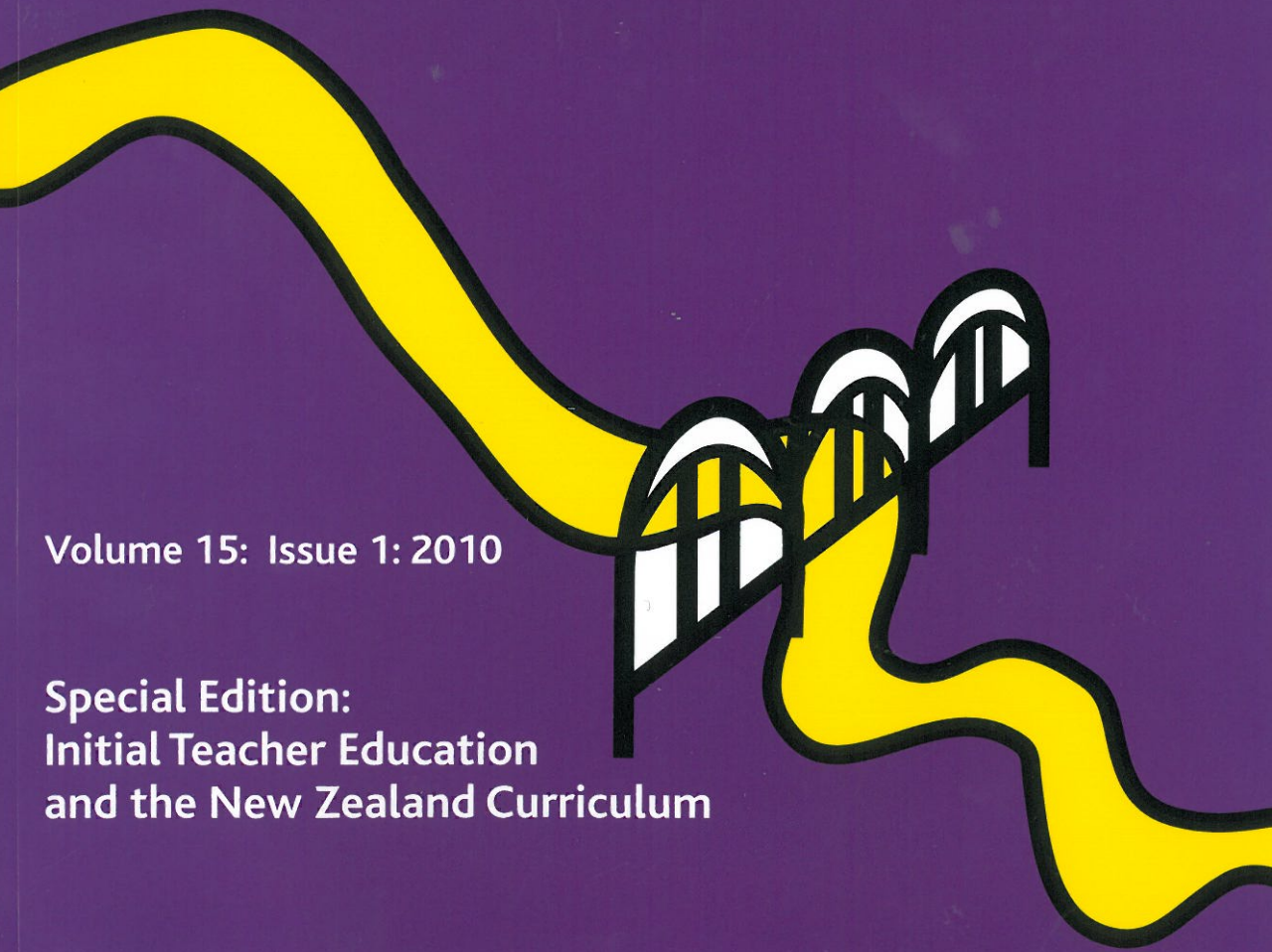
THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

School of Education
Te Kura Toi Tangata

Waikato Journal of Education
Te Hautaka Mātauranga o Waikato



Volume 15: Issue 1: 2010

Special Edition:
Initial Teacher Education and the New Zealand Curriculum

WAIKATO JOURNAL OF EDUCATION

TE HAUTAKA MĀTAURANGA O WAIKATO

VOLUME 15, Issue 1, 2010

Waikato Journal of Education 15, Issue 1:2010

GETTING IT STRAIGHT: THE DIFFERENCE BETWEEN INQUIRY-BASED LEARNING AND TEACHING AS INQUIRY AS TAUGHT TO PROSPECTIVE TEACHERS

SUE BRIDGES AND FIONA GILMORE
College of Education
University of Canterbury

ABSTRACT: *Teaching as inquiry is a concept included in the notes on effective pedagogy in The New Zealand Curriculum (Ministry of Education, 2007). In this paper we look at this concept in relation to inquiry-based learning, a longstanding approach to beliefs and practices in teaching. We study these two types of inquiry in the context of two courses in teacher education at the University of Canterbury. We demonstrate that these two types of inquiry are complex and there is a need for more evidence to evaluate their respective merits, given that they serve different purposes.*

KEY WORDS:

Inquiry, inquiry-based learning, teaching as inquiry, teacher education

INTRODUCTION

The term "inquiry" has a long history in education. In recent years it has been used in different ways in educational dialogue and documentation and its use in different contexts has led to some confusion for teachers, researchers and practitioners. This paper examines the differences between two of these uses: *inquiry-based learning* and *teaching as inquiry*. Two successful courses have been developed by the University of Canterbury's College of Education which demonstrate the underlying philosophy of each focus, and allow students to actively participate and take ownership of the embedded learning processes. Both are delivered to graduate teacher education students: the first to Graduate Diploma of Teaching and Learning (GDipTchLn), (Primary) and the second to students in the Bachelor of Teaching and Learning (BTchLn) Honours programme. The elements of these courses are described, compared and contrasted in relation to deeper learning states in students urged by the recent *The New Zealand Curriculum* (Ministry of Education, 2007).

