An investigation into constructivism within an outcomes based curriculum

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This paper presents a positivist quantitative case study of four rural Queensland schools implementing the Queensland Studies Authority's outcomes based education curriculum. Queensland’s school-based management system means that these schools are operating at distinctly different points along their implementation phase. This research shows how the QSA is yet to achieve an effective understanding of outcomes based education in the cluster schools. It establishes a relationship between successful implementation of an outcomes based education curriculum and an understanding of the curriculum’s intended constructivist learning theory and pedagogy.

Introduction

This study stems from my interest in curriculum development and sixteen years of classroom teaching. It investigates the professional development four rural schools experienced from the Queensland Studies Authority’s (QSA) outcomes based education implementation support.

I believe that the QSA’s outcomes based initiative has significant educational merit. It is the scope and depth of professional development offered by the QSA to effectively implement outcomes that this research investigates. It is my contention that a deep understanding of outcomes based education and associated constructivist learning theory have not been successfully integrated into teacher practice.

The purpose of this study was two fold. Firstly, it aimed to inform educational leaders whether constructivism should have been an explicit part of the professional development for the sampled schools. Secondly, it wished to inform the schools on the current level of constructivist pedagogy present in their workplace. Such information would have supported curriculum leaders to align their school’s professional development and syllabus implementation action plans.

Queensland’s outcomes based education model

Educational reform has offered Queensland’s State, Catholic and Independent schools the choice of outcomes based education as a curriculum framework since 2000. This initiative meant far more than a
shift in syllabus content. Administrators and teachers needed to understand and engage with an unfamiliar ideology to effectively take outcomes based education into the classroom. Only then could student performance be used to evaluate this curricular reform.

The rationale of the QSA’s outcomes based syllabuses embraces constructivism as a learning theory. Constructivism guided the curriculum framework, where knowledge, process and skill were scaffolded over six cognitive levels. This “advance organiser” framework distinguishes QSA’s outcomes based education from the failed values-based American outcomes based education reform (Christensen, nd; Devlin, nd; Killen, nd; Manno, 1994; Wilson, 1994).

Queensland schools were being offered a curriculum where age need not classify an individual’s educational experiences. However, as in many cases, practice and theory arrived at an educational compromise which was very much school dependent. Infrastructure and logistical constraints continued to define and arguably constrain the learning environment. Cognitive development continued to run second to age as the maxim for learning opportunities when QSA outcomes based syllabuses notionally benchmarked cognitive development to traditional year levels (Figure 1). Consequently, many Queensland schools continue to find themselves contained by traditional administration practices within a school-based management model.

![Figure 1: Progression of conceptual development of outcomes](Adapted from Mathematics, Years 1 to 10 Syllabus (QSA, 2004))

The QSA syllabuses ask Queensland teachers to engage student learning through constructivist pedagogy, acknowledging Killen’s (nd) view that “thinking is facilitated and encouraged by the processes that you use to engage students with the content, as well as by the content itself”. Meeting such a challenge would take outcomes from the syllabus documents and into classrooms.
It has been my experience that the QSA supported schools to logistically implement outcomes based education. This allowed schools to organise the delivery of syllabus content. However, the potential of outcomes beyond a content shift has yet to be fully realised. This study has taken the view that the QSA has failed to sufficiently support schools understand how to engage students with outcomes. Administrators and teachers have been provided some tools, but not the explicit understanding or training necessary to use them. I contest that the merits of QSA's outcomes based education are yet to be realised because of ineffective implementation support.

**Constructivism**

Fundamental principles of learning theories collectively called ‘constructivism’ evolved from research into developmental and cognitive psychology (Bodner, 1986; Duit & Treagust, 1998). I characterise the basic principles as i) the use of prior knowledge for new learning; ii) active involvement in the learning process through problem solving; and iii) knowledge which is continually changing. Constructivist pedagogy models and develops learning by promoting the virtues of an individual’s search for meaning as much as the knowledge being gained from that search. This is what I believe it means to develop lifelong learning.

Constructivists share the view that conditioning is an inadequate tenet on which to base contemporary learning theory (Duit & Treagust, 1998). However, the need for conditioning along a cognitive continuum has been established in works such as Bloom’s Taxonomy (Huitt, 2004; Atherton, 2005). In fact, the importance of foundation knowledge, in part based on conditioning, is evident in the most constructivist mathematics or science lessons. Constructivism merely supports minimising the dependence of conditioning in preference for higher order cognitive abilities as students progress through their education. It is my experience that student dependence on others, rote learning, and a view of education as disconnected and irrelevant, will persist where conditioning dominates in the classroom. Constructivism offers a significant but by no means exclusive pedagogy to educators seeking a more engaging learning environment.

