Constrained by Ideology: Attitudinal Barriers to Undergraduate Research in Australian Teacher Education

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ABSTRACT

The ‘higher’ in higher education (HE) will need to be justified and reinstated, as the next generation of knowledge workers are educated in Australian universities. More precisely, teacher education programs will have to be at the forefront of this process. This means that there is an urgent need to shift current mindsets of a great number of teacher educators stuck in the industrial era, practising Fordist modes of ‘knowledge telling’. Are they depriving students of the capacity to think critically, solve complex problems, develop research skills and principally, denying them the ability to argue their point and make judgements on the basis of solid empirical evidence? An argument will be presented that outlines how educational socialisation chains carefully crafted in school education and continued in higher education are developing learner dependency on teachers’ knowledge telling approaches which are detrimental to prepare knowledge workers fit for purpose in a 21st century knowledge economy. There is an urgent need to break this chain and replace it with new links and elements, such as undergraduate research in teacher education, so that all learners can be better prepared for the demands of an uncertain but complex future.

Keywords: undergraduate research, teacher education, 21st century learning, Fordist mode of education, far transfer of knowledge, barriers to change
Introduction

To explore creatively the nature of work in the 21st century, we must challenge many of our deeply held assumptions, beliefs and perspectives. (Kelly, 2008, p. 21)

The current push for 21st century knowledge and skills development is in need of an all-round different mindset of teachers at all levels (Molebash, 2010; Plants & Rose, 2010). In this paper, a central argument will be presented outlining that paradigmatic changes are required to the way in which teacher education is perceived and delivered in some Australian universities. The goal of new learning through the introduction of undergraduate research, which is inherently student-centric and problem-driven, is to enhance students’ skills and strategies to develop new knowledge, independent of teacher pre-telling and in collaboration with others. Undergraduate research will provide opportunities for teacher education students to partake actively in new knowledge creation, solve complex problems, test their resilience as they grapple with ambiguity in contexts that they have not yet encountered and in which they have not been pre-taught. It is no longer sufficient to simply remember something and be able to perform tasks that were modelled by teachers. The ability to apply knowledge and skills in new contexts, is called far transfer of knowledge, encompassing “cumulative learning and the continuous adaption of past experiences to current goals” (Shapiro, Könik, & O’Rorke, 2008, p. 6) and is vital for 21st century knowledge workers. The concept of ‘far transfer of knowledge’ is contrasted here with a concept referred to as ‘near transfer of knowledge’, both of which will be explored in detail below.

