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Contradictions and Challenges Facing Future Teachers.**

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Teaching Technology – Design Briefs and Rich Tasks: Contradictions and Challenges Facing Future Teachers

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The teaching of Technology as a Key Learning Area in Queensland schools will become the focus for teacher education and professional development during the next decade as a new Technology syllabus is implemented in education systems in Queensland. Prior to the launch of that syllabus, there has never been an official Technology curriculum for Queensland primary schools. In addition, this will take place within a context of Queensland State Education 2010 (QSE-2010) which provides a "blueprint for the future of state education in Queensland... [and] ... is the key to delivering our vision of the Smart State..." (Bligh 2002). Thus, teacher education institutions in Queensland and schools are faced with enabling teachers to effectively implement a new Technology syllabus as well as embracing the principles of Education Queensland's New Basics framework which provides a suite of Rich Tasks. This paper explores the concepts of Design Briefs contained in the Queensland School Curriculum Council's new Years 1–10 Technology syllabus and Education Queensland's Rich Tasks and the implications this holds for conducting effective teacher education programs in Technology education. The intention is not to argue which of the two orientations is the better approach, but examines, through a case study of a school-University partnership in delivering a course for student teachers undertaking primary teacher education, the contradictions and the challenges facing those future teachers of technology education.

Introduction

Until recently, teachers in Queensland primary schools have not had any formal syllabus for teaching technology. Thus, teachers are faced with the emergence of a new curriculum are in the form of Technology as a Key Learning Area (KLA). At the same time, Education Queensland has conceptualised the New Basics Project occurring within the context of Queensland State Education (QSE-2010) which provides a "blueprint for the future of state education in Queensland... [and]...is the key to delivering our vision of the Smart State..." (Bligh 2002). This paper does not examine which of the two orientations is the better approach, but flags the challenge for teacher education institutions in Queensland and schools faced with enabling teachers to effectively implement a new Technology syllabus as well as embracing the principles of Education

Queensland's New Basics framework which provides a suite of Rich Tasks.

Thus, this paper explores the concepts of *Design Briefs* contained in the Queensland Studies Authority's new Years 1–10 Technology syllabus and Education Queensland's *Rich Tasks* and the implications this holds for conducting effective teacher education programs in Technology education. The paper concludes with a case study of a University-School partnership in delivering a course for student teachers undertaking primary teacher education. In particular, the case study highlights the advantages which University-School partnerships can provide in terms of engaging student teachers and teachers in the sharing of current trends and initiatives.

New technology syllabus for Queensland schools – Design briefs and design challenges

The newly formed Queensland Studies Authority (QSA) established under the Education (Queensland Studies Authority) Act 2002 has "portfolio-wide responsibilities for the development, review and approval of pre-school guidelines and syllabuses for years 1–12, as well as the development of professional resources for teachers to support the implementation of relevant guidelines and syllabuses" (QSA 2002a). Those responsibilities include the design, development and publishing of a Years 1 to 10 Technology key learning area (KLA) syllabus, sourcebooks and initial in-service materials for use in Queensland schools from 2002 (QSA 2002b). That project began in January 1998, under the auspices of the former Queensland School Curriculum Council, and has moved through trial and pilot phases. Descriptions of the project can be found elsewhere (QSA 2000b) and the Technology Years 1 to 10 Syllabus has been developed and approved (QSA 2000c).

Integral to the syllabus is the concept of Design Briefs (see *Technology Years 1 – 10 Syllabus*, pp.6, 45) and Design Challenges (see *Technology Years 1–10 Syllabus*, pp.2, 5, 6, 7, 9, 10, 11, 14, 15, 16, 20, 21, 22, 23, 26, 37). For example, in the Technology Practice strand, "Production procedures can be identified, described and managed when making products that meet design challenges" and the syllabus indicates that

"The implicit purpose of 'working technologically' is the design and development of products that enable people to meet their needs and wants and to capitalise on opportunities" (QSA 2002c, p.1).

Design challenges are defined as "situations, problems or tasks that have a technology demand – that is, they are challenges requiring students to make cognitive and practical responses that draw on their technology knowledge, practices and dispositions" (Queensland School Curriculum Council 2002, p.2). Examples of design challenges include:

- Design a safer transport vehicle for students which overcomes the injury risks presented by current bicycle designs,
- Design and construct a classroom of the future.

The KLA of technology is expected to contribute to attributes of the lifelong learner; viz. A knowledgeable person with deep understanding, a complex thinker, an active investigator, a creative person, an effective communicator, a participant in an

interdependent world, and a reflective and self-directed learner. Furthermore, the Technology KLA promotes cross-curricular priorities of literacy, numeracy, lifeskills and a futures perspective. For example, in terms of a futures perspective planning, teachers are encouraged in their planning, implementation and assessment to adopt a futures perspective through a consideration of the effects of technological developments on individuals, communities and environments.