The creation of knowledge from experience and use of that knowledge to support new learning represent fundamental principles of any constructivist instructional model. A consideration of the source of experiences distinguishes two perspectives of constructivism. Works of developmental psychologist Jean Piaget, advanced a more individualistic cognitive view. ‘Cognitive constructivism’ tells us that an individual's version of reality, ie, epistemology and ontology, results from a multitude of isolated experiences forming a network of neural connections - a ‘cognitive
map. The works of Vygotsky (Driver et al., 1994; Tinzmann et al., 1990; Duit & Treagust, 1998) advanced the sociological aspects of learning. ‘Social constructivism’ tells us that the experience of human interaction significantly affects the scope and sequence of cognitive development.

The variety of instructional models arising from research into constructivism may have served to confuse the application of constructivist pedagogy. Jerome Bruner’s ‘discovery learning’ model (Kristinsdóttir, 2001) is heavily student-centred. It emphasises an internal motivation to learn and minimal teacher guidance. Students will reference their previous experiences as they engage in problem solving. Learning is achieved by exploration and experimentation. Such a model particularly dominates in primary science pedagogy and perhaps lower secondary science classes. However, as an objectivist secondary science teacher, I sympathise with Killen’s (nd) cautious view of Bruner’s model where “...the assessment in these courses is based on the students’ participation in the activities and their recording of ‘results’, rather than on what the students learned.” As Novak (1978) puts it, “discovery teaching approaches do not guarantee meaningful learning.”

The cognitive psychologist David Ausubel held the view that discovery learning may be cumbersome and ‘inefficient’ (Erlendsson, nd). Ausubel’s ‘reception learning’ model suggests that students may require more external motivation to learn, facilitated by substantive dialogue – meaningful verbal learning. Teacher involvement in the learning process becomes a key pedagogical difference between Bruner’s and Ausubel’s models (Clements & Battista, 1990). Both constructivist instructional models aim to climb Bloom’s cognitive domain, but with different emphasis and arguably different efficacy.

Ausubel’s model promotes the use of ‘advance organisers’ (Novak, 1978) to more closely sequence and focus student learning. This facilitated learning model strategically positions the context of learning to connect prior learning, motivate new learning and target higher order thinking (Driver et al., 1994; Christensen, 1995). Findings from the Queensland School Reform Longitudinal Study (QSRLS) support the view that quality student outcomes are promoted by ‘sustained and disciplined inquiry focused (pedagogy) on powerful, important ideas and concepts which are connected to students’ experiences and the world in which they live.’ (Zyngier, 2005). The QSRLS gave rise to the QSA’s Productive Pedagogies project (see below).

Pedagogy modelled more on externally motivating factors may find greater favour in the upper middle school (Years 6 to 9) and lower senior years (Years 10 and 11). This is a significant transition time for students (Bryer & Main, 2005). They experience differentiation of the curriculum, the timing and extent of which varies between Queensland state schools because of a
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school-based management policy and infrastructure of the school, eg, traditional primary and high school settings, such as P-10 and P-12 campuses. Such times are also traditionally met with significant physiological and psychological change. Rightly or wrongly, an acknowledgement of these changes has particularly driven the middle school model of education (Pogrow, 1996; Bryer and Main, 2005). Social development appears to become more dominant in the minds of students, presenting particular learning difficulties for students and teachers. Student independence may become a behaviour management issue that denies the teacher and student access to an effective learning environment. I believe an educator’s role in facilitating active and focused learners particularly at this time significantly adds to any student’s level of motivation for future learning.

Middle and senior schools call for a shift in a teacher’s pedagogy to meet the changes in the learning environment. However, much care must be taken as to how this argument gets interpreted and actioned in the classroom. Traditionalist educators identifying with Ausubel’s model may mistakenly over emphasise a teacher-centred dynamic where an expository instruction model dominates and students become passive learners. This would only serve to promote an expert-novice role dichotomy between teacher and students. An extreme view of students as tabula rasa, empty vessels devoid of any prior knowledge, would disqualify the second principle of constructivism identified at the beginning of this section.

Vygotsky proposed a ‘social constructivism’ model (Anderson et al, 1997; Cobb, 1998; Duit & Treagust, 1998; Geier, nd). Social constructivism expands the understanding of external motivation for learning within Ausubel’s model by focusing on two dynamics. It asserts that the motivation for learning and construction of meaning are contextually based and guided by interaction with significant others. Research on these dynamics has lead to the principles of ‘situated cognition’ and ‘zone of proximal development’ respectively (Anderson et al, 1997; Cobb, 1998). Situated cognition has particular importance for the engagement of learners in the differentiated curriculum of traditional high school settings (Years 8 to 12). Students may have to identify with three or four specialist teachers (distinctly different in their pedagogy) and disciplines (distinctly different in their contexts) in any one day. Students may become passive learners or disengage from learning with particular teachers or particular disciplines. Mathematics and science education typically experience this phenomenon (Byers & Herscovics, 1977; Prawat, 1989; Duit & Treagust, 1998). The zone of proximal development has particular importance for the engagement of higher order learning in a teacher-centred environment, or pedagogy limiting learning experiences to a collaborative learning model where peer selected group members remain unchanged.
Successful teaching and learning employing the social constructivist model hinges on the cognitive ability, internal motivation and collaborative learning skills of the learners as much as the external motivation coming from the teacher's pedagogy. How active and focused a learner is in his or her social context can dictate his or her sense of connectedness with the world around them. As such, Vygotskian pedagogy sits well in the senior years, extension classes or in a gifted and talented program.

