies (Figures 11, 12, and 13); and, the direct link to educational ends, goals, purposes and values (Figures 17, 18 and 19).

The most commonly identified pedagogical content knowledge links to other aspects of social science teaching were student-centred learning/teaching, using a variety of forms of constructivism such as constructivist approaches to teaching, constructivist learning, students constructing own meaning, and social constructivism. They identified collaborative learning, discussion groups, depth studies, and cooperative learning as examples of social constructivist approaches to teaching. As social science teachers, they facilitated learning through innovative teaching methods to develop higher order thinking and holistic understandings. They used links such as flexible planning, and flexibility of delivery that allows students to consider the influence of geographical and historical context.

Most participants on realization of independent practice showed that they had developed a deeper understanding of pedagogical content knowledge. They identified specific processes such as De Bono's Six Thinking Hats, PMI, T/P/S, brainstorming, kinaesthetic activities, real life examples, and creating premium learning as links to other aspects of learning. Pedagogical content knowledge was identified to the cyclical process of the 'reflecting', 'planning' and 'implementing' (See Figure 22), process that reflects Shulman's model of pedagogical reasoning and action (See Figure 3). 'Scientific methodology' was identified as pedagogical content knowledge because it indicated a process of action between 'content of science' and 'scientific literacy' (See Figure 28). Participants identified the ability to relate concepts to the real world and students' prior knowledge, and to be able to convey knowledge to students in an interesting way.

Three participants spoke of the importance of brain gymnastics as a means of knowledge building, of using role-play and drama and by using analogies and storytelling to develop links to other facets of social science. Others spoke of using

discussion groups, the action research process, geographical inquiry process, contextualising issues, using pictorial examples, and of challenging student preconceptions just enough for them to consider alternate views. One participant was consistently strongly focused on pedagogical content knowledge throughout his development as a teacher, and used such key words/phrases/concepts as ‘unpacking’, ‘clarifying’, ‘chunking’, ‘bridging the gap’, and ‘elucidate the concept’, pedagogical content knowledge, constructivism, social constructivism, and scientific methodology as links to other aspects of his teaching.

### ***Summary and implications for future practice***

The pedagogical content knowledge bases that were identified in participants’ initial experiences of social science teaching, at the stage of their developing thoughts on social science teaching, and on realization of independent practice, reflect the key concepts and understanding of teaching and learning in the three syllabi of Studies of Society and Environment (SOSE) (QSA/QCSS, 2000), Modern and Ancient History (QSA/BSSSS, 1995), and Senior Geography (QSA/BSSSS, 1995) (See Figures 5, 6, & 7). The ‘process of inquiry’ to which a number of participants alluded is key to all three syllabi and indeed a strong endorsement of the syllabi.

The conception and development of pedagogical content knowledge by all participants over the twelve-month period suggest that pedagogical content knowledge does not need to take years to develop. Although some participants showed a greater expertise than others in the use of pedagogical content knowledge in the classroom, all were aware of the importance of unpacking knowledge and delivering it in different ways for student understanding. There was, however, an expectation that experience would enable them to improve their pedagogical content knowledge.

Three participants were teaching subjects other than the social sciences at the stage of independent teaching practice. The results showed that participants were able to make adaptations to their pedagogical content knowledge across subject areas because they had sufficient knowledge of their subject and general pedagogical skills. For example, 'pedagogical content knowledge' (PCK) was common to one participant's concept maps (Figure 26, 27 and 28) and indeed, its role on two concept maps (Figure 26 and 28) was central in their conceptual structure. Another participant identified 'facilitator' (PCK), 'student-centred learning' (PCK) on her concept maps at the three data collection points, while the theme for the third participant was 'analysis, interpretation, decision making', 'higher order thinking tasks' (Figure 17), 'active investigation' (Figure 18), and 'activity based' (Figure 19). These examples indicate the generic nature of PCK across the subject areas. 'Scientific methodology' (PCK), on the other hand, is obviously not common, just as the various inquiry processes such as 'depth study' (PCK), 'cycle of history' (PCK), and 'geographical inquiry process' (PCK) in the social sciences are not common.