LITERATURE REVIEW

The demands teachers and teacher educators currently face are complex and diverse. With technology changing at a rapid pace, current teacher education students are preparing for challenges which may not exist in future, and today's job market requires people to self-regulate, research ideas, synthesise and analyse

information, and have the ability to work effectively with others (Darling-Hammond, 2008). Therefore the challenge for teacher educators and teachers is to develop a wide range of skills and "dispositions" that will enable teachers and children to have the resilience and flexibility to cope with the changing fields of knowledge (Gilbert, 2007; Ministry of Education, 2007). Furthermore Gilbert (2007) argues that knowledge has become more "fluid" and is more process orientated, produced largely within groups of people. Knowledge therefore continues to expand within authentic and real-world contexts, and a more learner-centred approach needs to be adopted, so students can be given choices about work or further education (Cochran-Smith & Lytle, 2009). Gilbert (2007) states that our education system needs to emphasise that individuals are "active knowledge-builders" who are able to produce knowledge and who value diversity and difference.

As New Zealand teachers have grappled with the new direction of *The New Zealand Curriculum* (Ministry of Education, 2007), the term "inquiry" has at times become confusing. Erb (2009) notes the following definitions in a recent *New Zealand Education Gazette* article

> Teaching as inquiry is when teachers inquire into what is most important; what strategies or approaches are most likely to work; and the impact of teaching on students. Inquiry learning is … one approach in which students learn about learning, investigation and research as they explore topics of interest. (p. 3)

Teacher inquiry falls under the umbrella term of "practitioner inquiry" which is a process that allows individuals and communities to engage in discourse about critical issues within their professional practice and to investigate these issues in order to gain new insights or new ways to theorise about their practice (Cochran-Smith, & Lytle, 2009). These authors note that the different forms of inquiry referred to in literature have a number of commonalities which include: teacher as the researcher and knowledge source; community and collaboration; professional context as the inquiry site; validity and generalisability; systematicity (often of data collection) and public dissemination. Within the New Zealand educational context, the teacher inquiry cyclic process has been highlighted in both *Teacher Professional Learning and Development Best Evidence Synthesis* (Timperley, Wilson, Barrar & Fung, 2007) and *The New Zealand Curriculum* (Ministry of Education, 2007, p. 35). Both documents emphasise that this approach allows teachers to investigate their teaching by identifying the impact it has on student outcomes.

Inquiry-based learning as a pedagogical approach has become closely aligned to the development of information literacy (Bond, 2001; Levy, 2009), the application of learning models and the use of higher-order thinking strategies and tools (e.g. Pohl & Dixon, 2005) which partly explains its high degree of relevance to learners. Learners are scaffolded by teachers, mentors, and fellow students to develop and explore essential and self-generated questions and wonderings (McKenzie, 2005) through self-directed learning, which drives their meaningful and worthwhile learning experience (Levy, 2009). It is argued that learning is preferable

when it it is relevant, authentic, fluid and valued by each learner. Learners engage in the dual roles of constructor and disseminator of information to a level of "expertise" (at least among their peers, and often in the wider educational community). Situated within such growing learning communities of shared practice, inquiry-based learning also provides a model and vehicle for a future vision of collaboration between reflective and forward-thinking educators. Such skills and direction should surely serve to enhance the global educational community to which future teaching and student generations will belong.

Teaching is a complex and challenging profession and there are no simple recipes or formulaic approaches to effective teaching. However, Hattie (2009) argues that teaching is strategic and deliberate and must be made "explicitly" visible to the student and be linked to student assessment data. In this way teachers take an active ("activator") role in the classroom, and combine elements of direct instruction and "discovery" methods (Hattie, 2009). Much evidence surrounds established principles of learning including: acknowledging, identifying and connecting to learners' prior knowledge; allowing opportunities to organise and use knowledge conceptually; and allowing learners to understand how they learn and manage their own learning (National Research Council, 2000). But in New Zealand initial teacher education this involves incorporating and allowing student teachers to develop the tertiary key competencies (thinking, using tools interactively, acting autonomously, and operating in social groups) as outlined on p. 42 of *The New Zealand Curriculum* (Ministry of Education, 2007) and to enact effective pedagogy in response to students' needs. Consequently, student teachers need to be constantly monitoring their own practice and the effects it has on their students ("teacher inquiry"), thus deepening their own learning and modelling active learning to children.

However, the argument for incorporating learning strategies is not just about modelling effective pedagogy. There are deeper issues surrounding student teachers developing their professional teaching identity. It is argued that student teachers need to be enabled to reflect on themselves as learners while also thinking about pedagogy by creating opportunities for them to see "into" teaching (Loughran, 2007). Bullough (1997) identified that teacher identity was important as prospective teachers deconstructed and challenged their personal beliefs and previous understandings in light of their current experiences. While teacher education must be powerful enough to challenge beliefs, it should remain respectful and supportive of the individual learner (see Bullough, 1997). Teacher educators can design experiences in which students can actively engage as learners and "guide" them as they take risks in their learning and increase their effectiveness, by "making teaching a site into inquiry" which encourages questioning, probing, reflection and critique (Loughran, 2007). Two such experiences include "learning through inquiry" and "teacher inquiry".