It is essential that teachers develop the skills students require to participate within a constructivist classroom. Vygotsky's work defined 'scaffolding' and its significance within the social flux of any classroom. Scaffolding suggests that a significant other, eg, peer, carer or teacher, adjusts any level of assistance offered in response to observed learnings. Teacher mentoring pedagogy is very apparent in lower primary where students are developing foundation knowledge and skills. Middle schooling views the specialisation of teacher pedagogy as critical to developing an effective teaching and learning environment. Senior education is a time when students are being asked to embrace self-directed learning (Cuttance, 2001). A peer mentoring 'buddy system' or formative tutorials may be explored in schools attempting to support senior students engaging with the curriculum.

Constructivist philosophy aligns curriculum, pedagogy and assessment when fully understood and effectively implemented within a whole school focus on learning. This is the intent of the QSA's outcomes based education syllabuses. Achieving such an alignment forms much of the work currently being done by the Queensland Curriculum, Assessment and Reporting (QCAR) taskforce (Queensland Government, 2005a). Recommendations from QCAR are to be implemented across Queensland schools in 2008.

I believe constructivism offers a significant pedagogy for teachers to meet the challenges of educating today’s youth. It offers a theoretical framework, a technology, from which teachers can model and encourage lifelong learning for themselves and their students. However, I also believe it would be unproductive to attribute a single instructional model to a particular phase of education, or indeed as the only pedagogy within a curriculum framework. I hold the view of Queensland’s education authorities that a repertoire of models would more effectively allow teachers to develop a progressive learning environment (Luke, 2002; Zyngier, 2005). Ongoing professional development is an essential element in maintaining efficacy of such a repertoire.

**Productive pedagogies**

Educational reformers at the turn of this century asked Queensland schools to trial one of two curriculum frameworks: *Outcomes Based*
The New Basics framework originated from the findings of the Queensland School Reform Longitudinal Study (QSRLS) and consideration given to Bernstein’s ‘three messages’ (Zyngier, 2005). The alignment of curriculum, pedagogy and assessment (Figure 2) underpins what New Basics identifies as essential to best practice education.

The QSA acknowledges through its ‘Productive pedagogies’ that quality teachers are essential to a curriculum intent on providing ‘socially equitable’ (Gore et al, 2001), quality learning. Productive pedagogies offers teachers a means to substantively reflect on their practice, as well as a vocabulary to engage in ‘critical conversations’ (Gore et al, 2001; Zyngier, 2005). The ‘metalanguage’ of Productive pedagogies is seen as a significant driver of quality professional development (Zyngier, 2005).

The QSA’s Productive pedagogies framework identifies four dimensions critical to quality teaching: intellectual quality; connectedness; supportive classroom environment and recognition of difference. Elaboration of these dimensions has produced 20 elements, seen as a “more comprehensive … analytical framework” than previous attempts to capture the nuances of pedagogy (Gore et al, 2001). I believe the 20 elements of Productive pedagogies shift the basic principles of constructivism into a practical pedagogical framework.

My experience with the term ‘pedagogy’ positioned it as a very elusive term, often given the ethereal definition of the ‘art of teaching’. Zyngier (2005) discusses the difficulties teacher training institutions have developing ‘teacher identity – what it means to be a teacher’ as distinct from ‘the teacher role’. My pedagogy has been guided consciously and subconsciously as much by my own beliefs, ie, personal, social and political ideologies, as by educational theories. I have experienced teacher identity being formed largely from the experience of ‘what works’ for the teacher and his or her students. Therefore, I deemed it much easier to ask a teacher to
reflect on examples of his or her practice than asking him or her to explain the theory behind his or her practice. The power of Productive pedagogies, allowing teachers to reflect on and evaluate their practice relative to a framework of 20 elements forming quality teacher pedagogy (Gore et al, 2001; Zyngier, 2005) ideally suited the inclusion of Productive pedagogies into this case study’s teacher questionnaire.

The problem

Educational research has demonstrated that individuals actively engage in learning from a platform of interest, need, personal style and developmental readiness (Anderson, et al, 1997; MacKenzie, 1998). Zyngier (2005) discusses that a different emphasis on these traits defines two basic approaches taken to structure teacher training, i) practical – developing the basic skills of teaching, or ii) theoretical – a level of belief of teaching. My memories of pre-service training and early teaching experience highly valued practical skills development. Sixteen years of service have shifted my interests, needs and developmental readiness, highlighting what I now see as professional naivety. Sixteen years of scaffolding have permitted me to develop a deeper understanding of my pedagogy, continually developing its expression in the classroom. However, scaffolding alone rarely offers a sufficient coping mechanism to deal with the frequency or rapidity of educational change. Educators are left with a sense of being overwhelmed by change. Add the collective of complex, often competing dynamics within the social context of schools and successful implementation of educational change can become very problematic. It becomes obvious that receptivity to change depends on i) what is to be changed, ii) the evidence establishing a need for that change, iii) the process for implementing change, and iv) the support mechanisms for the implementation of change (Pogrow, 1996; Fullan, 2000).