The participants' journey from preservice to inservice teaching indicated some semblance to Fuller and Brown's (1975) model of teacher development. The third stage of 'concerns about impact on students' was in accordance with the participants' mode of development. Participants showed a consistency in the second stage of development of 'concerns about task'. One participant expressed a 'concern about self' at the initial stages of her teaching before progressing through the other stages. What is striking about the participants' passage to the third stage is that it has happened quickly, that is, within twelve months. This is evidenced by their concern about knowledge of learners and learning; educational ends, goals, purposes and values; and, the nature of their pedagogical content knowledge.

The contextual influences on participants during their first six months of teaching were broad ranging. One participant spoke of having just one meeting with the school administration, and relied heavily on support from a colleague for professional development, while another stated that she received constant support from the administration and her colleagues. Others pointed to the support from their heads of department as crucial in their first six months of teaching.

Over the course of the three data collection points participants discussed other factors contributing to expertise in teaching that were outside Shulman's categories, such as *professional learning* and *community integration*. Seven participants identified a range of concepts including 'networking with profession', 'informed with networking/professional development', 'networking', 'update own knowledge and professional development', and 'professional development', that were categorised under *professional learning*, while 'cooperative planning', 'meeting school community expectations', 'collegial circle', 'community groups', and 'collegiality' were nominated as *community integration* knowledge bases. Two participants had both *professional learning* and *community integration* within their conceptual structure, thereby indicating a desire to work with professionals both within and outside the school context, and with the broader school community in general. One participant in particular, identified 'professional development' (PL) as paramount in her school, along with regular 'cooperative planning' (CI) with fellow staff members, and 'meeting school community expectations' (See Figure 31). These factors show that within Shulman's categories the individual context is a strong influence on the development of particular knowledge bases. This study in itself must be recognised as an experience that has influenced these ten individuals' professional growth.

The development of the four focus knowledge classifications by the majority of participants during their first six months of teaching indicates that benefits may accrue for preservice teachers if they should have the opportunity to enhance their knowledge of teaching through internships that bridge the university program and independent practice. Internships are offered at some universities for preservice teachers in the final semester of their preservice teaching, although not used by these participants. Interns usually teach a negotiated load of classes without the presence of the teacher, but such a program could be broadened by having the usual classroom teachers play a greater mentoring role. Their mentoring role could extend to being videotaped teaching a class and then engaging in a stimulated recall interview in the presence of the novice teacher. The novice teacher could then look beyond the expert teacher's actions to develop an awareness of the underlying principles of teaching.

This process of the novice teacher learning from the expert teacher could be extended to the induction period, and in isolated areas where novice teachers may not have access to an expert social science teacher or, may be the only teacher in that subject area, they could access the video stimulated recall interviews of expert social science teachers from other schools.

As McDiarmid, Ball and Anderson (1989) pointed out, beginning teachers cannot be provided with ready-made repertoires that will suit every possible context in which they teach. Knowledge of learners, for example, will occur as a result of the classroom interactions that will then form the basis of novice teachers' pedagogical decisions on what students already know, what they have to know, and how they can be helped to acquire that knowledge (Penso, 2002). Hence, there is a need for teaching to take place in concrete, dynamic situations (Lampert, 1984), where the teacher can engage in reflective practices through techniques such as video stimulated

recall. As noted earlier, the novice teachers should be able to eventually monitor their own teaching performances, thereby "...enhancing both the quantity and quality of their recollections as interns and as practicing professionals" (Wear & Harris, 1994:50).

Alternatively, a series of workshops could be incorporated into the professional practice teaching courses, in which teacher education students could access the thoughts of mentor/expert teachers through video stimulated recall sessions. The teachers could be video-taped teaching a lesson at school, and then engage in a stimulated recall session, with teacher education students observing as the expert teacher reveals his/her interactive cognitions about the "why" of teaching. Meijer et al. (2002) had four preservice teachers conduct stimulated recall interviews with their mentor teachers. The study found that the student teachers not only became more aware of the underlying thoughts of their mentor teachers' actions but also their own. As mentioned earlier, Ethell (1997) used stimulated recall to access the thoughts of expert teachers in a series of workshops with student teachers.