FINDINGS RELATING TO THE ISSUE

The context of initial teacher education changed when the Christchurch College of Education merged with the University of Canterbury in 2007. The merger prompted a restructuring of teaching staff organisation so that the new University College of Education's initial teacher teacher education programmes (early childhood, primary and secondary) consist of courses taught across four schools in the college. In addition, there are postgraduate qualifications to doctoral level.

The primary undergraduate teaching qualification (BTchLn) is a three year programme of study. The GDipTchLn is a fifteen-month programme for those with a degree or equivalent on entry. Distance options known as flexible learning options (FLO) are available for these qualifications. The BTchLn(Hons) programme is an on-campus one-year qualification which is undertaken upon completion of the BTchLn degree and may be focussed upon either primary or early childhood.

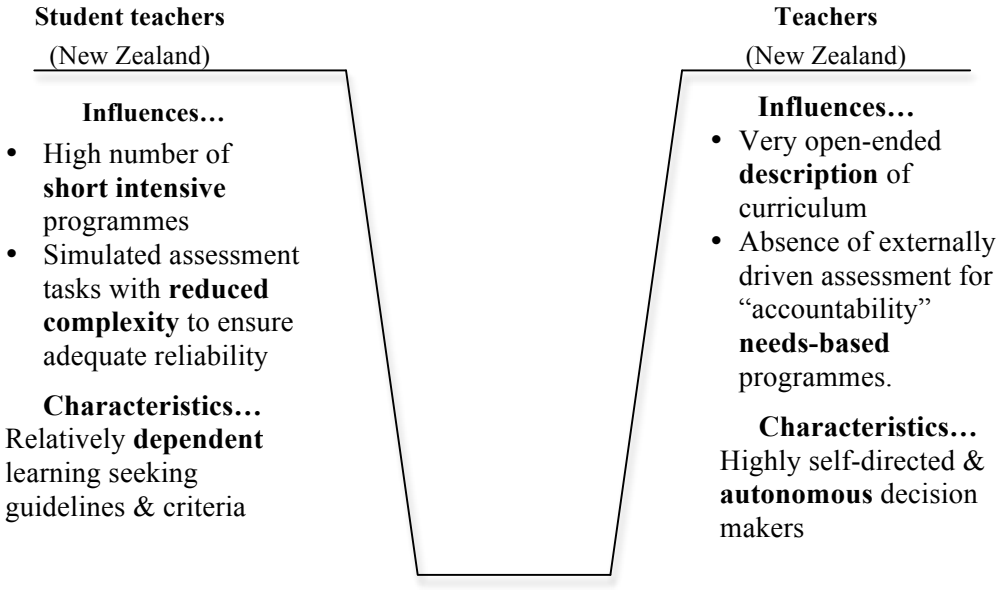
The two courses discussed in this paper are *Investigations in Inquiry-based Learning* (GDipTchLn) and *Learning and Curriculum* (BTchLn(Hons)). Both are compulsory courses within their respective qualification. The former is generally undertaken in the final semester of the programme, on the successful completion of two five-week professional placements and most curriculum studies. It was first delivered in 2006, prior to the merger of the institutions. In existence in this form since 2008, the latter is taken throughout the year of the study, with *teaching as inquiry* being the focus of this course.

Inquiry-based Learning: GdipTchLn–Time for a Change

In recent years lecturers of our GDipTchLn (Primary) students began to feel that a mismatch existed between the types of learning that research (see Darling-Hammond, 2008 for an extensive literature review) indicated were relevant and useful to contemporary learners, and the current experience of students within the programme. At that time, curriculum courses, interspersed with professional studies and professional placements, were delivered throughout the 3–semester/15–month course. During the final months of their initial teacher education programme, students were required to "juggle" discrete packages of learning, then expected to independently integrate these while on professional placement (practicum). This led to fragmentation and overload, challenging us to find ways to enrich this last semester through deeper learning to inspire students to embark on their teaching careers enthused by approaches that would in turn enthuse their own students.

Russell and Meek (2006) described the situation neatly as "crossing the professional divide". Figure 1 shows the gulf between what they perceived to be the common experience for New Zealand initial teacher education students and the role expected of them as classroom teachers. How could we expect these fledgling professionals to demonstrate self-direction and autonomy as professional decision makers if they had not been encouraged to do so themselves as recent learners?

Figure 1. Crossing the Professional Divide



(Adapted from Russell & Meek, 2006)

Fortuitously, the qualification was due for review in 2005 which provided us with the chance to reflect on our existing model of delivery and to consider new lenses through which to view and promote learning. Up to this point, traditional lecture and workshop approaches had been used, based on pre-approved course learning outcomes firmly connected to national curriculum documents. Students moved from short course to short course, and apart from the binding thread of professional studies and professional placement in schools, they were not directly involved in the integration of this curriculum knowledge and understanding. Nor did they play any part in course direction. As shown in Figure 1 (Russell & Meek, 2006), this resulted in potentially *dependent* emerging teachers, who would nonetheless be required to act very differently as autonomous decision makers once responsible for children in a classroom.

Around this time, considerable work was being done in Queensland, Australia (Education Queensland, 2000) on the development of "rich" tasks to organise and promote higher-order thinking skills. This approach had synergies with our own emerging understandings and vision, and it was proposed that this pedagogy should be embedded in our own practice. The Ministry of Education's 2005 discussion document on key competencies in tertiary education (Ministry of Education, 2005) which built on the thrust of the review of the New Zealand curriculum framework, provided further evidence that we were focussing our energies in the right direction. An inquiry-based learning model was agreed to be the best fit for our purposes. Following a period of considerable research, consultation and discussion, our

curriculum centres (health, literacy, Māori, maths, multicultural studies, music, physical education, science, social studies, technology and visual arts) each released credit contributions to a new 16-credit "rich course".