Points i) to iii) are often seen as directives, which simply must be accommodated. It therefore became the focus of this paper to investigate the effectiveness of support mechanisms and the notion of teacher identity (Zyngier, 2005) as schools attempt to implement outcomes based education.

The potential always exists for a minimalist philosophy to express itself as a powerful force resisting change in a social setting. The status quo may endure if a shift in thinking and practice cannot be effectively established or understood by stakeholders asked to deliver change in the workplace. Some tinkering around the edges satisfies those further up the hierarchy, but the core of the system’s operation remains static. Educational reform on the scale of a new curriculum framework is bound to experience and must overcome strong tradition and ideological differences if it is to be successfully implemented.
It takes a significant amount of ‘unpacking’ by Queensland teachers to holistically understand and then adjust to the impact QSA outcomes based syllabuses have on curriculum, pedagogy and assessment. QSA’s support for teachers needed to demonstrate how to plan for, deliver, assess and report on the learning experiences through outcomes. Following syllabuses as recipe books with “highly specific, systematic, and structural methodologies” (Pogrow, 1996), would severely limit the effectiveness of outcomes based education. I take the view of Pogrow (1996) by stressing the need for “supporting materials of tremendously high quality” for reform to be successful. However, Pogrow (1996) elaborates on this view when he states that it is a myth to effect educational reform through “advocacy, in-service and training ... if it lacks an underlying technology”. I believe that constructivism represents an essential underlying technology within the QSA’s outcomes based syllabuses. Constructivist pedagogy will support the alignment of curriculum and assessment.

Leadership is crucial to successful reform (Sergiovanni, 1993; Anderson & Dexter, 2000). It is through leadership that the workplace feels supported. The devolution of the Queensland education system, with a policy of school-based management, makes leadership an essential element at all levels of reform (Education Queensland, nd; Cuttance, 2001; Carrington, 2002). I contest that Queensland schools implementing outcomes based education have not been offered the necessary leadership, training and sustained support from the QSA to realise the significance constructivist philosophy and pedagogy have on the success of this curricular reform. I see the report card on outcomes based education for Queensland education heading towards ‘failed to meet its potential’.

It is the purpose of this educational research to investigate whether resistance to curricular reform in fact exists within a cluster of four rural Queensland schools. If so, to then identify ways those schools can be supported to overcome such resistance as part of an effective professional development program.

**Method**

My objectivist ideology guided this purposive quantitative case study (Cohen, et al, 2000). Case studies can effectively sacrifice the quantity of information found in survey methodology with quality of information if careful consideration is given to the standards for data handling and analysis (Cohen, et al, 2000). Hence, a case study was more suited to this research involving a cluster of four schools from the Warwick District, Queensland (Table 1), where a small sample population was expected. Significance rather than frequency of reliable and valid data was established through detailed administrator and teacher questionnaires.
Constructivism within an outcomes based curriculum

Table 1: Profile of participating schools

<table>
<thead>
<tr>
<th>School</th>
<th>Number of staff</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>School A*</td>
<td>15</td>
<td>260</td>
</tr>
<tr>
<td>School B*</td>
<td>15</td>
<td>160</td>
</tr>
<tr>
<td>School C*</td>
<td>40</td>
<td>660</td>
</tr>
<tr>
<td>School D*</td>
<td>22</td>
<td>240</td>
</tr>
</tbody>
</table>

* State government schools
* Catholic Education Office (CEO) school.

It was made clear through correspondence to schools and instructions to participants that individuals were free not to participate at any stage. No individual names were recorded and schools were coded to ensure confidentiality.

Modal responses were used in collating the raw data. I then applied four ‘focus questions’ to help organise and analyse the data. These questions were aligning to school roles using specific descriptors (see below). This approach was adopted to clarify relevant cause and affect relationships emerging from individual schools and sample population data. Interpretation of these relationships would form the basis for any recommendations.

Table 2: Focus questions

<table>
<thead>
<tr>
<th>Administrators</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the general experiences of school administrators with outcomes based education?</td>
<td>What are teachers' experiences with outcomes based education in their school?</td>
</tr>
<tr>
<td>Do the school administrators have an understanding of constructivism?</td>
<td>What is the teachers' level of awareness and understanding of constructivism?</td>
</tr>
<tr>
<td>What considerations were made by school administrators to implement outcomes based education?</td>
<td>How does teacher pedagogy reflect the application of constructivist theory within an outcomes based teaching and learning environment?</td>
</tr>
<tr>
<td>Does gender affect school administrators' responses to the questions above?</td>
<td>Does gender affect the outcomes of teachers' responses to the questions above?</td>
</tr>
</tbody>
</table>

An individual school perspective would best allow each school to address specific implementation and professional development issues. This was considered important as each school was at a different stage in their curriculum implementation action plan. However, it must be stressed that the research standards adopted in this study sacrifice extrapolation of any
findings or recommendations to any other State, Catholic Education or Independent schools.