Unlike law or medicine, teachers have no 'Materia Medica', no case studies of successful teaching practices to guide the novice teacher. Shulman (1986b) suggested that the research community should develop codified representations of the practical pedagogical wisdom of able teachers. Whilst the teaching community can gain enormously from a case literature of excellent teaching, teacher education students could also benefit from a case literature on learning to teach. A case literature of samples of student teacher portfolios, for example, could be accessed by other student teachers, so they could read about the successes and mistakes of others, and hence refine their own professional knowledge.

Newly graduated teachers can also be sent to isolated schools, as in the case of one participant in this study, where they are often expected to manage their own teaching area (s). A high turn over of staff may also mean that there is a shortage of experienced teachers to act as mentors for the high number of novice teachers, especially in their chosen teaching area. The isolation, then, is further compounded. A partnership among novice teachers according to their subject area lines under the auspices of a district authority, that included input from university educators and experienced teachers, would provide the platform for ongoing professional development. The development of this communal practice would be conducted by using a network of information and communication technology where novice teachers would interface with each other, experienced teachers, and university educators to acquire further understandings of social science concepts, and teaching and learning strategies. Vignettes of experienced teachers would further influence their development of pedagogical content knowledge.

### ***Limitations of the study***

All participants in this study were volunteers and as such, were highly motivated and above average students in terms of academic performance and professional practice teaching. They were prepared to take time out from their regular studies and teaching time to participate in the study. For these reasons participants in the study may not have been representative of the cohort of preservice and novice teachers. Over the course of the study participants may have become familiar with the theoretical framework and sought to respond according to the “wishes” of the researcher rather than to their own thoughts about effective teaching and learning. Participants would have gained oral language about the nature of study from the ‘Information Sheet’ (See Appendix D), and specific understanding of the study from

the three post data collection discussions the researcher had with each participant. It was found that participants needed support initially in completing concept maps, but no support was necessary by the third stage of the data collection. Variability in capacity to complete concept maps has been found to occur in previous research (Wilson, 1994). The prompts and dialogue between the researcher and participants before, during and after the construction of concept map diagrams and video stimulated recall interviews may have been of help to participants, because prompts may have provided useful clues, directions or insights about the researcher's conceptual structure of effective social science teaching. A number of participants were keen to understand the nature of the researcher's theoretical framework and how it related to each of them in the three data collections, including the role of pedagogical content knowledge in their teaching. The researcher's subsequent explanations over the twelve-month study period may have helped participants focus on the wishes of the researcher.

### ***Strengths of the study***

This is a longitudinal study in which data were collected at three separate points over a twelve-month period from participants who were moving from preservice education to inservice education. A longitudinal study using a qualitative approach is the best way to answer the question relating to knowledge growth of teachers. A once only blitzkrieg assessment (Denzin & Lincoln, 1998) would not have been able to identify the developmental themes that are central to the study of knowledge growth in teaching. The timeframe of the longitudinal study, that is, from preservice to inservice teaching gives the study more power in terms of seeking to understand the "leap" novice teachers must take from university to teaching their own classes for the first time. A qualitative study of this nature brings out the richness of the novice

teachers' biographies as they unfold over time – the feelings, the uncertainties, and the successes of participants' classroom practice. A quantitative study cannot do this.

The value of using case studies in qualitative research is that they capture the process of knowledge growth over a given period. Effective methods to capture the knowledge growth are video stimulated recall and concept mapping. The former shows how categories of knowledge are integrated and allows the teacher to make explicit their implicit understandings of their interactional cognitions. Video stimulated recall helps the teacher know the “how” and “why” of teaching. Concept mapping and the Think Aloud Protocol complement video stimulated recall as they help the teacher come to grips with the “what” and “why” of teaching. Both tools are effective for identifying and assessing the teachers' understanding of pedagogical content knowledge.