New information communication technology tools (including YouTube and Skype) provided increased opportunities for learners to access seemingly limitless information. Compared to even a few years earlier, students in the GDipTchLn (Primary) programme were computer–literate and had access to computers and the internet. Given the skills to filter and appropriately select information literacy tools, and time to properly engage in a reflective process, they would be able to combine new and traditional skills and processes to create meaningful learning experiences relevant to their personal and professional learning journeys, within authentic contexts relevant to teacher education.

In designing this new course, we needed to ensure that

- it "walked the talk", that is, there was a match between the aims and the teaching and learning approaches;
- it was generic enough to cater for a wide range of educational interests and fields of study;
- it could be adapted for distance (flexible learning option) students; and
- it would be re-evaluated and modified regularly in order to respond to learners' needs.

"Walking the talk" in this case meant a strong emphasis on the modelling and demonstrating of pedagogy throughout the course. Barron and Darling-Hammond (2008) emphasise the teachers' (in this case, lecturers) "critical role in establishing and modelling practices of productive learning conversations" (p. 30). This approach is somewhat at variance with the traditional university transmission model and more extreme than the traditional college of education classroom practice model and therefore demanded a new structure to unravel any pre-existing expectations.

Description of the Course

The organisation of the course was established to reflect the pedagogy of inquiry-based learning. Pertinent scaffolding, rigorous reflection and consequent modification were essential to its validity. The description that follows is of the current version, based on several years of feedback and review.

The Immersion Phase

The Inquiry course consists of two parts, carried out over the cusp of two semesters. During the second semester of the GDipTchLn (Primary) course, an *immersion* to inquiry-based learning occurs over three well-spaced two-hour sessions, involving a panel of ex-students, teachers, principals—and sometimes children—who have experience of classroom-based inquiry learning. Student teachers are introduced to the pedagogy of inquiry, to the notion of life-long authentic learning and to the resources (online and hard copy) to get them started. Multiple models of inquiry-based learning (e.g. Bond, 2001; Gawith, 2000; Pohl & Dixon, 2005) are introduced

alongside various locally-developed school models. Ethical research strategies are introduced. This package empowers student teachers to acknowledge the flexibility and recursive nature of learning stages which they will personally experience.

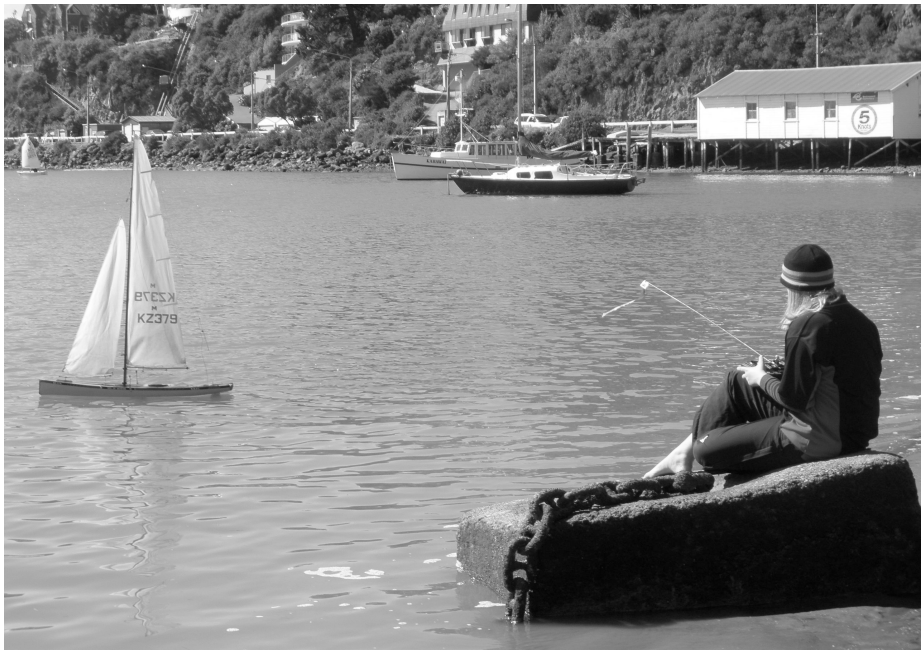
Students are encouraged to consider a topic which constitutes an area of education that they are enthusiastic about investigating. It might be something they know nothing about, or something that they possess prior experience in, but wish to study in much greater detail. The development of essential questions is raised at this stage and returned to many times; it is by no means the easy skill that it might at first appear. In each case the emphasis is on creating new meaning, not simply regurgitating the findings of others. Their inquiry is aimed at being meaningful and authentic–there must be a "so what?" leading to making a difference for learning and teaching.

Example of Deep Thinking Carefully Scaffolded by Thinking Tools

An important element of inquiry-based learning is the way in which thinking tools must be carefully and purposefully selected and used. It is not enough to *tell* students about this; it needs to be modelled so that they have a stronger perspective of the complexities of understandings and interactions involved. The example below demonstrates how this was achieved during the recent EDIS723 course *immersion* session in May 2009. It is not, however, constrained to this stage of the inquiry process. Indeed, it can be applied and revisited in mentor groups at any stage, as well as being used independently by learners.