Role as administrator or teacher determined the distribution of A5 sized booklet questionnaires. The teacher questionnaire was viewed as the primary source of data as it is through teachers that outcomes based education enters the classroom. Responses collected from administrators aided an understanding of how the cluster schools were implementing outcomes based education. Administrators’ data would also help establish the significance placed on constructivism within the cluster schools.

Administrator and teacher questionnaires were organised into discrete sections. The first section asked generic profiling questions on educational background. The second section sought responses on general understanding and experiences with outcomes based education. It also addressed the issue of role specific support offered during the school’s implementation process. The third and final section in the administrator questionnaire focused on school leaders’ awareness and understanding of constructivism. The third section of the teacher questionnaire dealt with awareness and understanding of constructivism as it applied to their role. A fourth section appeared only in the teacher questionnaire. This section adapted the QSA’s *Productive Pedagogies Classroom Reflection Manual* (Education Queensland, 2002) to quantitatively represent constructivist pedagogy in the sample teacher population.

A 10 point Likert scale (Cohen et al, 2000) for each element of Productive pedagogies was considered sensitive enough to effectively establish the level of constructivist classroom practices. A score between 0 and 4 suggested a lack of constructivist pedagogy. Scoring between 5 and 7 suggested constructivist pedagogy was developing. A score between 8 and 10 established the existence of constructivist teaching practice. A Cronbach alpha score of 0.92 established significant reliability of the responses collected from the pedagogy section of the teacher questionnaire.

Adapting the *Classroom Reflection Manual* proved to be somewhat problematic in maximising teacher participation and useful information for two main reasons:

i) Using Productive pedagogies made the teacher questionnaire quite large.

ii) The lack of teacher training in Productive pedagogies meant there was limited experience with this framework within sampled schools.
Results

This study looked for broad contexts as possible barriers to the cluster schools’ implementation of the QSA’s outcomes syllabuses, exploring initially factors such as time, location and population characteristics.

The four sampled schools were at very different stages in their outcomes implementation. The levels of acceptance, understanding and implementation of outcomes based education across the schools established that time alone would not result in full and effective curricular reform.

None of the sampled schools believed that a geographical context constrained their outcomes based education implementation.

The limited number of responses from individual schools cautions comment on data for each school other than to say that the responses from a Catholic Education Office school followed similar trends as the state schools.

The spread of teachers across years 1 to 10 offered a good representation of teachers implementing QSA Year 1 to 10 outcomes syllabuses (Table 3). However, the small sample of male respondents did not permit a comparative gender analysis. Equal representation from traditional primary and junior secondary years should negate any potential pedagogical bias between these school environments.

Table 3: Spectrum of teaching experience in the sample population

<table>
<thead>
<tr>
<th>School</th>
<th>Gender</th>
<th>Year Levels Taught</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>School A *</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>School B *</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>School C *</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>School D *</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>%</td>
<td>9.5</td>
<td>90.5</td>
</tr>
<tr>
<td></td>
<td>49.5</td>
<td></td>
</tr>
</tbody>
</table>

* Education Queensland and the Arts state school
* Catholic Education Office (CEO) school
The strength of this study lay in its further elaboration of population characteristics. Specific factors which resisted curricular reform were identified. These factors included school culture, awareness and understanding of constructivist learning theory and associated pedagogy.

**School culture**

Resistance to curriculum reform was quite dramatic, with 54% of the sample population preferring not to implement outcomes syllabuses if given the choice (Figure 3). There was insignificant difference between teacher and administrator populations in the proportions preferring not to implement outcomes based education. Being supported in curricular reform was viewed as important to effectively understanding outcomes based education by teachers (61%) and administrators (62.5%). Teachers were equally divided on whether none/limited or sufficient/ample time had been offered to develop such an understanding. Administrators were more decisive; with 87.5% believing that limited time was devoted to developing outcomes based education understanding in their school.

Figure 3: Administrator and teacher preference for OBE

Bivariate analysis between choice to implement outcomes based education and time devoted to understanding the curriculum distinguished two groups: reform blockers and reform supporters (Table 4). A total of 73.5% of the teacher population could be considered as offering some level of support for outcomes based educational reform. This suggested that a more effectively targeted professional development program for teachers could have minimised significant resistance to outcomes based education implementation in the cluster schools. There was a distinct need for administrators to get fully behind such an initiative, a plausible outcome given that no administrator was identified as a reform blocker (Table 4).
Table 4: Bivariate analysis on the level of resistance to OBE reform