Education Queensland's New Basics Project – Rich Tasks

The New Basics is described as "futures-oriented categories for organising curriculum" (Education Queensland Nov. 2000, p.1). According to Education Queensland, they provide a means for dealing with enormous economic, social and cultural change. Thus, we are seen to be living in 'new times' characterised by globalisation, the shift towards local service-based economies, new and constantly changing technologies, complex transformations in cultural and social relationships, fluid demographics, and a sense of uncertainty about the future (Education Queensland Nov. 2000, p.1). This is consistent with the Australian Council of Deans of Education (ACDE) (October 2001), in presenting a charter for change in *NEW LEARNING A Charter for Australian Education*, identified three shifts, in the conditions of technology, the conditions of commerce and the conditions of culture. The ACDE (October 2001, p.33) suggest that the market capitalisation of today's organisations are determined by technology (e.g. as direct means of production, as an internal systems filter and communications medium, as an information conduit to markets); commercial processes (e.g. business systems, winning employee buy-in at the level of work teams and corporate culture); and culture (e.g. branding, customer relationships, commodity-aesthetics, the integrity of the product and the ability to tailor or customise products to meet the needs of diverse niche markets etc.). The analysis undertaken by the ACDE here concludes that:

"These are all knowledge things, relationship things, things of human rather than fixed capital. Most importantly, they are all things that are made by learning. Learning has become pivotal to the whole economy. And, for the learning which is now required, the old education simply won't do. The new economy requires new persons: persons who can work flexibly with changing technologies; persons who can work effectively in the new relationship-focused commercial environment; and people who are able to work within an open organisational culture and across diverse cultural settings" (ACDE October 2001, p.33).

In comparison to the eight KLA's, there are four New Basics organisers oriented towards researching, understanding, and coming to grips with the new economic, cultural and social conditions – Life Pathways and Social Futures, Multiliteracies and Communications Media, Active Citizenship, and Environments and Technologies. It's claimed that "together they describe the interactive requirements of new life worlds and futures orientations" (Queensland State Education 2010, p.2). The New Basics requires the adoption of Productive Pedagogies and urges shifts in pedagogy. Moreover, there is a Queensland model of rich tasks (see Education Queensland 2000, *New Basics – The Why, What, How and When of Rich Tasks*) which sees Rich Tasks as:

"a culminating performance or demonstration or product that is purposeful and models a life role. It presents substantive, real problems to solve and engages learners in forms of pragmatic social action that have real value in the world. The problems require identification,

analysis and resolution, and require students to analyse, theorise and engage intellectually with the world. In this way, tasks connect to the world outside the classroom. As well as having this connectedness, the tasks are also rich in their application: they represent an educational outcome of demonstrable and substantial intellectual and educational value. And, to be truly rich, a task must be transdisciplinary".

There are some powerful underlying understandings here which go beyond the scope of this paper. However, it's important to understand that the Rich Task requires transdisciplinary learnings which utilise practices and skills across disciplines while retaining the integrity of the disciplines. This differs from crosscurricular or thematic approaches. In summary, a Rich Task is an integrated intellectual and linguistic, social and cultural practice, represents an educational outcome of demonstrable and substantive intellectual substance and educational value, is transdisciplinary, draws on a range of operational fields of knowledge, engages knowledges and skills from at least two of the New Basics clusters, is problem-based, connects to the world beyond the classroom, has face value for educators, parents and community stakeholders, has sufficient intellectual, cognitive and developmental depth and breadth to guide curriculum planning across a significant span of schooling, enables flexibility for schools to address the local context, and has reasonable workload expectations for teachers. An example of a Rich Task is:

Year 6 Rich Task – Design, Make and Display a Product. Students will design, or improve the design of, a purposeful product, and make the product or a working model or prototype. As part of a public display promoting their product, they will flesh out a (restricted) marketing plan and explore the suitability of materials for mass manufacture.

Design briefs and Rich Tasks – Contradictions and the challenges

Several challenges emerge from the new and differing concepts of Design Briefs and Rich Tasks. Firstly, practising teachers are presented with new curriculum frameworks and demands which have more differences than similarities. Some schools are adopting KLA's and thus have an outcomes model, others are New Basics trial schools. Anecdotal evidence suggests that many schools are becoming aware of both approaches and some hybrid approaches are evolving. For example, Productive Pedagogies inservice programs are being presented to teachers in many schools, and those teachers are becoming aware of Rich Tasks. A growing awareness is also occurring among teachers about the imminent Years 1–10 Technology Syllabus, as well as many schools undertaking outcomes-based planning in KLA's already being implemented such as Science. Teachers find themselves confronted with contradicting claims for the ways in which curriculum, assessment and pedagogy should occur. Do we plan for Design Challenges or for Rich Tasks? How do we assess and report learning outcomes?