The illustration in Figure 2 was displayed on a screen, and the scaffold shown in Table 1 recorded on a whiteboard. Students were first asked to discuss in small groups and then contribute facts to the first column (What do we *know*?) in a whole-class discussion. They were encouraged to consider the skills and tools they were accessing as they did so, and to consider what sources they were drawing on. Concepts linked to labelling, describing, and accessing of schemata were explored, as was the nature of shared knowledge and experience. For some students, the scene was unknown; it was outside their personal field of experience. For others it was a familiar and well-known scene and the specific terminology was available to them so they were able to easily take on the mantle of "expert".

Figure 2. Image Used to Stimulate Deep Thinking



The next step was to consider partial knowledge or educated guesses (What do we *think* we know?) again drawing on a mixture of prior experience and ability to make meaning from the visual image presented. The distinction was made between facts (the known) and reasoned suggestions. For some items, further information came to light, or debate was raised so that some were confirmed as fact (and moved to column one), and others left with some uncertainty, therefore moved into column two. What was important was not so much the static columns that stood at the conclusion of the discussion, but the unpacking and detailed exploration of the various pieces of information within the contextual knowledge of *each* group of learners, which in turn impacted on the understandings, wonderings and questions listed in the Know, Think, Want (KTW) chart. Sharing these with the whole class unlocked further clues and facts and suggestions were revisited and adjusted, confirmed, modified or added to.

Subsequent to this discussion, in which subtleties between personal and pooled knowledge and beliefs were explored in detail, students identified the ease with which they had become inspired to engage through a simple thinking tool combined with an authentic context in combination with a source of wondering. One described it as “a detective hunt”. The movement between roles as “expert”, “wonderer” and “novice” also interested them.

Table 1. Know Think Want Chart

What do we KNOW?	What do we THINK we know?	What do we WANT to know?
e.g. *Statements of observation* A model boat is being sailed A launch and yacht are moored in the background Another yacht is being sailed in the background. There is a 5 knot speed limit. *Statements from position of expertise/experience* That is Monck's Bay. It is opposite my grandmother's house.	e.g. It is a scene by a bay–maybe on the way to Sumner? The person is a girl; she has long hair The person on the rock is using a radio control for the yacht in the picture The building above the girl could be a yacht club There is another yacht sailing in the distance–it might be a full sized one. It might be a cold day–the girl (?) is wearing a warm hat rather than a sun hat. The buildings in the background are built up onto the cliff. They might be houses, built for the view. We think that's a mooring block	e.g. Is this person experienced at sailing this craft? How do we work out which way the wind is blowing? How does the remote control work? Does the model boat have a motor as well as sails? How is it steered? Why is there a huge chain by the person? How have construction methods changed between the building of the old and modern houses?

This activity drew a direct parallel to the role taken by learners engaging in inquiry-based learning. In addition, the resource (in this instance, pictorial) was interlinked with narrative information which took the learners further on the learning journey. Various snippets of information about the context were divulged, for instance

- The model boat sailor was a girl, the lecturer's 15 year-old daughter;
- She was wearing a hat, not because of the cold, but because she had suffered sustained concussion from a boom;
- She was a keen sailor, but was under medical instructions not to sail;
- She was supposed to be sailing in the race that the boat in the far background is involved in;
- She was invited to sail the remote control model yacht to displace her frustration at not being able to sail her own yacht; and

- She was engaged in her own form of mini-inquiry in an authentic context; she had never used the remote control before, so she was forced to integrate her existing skills (including those informed by her kinaesthetic sense) and knowledge of tides, wind, current, etc, with her novice use of the remote control and its application to the smaller craft. Her learning was self-driven and palpable.

This led to a general discussion of head injuries, sailing experience and the technical workings of remote controlled vehicles and how they might vary between motor-driven and wind-driven vehicles. Many and varied questions had been raised, all of which could develop as potential valid future inquiries. Personal connection (even when vicarious) while retaining professional objectivity appeared to be an important element of engagement. The important concept of learner "ownership" has long been acknowledged, and the provision of opportunity to explore an interest or passion or fill a perceived need appears to be an important driver of authentic learning. The power of metaphor and analogy were also modelled through this activity, demonstrating inquiry learning operating at several levels. Inquiry can be stimulating and exhilarating at times, as sailing can be, but it is almost never straightforward. As the yacht must tack from side to side to reach its destination, so must the inquiry journey, at times with the current, at times against it, and with tide and waves to encounter along the way. This process enhanced the learning of all who engaged with it. A dynamic and powerful yet simple tool was used, typical of the creative thinking approaches nurtured by inquiry-based learning.

The Body of the Inquiry Course

The main part of the course occurs during the third semester (for most groups after the summer break). Compulsory whole-intake sessions taken by the lead mentor provide modelling and exploration of various aspects of pedagogy. Deep thinking skills and collaborative approaches are accessed and nurtured through timely and relevant scaffolding throughout. Students are organised into mentor groups (usually with common content or process focuses) of about 10–15, with a staff mentor. This becomes their core but not sole learning community and support. Mentors and mentees share roles of expert and learner, as appropriate, enriching the learning of the community rather than simply themselves.

The majority of the time over the 5-week period consists of self-directed learning. Students organise their own time and engage in their inquiries in the ways that they think fit. They delve deeply into their topic of choice. They immerse, collect, sort, sift and create. They are accountable for their time through their journal records (see below) and meetings, but each is able to consider access of resources and experts, together with working to their own optimum learning strategies. In this way the course imitates authentic lifelong learning in the world outside academia. Each mentor group meets weekly to establish tentative timelines, share and review progress, pool ideas, apply thinking tools, debate contexts, ponder ways around "roadblocks" and inspire each other and plan their next steps. In addition, each member is committed to an individual weekly contact with the mentor through whatever medium is mutually agreed as appropriate (face to face,

email, phone, etc.) to maintain progress and validate the learning process through formative and collaborative feedback and feedforward. For distance students, the weekly meetings are held online via a "chat" forum and the discussion transcription is uploaded to the course website for reference.