<table>
<thead>
<tr>
<th>Reform blockers</th>
<th>Reform supporters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers (26.5%) Administrators (0%)</td>
<td>Teachers (21%) Administrators (12.5%)</td>
</tr>
<tr>
<td>Preferring not to choose outcomes after receiving what was believed to be sufficient to ample time to understand this curricular reform</td>
<td>Preferring to choose outcomes based education and that time to understand it was sufficient to ample</td>
</tr>
<tr>
<td>Teachers (10.5%) Administrators (37.5%)</td>
<td></td>
</tr>
<tr>
<td>Preferring to choose outcomes but felt more time was needed to understand this curricular reform</td>
<td></td>
</tr>
<tr>
<td>Teachers (42%) Administrators (50%)</td>
<td></td>
</tr>
<tr>
<td>Preferring not to choose outcomes but believed that none to limited time had been devoted to understanding this curricular reform at their school.</td>
<td>(Such a group would offer some resistance to curricular reform with the potential of changing their opinions given the necessary support.)</td>
</tr>
</tbody>
</table>

Learning theory
Half of sampled administrators had not included constructivism into their implementation plan. The remaining 50% had introduced it to their school, but it had only been partially received by staff. The term ‘constructivism’ was unfamiliar to 47.5% of the teacher population. However, when presented with a selection of four definitions, 68.5% of teachers identified with one of two preferred definitions of constructivism (ie, 1 & 4 in Table 5). An individualistic view of constructivism, ie, definition 1, was acknowledged by 26.5% of teachers. A social constructivism view of learning, ie, definition 4, was selected by 42% of teachers.

Teachers (81%) went on to indicate that ‘some’ or ‘a lot’ of understanding of constructivism would affect their school’s curriculum reform process. The sample population (89%) overwhelmingly believed that ‘none’ to ‘limited’ time had been spent on the professional development of constructivism.

Pedagogy
The finding that 41% of respondents had not engaged in pedagogical reform as part of the implementation plan warranted a more detailed investigation. The inclusion of Productive pedagogies in the teacher questionnaire allowed for more detailed analysis of the impact pedagogical resistance had on the implementation process.
Table 5: Preferred definition for constructivism selected by the sample

<table>
<thead>
<tr>
<th>Constructivism definition</th>
<th>Preferences</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The learner actively constructs his/her knowledge using previous experiences</td>
<td>50%</td>
</tr>
<tr>
<td>2. Existing knowledge changes only if something new is added, similar to laying bricks when constructing a wall</td>
<td>16.7%</td>
</tr>
<tr>
<td>3. Knowledge is constructed through a process of conceptual change</td>
<td>0.0%</td>
</tr>
<tr>
<td>4. Knowledge is constructed through experiences within a particular social setting</td>
<td>33.3%</td>
</tr>
</tbody>
</table>

The 10 point Likert scale used to collect pedagogical data offered sufficient distinction between strengths and weaknesses (Table 6). Constructivist pedagogy was shown to exist at a significant level of development within the teacher sample. A gross analysis identified that weaknesses dominated within the 'Intellectual quality' dimension. A closer look at elements within each dimension further clarified the strengths and weaknesses in the pedagogy of the sample teacher population.

The QSA's Productive pedagogies defines the substantive conversation element as being composed of four features: intellectual substance; dialogue; logical extension and synthesis; and sustained exchange. A comparison of all six elements for Intellectual quality (Figure 4) suggested that sampled teachers engaged with students in open dialogue. However, teachers needed to give more attention to how pedagogy could raise the intellectual ceiling of the curriculum students were experiencing. Such consideration would involve finding practices that improved contextual literacy, depth of understanding and higher-order problem solving skills in students.

Three elements of the 'Supportive classroom environment' suggested the presence of a Vygotskian model of instruction (Figure 5). However, a traditionalist's view of Ausubel's 'advance organisers' within the remaining two elements appeared to limit the development of a constructivist classroom.
Table 6: Modal positioning of constructivist pedagogy across the Productive pedagogies 20 elements

<table>
<thead>
<tr>
<th>Productive pedagogies</th>
<th>Constructivist pedagogy rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimension</td>
<td>Not evident (0-4)</td>
</tr>
<tr>
<td>Intellectual quality</td>
<td>Order of thinking</td>
</tr>
<tr>
<td></td>
<td>Depth of knowledge</td>
</tr>
<tr>
<td></td>
<td>Depth of understanding</td>
</tr>
<tr>
<td></td>
<td>Substantive conversation</td>
</tr>
<tr>
<td></td>
<td>Knowledge as problematic</td>
</tr>
<tr>
<td></td>
<td>Metalanguage</td>
</tr>
<tr>
<td></td>
<td>Student direction</td>
</tr>
<tr>
<td></td>
<td>Social support</td>
</tr>
<tr>
<td>Supportive classroom environment</td>
<td>Academic engagement</td>
</tr>
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Figure 4: Productive pedagogies: Intellectual quality

A Order of thinking  B Depth of knowledge
C Depth of understanding  D Substantive conversation
E Knowledge as problematic  F Metalanguage

Figure 5: Productive pedagogies: Supportive classroom environment

A Student direction  B Social support
C Academic engagement  D Explicit quality performance criteria
E Self-regulation

Particular attention to ‘Student direction’ and ‘Self-regulation’ (Figure 5) suggested a more traditional teacher-centred persisting as a means of supporting students. Supporting learning appeared to be confused with controlling learning. Teachers reported having high expectations, striving for the best from their students. However, student choice (ie, direction) was being compromised by teacher selection of learning tasks. Teachers
reported a high level of academic engagement, yet questioned the level of self-regulation.