Secondly, preservice teacher education programs need to address the challenges provided by this new environment as many tertiary institutions have conceptualised their teacher education programs around the KLA's such as Griffith University's Bachelor of Education (Primary). Student teachers are being exposed to a more diverse set of contexts in their practicum settings. Moreover, questions arise about the relevance of 'academic' courses in curriculum within a rapidly changing educational environment. The

challenge also for 'academics' is how to effectively integrate the essential, theoretical components of courses with the curriculum renewal occurring in schools and education systems. These implications for teacher education to address these challenges require conversations between Universities, schools and education systems.

University-school partnerships – A case study

A tentative solution to deal with the challenges posed by systemic changes in curriculum and, in particular, the tensions which exist between a University-led Bachelor of Education (Primary) degree organised around the Key Learning Areas and the emergence of the New Basics Project is to ensure that the University-School partnerships are built strongly at two levels;

1. People and Professional Development, and
2. Curriculum.

People

We argue that much greater potential is provided by engaging school-based people in teacher education. Those people have a mutual obligation of providing advice to University about course content and delivery as well as growing professionally through a reciprocal sharing of information and ideas by the relevant University academics. Therefore, the design and conduct of courses is seen as a worthwhile professional development opportunity by lecturers, tutors and school-based contacts.

Curriculum

In these new times of New Learning (ACDE 2001), new approaches to curriculum are being demanded and introduced. Effective sharing of knowledge about these curriculum developments is essential.

Further modifications of a Technology Education course for primary teacher education which was reported earlier (see Finger 2000) were made to enable students to be exposed to the new curriculum developments through utilising University-school links. In particular, a tutor was appointed due to her working in a New Basics school, and another tutor was an Educational Adviser involved in conducting Productive Pedagogies inservice programs with teachers. Both tutors provided advice to the Course Convenor, and other members of the teaching team. Within the parameters of the University course requirements, the teaching team, consisting of teachers, consulted and planned the course in ways which attempted to inject the current developments. As a result, students have gained some understandings of Design Challenges, New Basics, Rich Tasks and Productive Pedagogies.

While the course is still yet to be completed this semester, evaluations by students reflect the benefits of University-School partnerships. The following examples indicate the positive aspects in terms of 'at the chalkface', environment, resources, course structure, assessment, and student growth.

At the chalkface

The 'at the chalkface' comments emphasised the credibility which students perceived that the tutors had because they were 'actual teachers'. Comments included:

- *People who are teachers*
- *Sharing of information between student and teacher*
- *Positive relationships*
- *Getting to know and share*
- *Philosophy and effective pedagogy*
- *Supporting and acting notion of life long learning*
- *Students fears and or perceptions can be broken down.*

Environment

There were perceived advantages associated with the environment affordances of the school settings. For example, students cited the greater availability of parking when compared with parking problems at University, and immersion in 'real classrooms'. Examples of comments included:

- *Environment colourful and relaxing*
- *Real teachers real environment*
- *How classrooms have changed and what changes they will make with their new ideas*
- *Learning centres.*

Resources

Clearly, students identified the exposure to resources in the school settings as positives. The consensus among students was that they would love to spend more time in school settings with hands on activities involving the use of resources, such as digital camera, different software and exposure to resources available in the schools. Comments included:

- *Teachers as a resource*
- *Time as a resource*
- *Examining software and computers*
- *Teacher programs*
- *Play with computers*
- *Schools as a resource, library, classrooms, staff rooms.*

Course structure

There were strong evaluations suggesting that the tutorials were well designed in terms of gaining understandings of teaching technology. Together with positive evaluations of the

course in general, the course structure was seen as being important.

- *Most productive of all tutorials I am involved with. We actually do – therefore we understand*
- *Relevance to now and the future*
- *Fills in the gaps*
- *Walk the walk and talk the talk*
- *Delivery of course / program*
- *Humour and story telling*
- *Personal development with students*
- *Win Win scenario – relationships*
- *Course suggestions - computer time, observing classes, more time in classrooms and an open door when the course finished the learning continued.*

Assessment

Supporting the Course Design evaluations were comments relating to the integral design of assessment. For example, the following comment highlighted the effective design of the Design Brief assessment students were required to undertake:

- *Assessment of design brief was great and relevant! To finally be able to work on assessments that relates directly to the teaching profession is a relief!*

Student Growth

The links between the University coursework and the journey from student teacher to teacher were made more explicit according to some students. The University-school links were seen by those students to facilitate the transition between theory and practice.

- *My understanding of the subject and confidence to take it into the classroom has increased dramatically. Thank you.*

Conclusion

This paper has highlighted challenges for teachers and teacher education institutions in Queensland with the introduction of a new Technology syllabus and associated materials, together with the introduction of the New Basics Project. Specifically, the concepts of Design Challenges and Rich Tasks present students teachers and teachers with new and conflicting approaches to curriculum, pedagogy and assessment. The challenge for teacher education institutions is how to adequately immerse students in these new times. A tentative solution was presented in terms of capitalising on University-school partnerships in designing and implementing a University course in Technology Education.

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