A process journal is an essential element of the course and is a requirement for assessment. Organised and designed (many students choose to adopt the mantra "*colour switches on the brain"*) to suit the writer, it must nevertheless clearly document the inquiry journey with all its twists and turns, and show evidence of planning, data gathering and decision making. Reflection throughout is a critical, continual and a compulsory element. During the final week of the course, a mini-conference is held for students to present their inquiries to an audience consisting of their peers, invited guests (e.g. consulted experts) and the wider university community. This is not merely a synthesis of gathered facts, but a sharing of newly-created meanings relevant to classroom practice. As part of their requirements, students attend and provide written feedback on each others' presentations. The final requirement is to respond in a reflective statement to the feedback from peers, in light of the entire inquiry.

Teaching as Inquiry

Within "teacher inquiry" the teacher and all other participants are regarded as the "knowers, learners and teachers" (Cochran-Smith et al., 2009, p. 42). Inquiry seeks to personalise professional development within the context the teacher(s) are working in, as the learning needs of both children and teachers emerge (Timperley, Parr & Bertanees, 2009). While largely qualitative, there is a heightened call to include robust quantitative data of student achievement (see Hattie, 2009).

In current New Zealand research, teacher inquiry has been used to help increase and sustain student literacy achievement levels. Lai, McNaughton, Amituanai-Toloa, Turner and Hsiao (2009) encouraged teachers to develop action research projects after student data had been analysed and targeted professional development had been delivered. Likewise, Timperley, Parr and Bertanees (2009) reported that teacher inquiry led to improvements in student outcomes and in deepening teacher pedagogical knowledge. Both studies linked the process to student outcomes and identified that teachers required support and guidance from an expert facilitator or researcher. Within teacher education the use of this process can enable pre-service teachers to engage more deeply in critical thinking and provide a way in which they can investigate future teaching challenges while using a range of data sources (Phillips & Carr, 2009).

Students are required to complete this research process within one of the compulsory courses offered in the BTchLn(Hons) qualification. This does not constitute the whole course but does account for a significant portion and consists of two parts: proposal (Assignment A) and research report (Assignment B).

Teacher as Researcher

Many teachers have been actively engaged in inquiring into their own practice for years, with the purpose of seeking alternative ways to more effectively meet the

needs of their students while systematically refining teaching methods. As Robinson and Lai (2006) note, effective teaching is about being reflective and constantly making changes to improve. The bridge between "teacher" and "researcher" becomes a reality as teachers become immersed in research embedded within their own context.

Some caution is necessary, however, The advocacy of an inquiry approach does not imply that this model should always be used. Teachers also need opportunities to investigate and explore new methods or resources and systematically collect evidence to identify how they can effectively meet their students' needs. This allows teachers to explore theory related to teaching decisions as opposed to unsubstantiated hunches or personal beliefs (see Hattie, 2009). This form of inquiry allows teachers to relate their professional development to the the context in which they are working. Thus, rather than being fully "professionally developed", they are actively engaged in an ongoing way and responsible for identifying and making decisions about their professional needs and practices.

Teacher Education

This form of research-related teaching and learning inquiry has enabled us to integrate teacher practice and research to identify a practitioner-based assignment which further develops the necessary skills to refine teaching effectiveness. As noted above, it allows for an explicit link to be made between research-based evidence ("the theory") and the classroom context ("the practice"), a link that is an essential component of teacher education. Theory underpins and helps to determine and decide teaching approaches. In addition post-graduate students can develop research skills with appropriate guidance and support. While data collection methods and research design are stated, students have choice of their research that enables them to personalise their own learning journey. We would argue that personal and professional identity was strengthened as they challenged existing practices and beliefs, allowing for powerful learning experiences.

Research Process

In preparation for their inquiry students are introduced to the methodology of action research. Examples of action research are studied and invited academics who have utilised this approach present and discuss their research. Students are placed in schools that have associate research teachers (ART) who have completed post-graduate study themselves and are able to provide appropriate mentoring and direction. Initially a research proposal is completed outlining the context, appropriate literature and research, research design and ethical considerations. These proposals are presented to an audience which includes interested academic staff and other BTchLn (Hons) students.

Collaboration and Facilitation

Throughout the data collection (such as interviews, observations, document analysis) the students meet to resolve any issues that arise and identify any initial thoughts on emerging themes. Where relevant students bring transcripts to class and

initial coding is completed collaboratively. Throughout the process appropriate professional readings are reviewed and discussed in light of the research project, an approach that fosters collegiality and collaboration. The field-note journal which the students are required to keep also provides a record of their personal and professional growth, and identifies specific incidents which may have challenged their personal beliefs about research and teaching.

Upon completion of the final project students present their research to a mixed audience of academic staff and postgraduate and prospective BTchLn(Hons) students. This public dissemination is an important part of the teacher inquiry process, for it enables the findings to be discussed with others who may be in similar contexts.

Reflections

Throughout the inquiry process students had considerable control of their own learning, driven by a systematic approach in developing their professional needs and identity. The process has been powerful in letting students take ownership and responsibility of their learning. It has allowed them to see the realities of evidence-based teaching and that teachers need to constantly re-examine their own practice in order to more effectively meet the needs of their children. In our experience, when student teachers listen to the "voice" of the children the visibility of the learning process is heightened (Hattie, 2009). Evidence is used to support or challenge current perceptions, beliefs or resources used in their teaching practice, and the alignment between research and practice is maintained by living the experience of teacher-researcher.