These observations must be qualified by reminding ourselves that teachers are reporting on students ranging from Years 1 to 10. A shift towards having students self-regulate their learning gains greater pedagogical attention in the senior years of Years 10 to 12 in Queensland (Cuttance, 2001). However, it does appear that students are still being asked to learn from teachers’ experiences, rather than their own experiences with the curriculum. Blais (1988, p.4) refers to this as promoting a “… remedial processing option ...” when he wrote “Conventional instruction fails, not because it is poorly executed but because of what it includes.”

Queensland’s educational authorities premise policy development on the notion that people learn in different ways and at different rates (QSCC, 2002), as well as social justice issues such as inclusivity and equity. This has necessitated Queensland teachers accommodate the increasingly diverse learning needs of students by modifying tasks and assessment. The effectiveness of such effort requires considerable evaluation of pedagogy to align curriculum with assessment.

Classroom communication was shifting towards a balance between narrative and exposition (Figure 6). This supported a sense of community within the classroom that ‘Group identity’ aims to promote, as well as demonstrating a constructivist shift towards valuing students’ existing intellectual quality. Teachers did not view their students as a tabula rasa.

**Figure 6: Productive pedagogies: Recognition and valuing difference**

A  Active citizenship  B  Inclusivity
C  Narrative  D  Group identity
E  Active citizenship

0% 20% 40% 60% 80% 100%
A B C D E
8 to 10 5 to 7 1 to 4
Queensland educators are increasingly being asked to shift towards integration and the use of investigations to frame a learning context. This aims to emphasise compulsory education’s futures perspective and connectedness to lifelong learning.

![Figure 7: Productive pedagogies: Connectedness](image)

Figure 7 suggests that pedagogy has begun eroding the problematic nature of traditional curricular differentiation, promoting connectedness between the eight key learning areas and education with world events.

Responses to ‘Problem-based curriculum’ reflect the view that all investigations need not be on such a large scale as seen in New Basic’s Rich Tasks to engage students in deeper understanding. However, the composition of any task and subsequent assessment for learning needs to shift towards more open-ended questioning.

**Discussion**

Implementing educational reform should take the lead of constructivist theory. Firstly establish the current knowledge of stakeholders. A sound evidentiary need for any change must then be established. Finally, present, explain and assist schools plan for change in an understandable and meaningful way. The resistance to outcomes based education evident in this study demonstrated that the QSA’s professional development plan had been unable to apply the learning theory it wished teachers to take into the classroom. There is obviously work still to do before the sampled schools would be convinced that change was actually needed, or that outcomes based education offered the right direction to take. However, bivariate analysis (Table 4) suggested resistance may have been minimised had the
QSA and school administrators considered a more effectively targeted implementation support plan.

Pogrow (1996) cautions reformists by stating, “It is a myth to effect educational reform through ‘advocacy, in-service and training ... if it lacks an underlying technology.’ The QSA’s professional development has without a doubt offered schools in this study some of the in-service required to implement an outcomes curriculum, but insufficient training in the pedagogical technology necessary to substantially connect the curriculum to student learning.

A new vocabulary can add to a negative impression of what change entails. Constructivism underpins the pedagogical intent of the QSA’s outcomes based syllabuses, yet the term ‘constructivism’ was unfamiliar to 47.5% of teachers sampled. This was in contrast to 68.5% of teachers being able to select one of two preferred definitions from a choice of four (Table 5). This highlights that Productive pedagogies used in the teacher questionnaire allowed teachers to articulate their level of constructivist pedagogy, without fully understanding the rationale of the QSA syllabuses. It can therefore be argued that teachers continued to do ‘what works for them’ in various degrees of ignorance of the literature and theoretical constructs embraced by the QSA’s outcomes based education.

This study offered participating educational leaders evidence to assist their development of a more effective outcomes implementation action plan. Firstly, the data demonstrated that 81% of teachers and 50% of administrators were aware of a cause and effect relationship between pedagogical reform, ie, constructivist learning theory, and effective curricular reform, ie, outcomes based education implementation.

Secondly, this study supports Cuttance (2001) by suggesting teachers need to give greater consideration to how students are being presented with the curriculum across the eight key learning areas so as to improve student performance under outcomes based education. Including Productive pedagogies into curricular reform would help establish a better connection between quality teaching and improved student performance, supporting the recommendations of the QSRSLS (Zyngier, 2005) and the position of QCAR (Queensland Government, 2005b). This view is consistent with a better understanding of constructivist instructional models (Novak, 1978; Geier, nd; Kearsley, nd) and would in part shift pedagogy towards developing a more learner-centred environment.