### ***Suggestions for further research***

This study has been about the knowledge growth of ten novice social science teachers especially their pedagogical content knowledge. There is a need for further research with larger groups of novice teachers, involving teacher educators, supervising teachers and heads of department, using a similar methodology, that is, a longitudinal study using concept maps and video stimulated recall to determine novice teachers' level of knowledge growth especially pedagogical content knowledge. A study such as this may alleviate the perceived narrowness of a study involving a small group of highly motivated and high achieving novice teachers. The study would also have a broader involvement from university educators and school teachers, thereby inculcating a culture of mentorship on one hand, and novice teacher as researcher on the other. This program could be made a compulsory part of teacher

education program in their final year, thereby allowing greater pool of participants to choose from.

Support for such a program may need to be gained from government educational authorities and the independent schools. It would then be incumbent upon supervising teachers during the practicum to broaden their mentoring role by helping preservice teachers engage in their reflection on action. As Ethell (1997) found in her study, having preservice teachers examine their knowledge in action and reflect on it, is vital in their development as teachers. The concept mapping exercise could be done at the university in participants' curriculum areas. An induction program that includes at least one video stimulated recall session and a concept mapping exercise, under the supervision of the head of department, would go a long way in preventing what Moir and Gless (2001) refer to as a "trial-by-fire" method of launching a teaching career. The ultimate aim, as noted earlier, is to have preservice and novice teachers collect and analyse their own data and learn from their experiences (Wear & Harris, 1994). Further data could be added to the longitudinal study by having participants keep a reflective diary in order to give a broader understanding of their contextual development as teachers.

A study of participants' supervising teachers during professional practice teaching and of mentors during participants' inservice phase, could also be conducted by using concept mapping techniques and video stimulated recall, and so determine their expertise and impact on the development of participants' knowledge bases, especially in terms of the extent to which pedagogical content knowledge is part of the feedback given. An undertaking like this would first result in a scan of just where mentors stand in terms of their professional knowledge. The second phase of the study would then

seek to bring consistency in the professional skills of mentors through a district wide or state wide professional development programs.

It would also be valuable to have a study with a group of experienced teachers of social science using concept maps and video stimulated recall to reveal the extent of their pedagogical content knowledge, and hence to identify where the novice teachers in this study stand in relation to their expertise of social science teaching. Heads of departments are regarded as leaders in their curriculum area; the study would also be useful in finding out whether heads of department and experienced teachers' knowledge base of teaching would endorse the social science syllabi as the participants have done in this study. A lack of support by experienced teachers for newly introduced social science syllabi could indicate systemic failure not only at the school level but also at the district and governing authority levels. Perhaps a public outcry would be followed by an increased injection of money to properly fund a professional development program that would seriously take into account the needs of teachers and learners. The acceptance of the social science syllabi into the school curriculum, on the other hand, would be indicative of an educational authority that is supportive of the school community.

This study sought to identify participants' understandings of effective social science teaching. The findings demonstrate a commonality of knowledge bases from each the participants' three concept maps. Three of the participants on independent practice constructed maps that described effective science teaching and effective English teaching. It became obvious through the data analysis process that for some of the conceptual understandings, the subject areas were irrelevant. That is to say, effective teaching seemed to be the focus. In this sense, a further study could investigate the conceptions of novice teachers using concept maps to describe

*effective teaching* regardless of subject areas to determine whether their knowledge bases would be different. This could be especially important for teachers in Queensland, and elsewhere in Australia, where curriculum changes are effecting the traditional social science curriculum. For example, in Queensland, if schools choose “New Basics” in a curriculum framework, the structure of learning is not around “subjects” but on four pillars: life pathways and social futures; multiliteracies and communications media; active citizenship; and, environments and technologies.

This study of a relatively small group of novice social science teachers has contributed to the research concerning knowledge growth of teachers, by showing that it is possible to gain a sound understanding of pedagogical content knowledge at such an early stage of participants’ teaching careers. The teachers in this study appear to be already well on their way on the journey to effective social science teaching. .

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