DISCUSSION

There is much debate and negotiation about the construction of effective teacher education programmes. Student teachers do not learn about teaching only while on teaching placements. Teacher educators need to design on-campus or online teaching and learning experiences which show the relationship between theory and practice and school and university links (see Loughran, 2007). Gilbert (2007) discusses the paradigm shift of "catching the knowledge wave". This has become a fashionable call, but within the domains of the two courses under discussion genuine movements to allow authentic, meaningful and connected learning are evolving. Learners need not be cut loose to drift, but can be well guided and supported by mentors and lecturers adopting Hattie's (2009) role of activator. As Loughran (2007) acknowledges, these inquiry approaches offer both risk and support to learners who are "vulnerable" when revealing their own practices and beliefs to public scrutiny and discussion.

The "feel" and context of the two types of inquiry discussed demonstrates the difference between them (see Figure 3). *Teaching as inquiry* is characterised by a systematic and analytical self-collection of data focussed on the personal professional identity of a thinking and thoughtful teacher. It can often be introspective, yet can effectively feed outwardly and grow from the response of others (critical friends) through the mechanism of interactive learning community

feedback. On the other hand, *inquiry-based learning* leans away from reliance on the rigid parameters of traditional research models, remaining open to serendipitous experiences which might radically transform the original direction and focus. While ensuring that an ethical approach is maintained, the learner is able to rely on ongoing scaffolding and support of a close learning community and still retain the responsibility of decision-making. This occurs throughout the learning journey, mirroring much authentic learning observed in everyday life.

Teachers in the future will need to develop proficiency in both kinds of inquiry. Indeed, in some ways it is hard to separate the learner-teacher roles in an educator's work. Embarking on an *inquiry-based learning* journey, for example, will also provide an opportunity for the self-analysis central to *teaching as inquiry*. Children too, need to be actively participating and "inquiring" into their own learning. Likewise, teachers need to be committed to actively "inquiring" into their own practice to deepen their learning and thus model active learning.

While appearing to address slightly different purposes at the outset, ownership and responsibility for lifelong learning are strongly nurtured in both courses. We believe that through these we have at least begun to enable our emerging teachers to clarify their understandings of the terms and value the importance of active learning communities.

Figure 3. A Comparison of Both Inquiry Courses in the Context of the Tertiary Competences

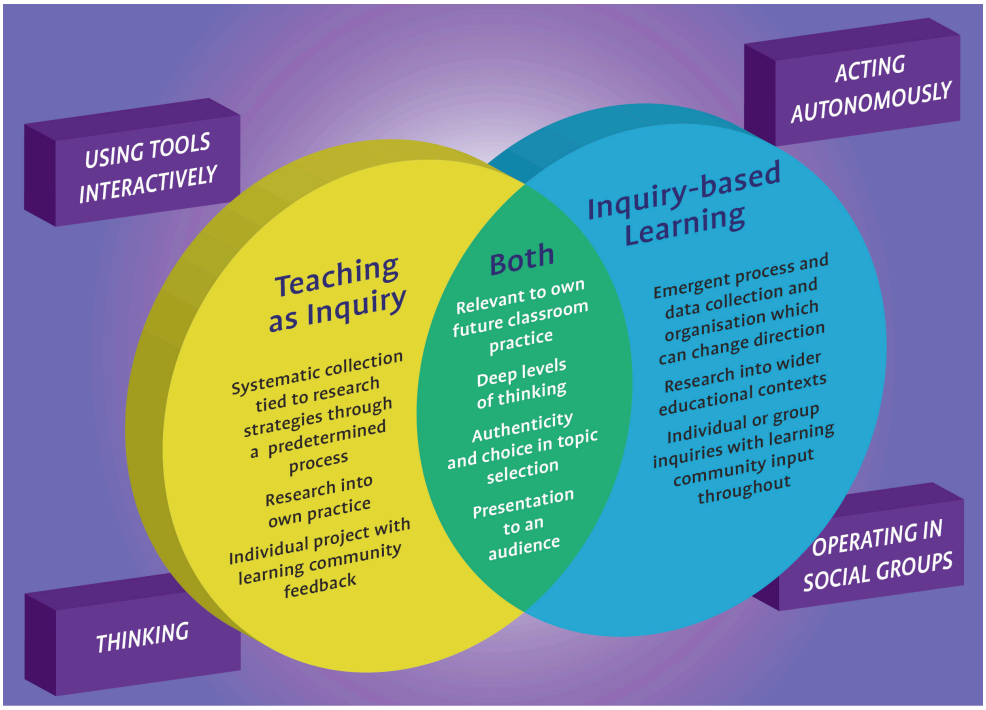


Figure 3 demonstrates the alignment of the tertiary competencies in the context of a comparison of key features of the courses. It is believed that New Zealand

learners will benefit from the focuses of each–a difference is made to both content and process learning in each case, but the pathway to lifelong learning and better outcomes for students is distinct. Two challenges now emerge which we hope to explore in future research

1. to ensure that as beginning teachers these students transfer this high level of understanding and practice to their own classroom context as they implement the New Zealand curriculum; and
2. to make these paradigms and opportunities available to our undergraduate students so that they too, might emerge from the chrysalis into a teaching career illuminated by evidenced-based, independent thinking, and creative, innovative, authentic practice.