Only 8% of the sample population rated the importance of understanding constructivist pedagogy as ‘none’ or ‘little’. It was then not surprising to see that 89% of the sample population expressed concern over the minimal efforts taken to engage teachers in a deeper understanding of
Constructivism as an essential part of an outcomes implementation plan. It would be unfair to blame administrators at this point for a lack of foresight and support in implementing outcomes when 25% were unaware of the term constructivism and 12.5% thought it was not applicable within this curricular reform. Such findings highlight an obvious need for both administrators and teachers to experience effectively targeted professional development from the QSA. The level of commitment to staff training warranted an investment commensurate to the scale of change schools experienced implementing outcomes based education. This has not occurred.

Thirdly, the data demonstrated the presence of constructivist pedagogy by participating teachers (Table 6). Simply targeting general awareness and understanding of constructivism may not have had as significant an impact on outcomes based education implementation as first thought. However, significant gaps in teachers' constructivist practice were established (Figures 4-7). This may simply be acknowledging that teachers, to engage the diverse range of learning styles in today's classrooms, were practicing other instructional models. However, it is the view of this study that specifically identified and targeted pedagogical support should have been provided, as much as it still remains necessary, to bridge the gaps within teachers' constructivist practices to effect an alignment of the curriculum, teaching and assessment. Raising an awareness of specific pedagogical gaps from studies such as this should offer pause for the QSA and school administrators considering future professional development programs.

This study identified a particular need to up-skill teachers in the 'Intellectual quality' dimension of Productive pedagogies (Figure 4). Better contextual learning strategies would help teachers connect the curriculum to student learning needs. Social constructivism, demonstrated by 'Supportive classroom environment' data (Figure 5), would help teachers make that connection. Development of the 'Problem-based curriculum' element of 'Connectedness' would support benefits gained by developing 'Intellectual Quality' (Figure 7). Successes gained from such targeted professional development would assist students engage with higher order problem solving strategies. Student performance could then be a legitimate criterion in the evaluation of outcomes based education implementation.

However, this study also cautions resistance towards curricular reform should teachers feel unsupported in a push towards greater learner-centred pedagogy. Teachers must be provided time, training and resources to develop confidence with curriculum content. Just as importantly, teachers must be supported in developing a deeper understanding of effective instructional models to deliver the curriculum. Curricular and pedagogical support are essential to effective curricular reform (Pogrow, 1996; Hattie, 1999; Fullan, 2000). Status quo continues in the face of reform if support is
ineffective. Two other scenarios could be present. A traditional, teacher-centred model may persist, where professional responsibilities are ‘met’ by covering the curriculum content. A student-centred pedagogy may be ineffectively implied when Ausubel’s advance organisers prescribe learning experiences (Blais, 1988). Alternatively, Bruner’s student-centred Discovery Learning model may be implemented that produces little meaningful learning (Killen, nd; Novak, 1978).

The data from this study supports the claim that specifically targeted pedagogical support should have been provided, as much as it still remains necessary, to bridge the gaps within teachers’ existing constructivist practices.

Understanding, positioning and connecting outcomes to student learning over 10 years of compulsory education remain significant challenges for the cluster schools. The QSA’s support to the four schools in this study has not allowed the merits of outcomes based education to be fully realised.

**Conclusion**

The problem with this type of study is that it is retrospective. This study offers a snapshot of opinions developed over five years of experience with implementing outcomes based education. It is then perhaps a mute point to say the QSA got their initial professional development program wrong.

The value of this case study comes from its teacher focus. It offers an evidence-based perspective of curricular reform in schools, bounded by time, location and population characteristics. It offers guidelines for schools developing a support plan to implement change under outcomes based education reform. It promotes a futures perspective aimed at improving educational outcomes for schools, teachers and students. The findings in this study should therefore be of interest and importance to any educational leaders involved in driving change.

This study claims that professional development on constructivist pedagogy addressing three fundamental questions, (What is it?, What does it look like? and How can I take it into my classroom?) would improve the satisfaction levels of administrators and teachers implementing outcomes based education.

Only when common knowledge and the context of learning are understood and shared will all stakeholders operate within the same version of reality and be directed by the same goals. Classrooms that embody a constructivist philosophy are extremely pertinent to Queensland’s Smart State ETRF reforms – *Earning or learning* (Queensland Government, 2002)
and warrants significant support mechanisms missing from the QSA outcomes based education professional development for schools.

The findings of this research support the need for a longitudinal study into the social impact of school resistance to outcomes based education. This is especially true if curricular resistance found in this study is commonplace, left unattended, and outcomes based education remains a major curriculum framework within Queensland’s education system.

References


Constructivism within an outcomes based curriculum


www.education.qld.gov.au/qcar
www.ncrel.org/sdrs/areas/rpl_esys/collab.htm

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