Final thoughts

While it has been acknowledged that teachers can and do make a difference through both forms of inquiry, this alone will not be enough to meet the needs of our ever-increasing diverse population. More acknowledgement and discussion needs to be had of the impact of deeper and wider social, economic and learning needs (Snook, 2009); otherwise there is a chance of "teacher bashing or blaming" which could precipitate a high turn-over or attrition rate as illustrated recently in parts of the United States of America.

Recently the Ministry of Education has positioned the "teacher inquiry" model under the heading of "self-review" tools within the context of the new national standards (Ministry of Education, 2009). This signals some danger in removing and abdicating the responsibility for learning from the individual to the standards, as decisions about what and how content is taught could become standards-driven. Such a transmission model of teaching and learning has the potential to counteract the value of inquiry processes described in this paper. Initial teacher educators and teachers who have seen the benefit of inquiry processes need to strenghen the evidence base that supports the merits of inquiry.

REFERENCES

Barron, B., & Darling-Hammond, L. (2008). How can we teach for meaningful learning? In L. Darling-Hammond, B. Barron, P. D. Pearson, A. H. Schoenfield, E. K. Stage, T. D. Zimmerman, G. N. Cervetti, & J. L. Tilson (Eds.), *Powerful learning: What we know about teaching for understanding* (pp. 11–70). San Francisco, CA: Jossey-Bass.

Bond, T. (2001). *SAUCE.* Retrieved from http://ictnz.com/SAUCE.htm

Bullough, R. V. (Jr.). (1997). Practicing theory and theorizing practice in teacher education. In J. Loughran, & T. Russell (Eds.), *Teaching about teaching. purpose, passion and pedagogy in teacher education* (pp. 13–2). London, England: Falmer Press.

Cochran-Smith, M., & Lytle, S. L. (2009). *Inquiry as stance: Practitioner research for the next generation.* New York, NY: Teachers College Press.

Darling-Hammond, L. (2008). Introduction: Teaching and learning for understanding. In L. Darling-Hammond, B. Barron, P. D. Pearson, A. H.

Schoenfield, E. K. Stage, T. D. Zimmerman, G. N. Cervetti, & J. L. Tilson (Eds.), *Powerful learning: What we know about teaching for understanding* (pp. 1–9). San Francisco, CA: Jossey-Bass.

Education Queensland. (2000). *New basics project: Technical paper.* Retrieved from http://education.qld.gov.au/corporate/newbasics/docs/nbftech.doc

Erb, W. (2009). Ask yourself the big questions. *New Zealand Education Gazette, 88*(13), 2–3.

Gawith, G. (2000). *3 Doors to Infoliteracy®.* Retrieved from infolit.unitecnology.ac.nz/3doors/

Gilbert, J. (2007). "Catching the knowledge wave" redefining knowledge for the post-industrial age, *Education Canada, 47*(3), 4–8.

Hattie, J. (2009). *Visible learning. A synthesis of over 800 meta-analyses relating to achievement.* New York, NY: Routledge.

Lai, M. A., McNaughton, S., Amituanui-Toloa, M., Turner, R., & Hsiao, S. (2009). Sustained acceleration of achievement in reading comprehension: The New Zealand experience. *Reading Research Quarterly, 44*(1), 30–56.

Levy, P. (2009). *Inquiry-based learning: A conceptual framework*. University of Sheffield: Centre for inquiry-based learning in the arts and social sciences. Retrieved from http://www.shef.ac.uk/cilass/resources

Loughran, J. J. (2007). Enacting a pedagogy of teacher education. In T. Russell & J. J. Loughran (Eds.), *Enacting a pedagogy of teacher education* (pp. 3–15). London, England: Routledge.

McKenzie, J. (2005). *Learning to question to wonder to learn*. Bellingham, WA, Australia: FNO Press.

Ministry of Education. (2005). *Key competencies in tertiary education.* Wellington, New Zealand: Learning Media.

Ministry of Education. (2007). *The New Zealand curriculum.* Wellington, New Zealand: Learning Media.

Ministry of Education. (2009). *The New Zealand curriculum online*. Retrieved from http://nzcurriculum.tki.org.nz/National-Standards/Self-review-tools

National Research Council. (2000). *How people learn: Brain, mind, experience, school.* Washington, DC: National Academy Press.

Phillips, D. K., & Carr, K. (2009). Dilemmas of trustworthiness in preservice teacher action research. *Action Research, 7*(2), 207-226. doi:10.1177/1476750308097027

Pohl, M., & Dixon, M. (2005). *Lift off to learning in inquiry-based classrooms.* Moorabbin,Vic, Australia: Hawker Brownlow.

Robinson, V., & Lai, M. K. (2006). *Practitioner research for educators: A guide to improving classrooms and schools.* Thousand Oaks, CA: Corwin Press.

Russell, S., & Meek, B. (2006). *Implementing inquiry learning with pre-service teachers: Walking the talk*. Paper presented at the Improving University Teaching (IUT) 31st International Conference. Retrieved from http://www.cjlt.ca/index.php/cjlt/article/view/98

Snook, S. (2009) *Excuses, excuses: Social class and educational achievement.* Retrieved from

http://qpec.xleco.com/index.php?option=content&task=view&id=177&Itemid=209

Timperley, H. S., Parr, J. M., & Bertanees, G. (2009). Promoting professional inquiry for improved student outcomes for students in New Zealand. *Professional Development in Education, 35*(2), pp. 227–245. doi:10.1080/13674580802550094

Timperley, H., Wilson, A., Barrar, H., & Fung, I. (2007). *Teacher professional learning and development: Best evidence synthesis iteration.* Wellington, New Zealand: Ministry of Education. Retrieved from http://educationcounts.govt.nz/goto/BES