Many students and teachers at all levels of the Australian education system (primary, secondary and tertiary) are still comfortable with the Fordist mode of production and consumption where teachers are the information gatherers, producers and transmitters of knowledge to the masses of students, using a ‘knowledge telling approach’ to education, “where each stage of the ... process [is] broken down into small pieces ... [and] carefully regulated by time and management surveillance” (Brehony & Deem, 2005, p. 398). In such a system, students are socialised to become consumers of pre-packaged and easily digested information, leading to successful ‘near transfer of knowledge’, but too often not particularly successful in ‘far transfer of knowledge’ (see below for a deconstruction of the two concepts). Educational research conducted over the last few decades has shown that the Fordist mode of knowledge production and consumption often leads to underdeveloped metacognitive abilities in many students (Roscoe & Chi, 2007). There is an urgent need to break this cultural cycle of production and consumption which is, so I argue in this paper, ill-placed to prepare the next generation of knowledge workers for a 21st century world of supercomplexity and uncertainty (Adelman, 2009; Kelly, 2008). To achieve system-wide changes, Australian teacher education may be well advised to follow the European lead (European Commission, 2010) and resocialise its teachers and students so that school education can, and will, stop education processes the way they were conducted in the past centuries; and instead realise that the current knowledge era can ill-afford teachers who believe in the exclusive power of ‘knowledge telling’. Research-based learning and teaching opportunities for all students will need to be created, so that not only the students in academic extension classes at the high school level or ‘honours’ students at the university level are learning to become deep and critical thinkers. Kelly (2008) explains this poignantly: “This clash between the old model [of goods and knowledge production (e.g. Fordism)] and the new reality [of supercomplexity (e.g. climate change, aging/expanding population, food security and hyper-migration)] is quite significant” (p. 21), demanding knowledge workers who are able to “embrace and exploit creative tensions; navigate through ambiguity; and discover and articulate actionable answers to complex puzzles” (p. 23). What is
needed is a realisation that all students, not only the high achievers, are immersed in an environment that encourages student scholarship. Hence, new learning design conceptualisation is needed to develop students and teachers that will be ‘research ready’. It is noteworthy that contrary to the requirements of Australian teacher education, in England, France and Croatia, for example, student teachers have – for a considerable time now, been required to write a thesis at the completion of their undergraduate education, as a form of professional induction and socialisation process (Brisard, 2002); and in Germany, student teachers have to complete a final examination that requires a defence of a thesis and a report on the teaching practicum (Moon, Vlascenu & Barrows, 2003). The Finnish education system requires a research-based master’s degree of all of its school education teachers (Moon et. al., 2003). Similar to European initiatives to standardise teacher training in an effort to improve quality and efficiency (European Commission, 2010) Australia is in the process of reforming teacher education nationally (Australian Institute for Teaching and School Leadership, 2011). However, in its recently released document, the newly formed national body, the Australian Institute for Teaching and School Leadership (AITSIL) has not made any provision to include undergraduate research as a requirement for all graduating teachers from teacher education courses. Conducting a keyword search in the AITSIL (2010) document for ‘thesis’, ‘dissertation’ or ‘undergraduate research’, resulted in zero ‘hits’. Unsurprisingly, the keyword ‘research’ was found numerous times throughout the document, however, its only reference to ‘undergraduate research capacity building’ requires graduates to “demonstrate knowledge and understanding of research into how (school) students learn and the implications for teaching” (p. 8), which is, compared to the requirements of teacher education students in some European nations, rather minimal.

As noted above, the possibility to complete self-selected units, often modularised, to achieve the credit points required to satisfy the requirements of a Bachelor of Education (or equivalent) at present, is enabling social (re)production to take place, making it hard to ‘shift teacher mindsets’ as outlined below. Although it is argued that the new national framework and standardised approach to teacher education in Australia assisting the quality assurance process, an alternative analysis of the current heightened completion among teacher education providers in Australian may be that student teachers are educated to take advantage of their ‘consumer power’ (Dobozy, 2011), which results in the induction of new teachers into a narrow and instrumental professional roles in schools (Giroux, 2010).

Foregrounding the exploration of the concept of research-based learning and teaching, a brief overview of what I term ‘the Fordist mode of production and consumption’ is presented, which is leading to successful near transfer of knowledge and discuss why this form of education is detrimental to the development of knowledge workers ready to contribute actively to a global economy that has challenges, which are largely unknown, and a world which is in need of critical and creative thinkers and collaborative problem-solvers. Whereas in a Fordist society (highly specialised, stable, efficient and compartmentalised work environment) it was considered sufficient to acquire and pass on specialised skills and knowledge from so-called experts to novices (apprenticeship model), this knowledge and skills-base is considered insufficient and ineffective in a knowledge-based society and global economy. Given the information explosion and globalisation of recent times, critical thinking and cross-cultural communication are seen as vital life and work skills in the 21st century. Knowledge workers need to be able to examine often contradictory evidence from various sources, developed in different places and spaces, hence they need to understand complexity and ambiguity. The ‘new’ skills are often referred to as ‘generic skills’ and are, based on Fordist compartmentalisation tradition, seen as ‘apart’ from disciplinary and technical knowledge and skills (Jones, 2009). Making decisions on the basis of sound evidence, staying openminded and developing a critical but balanced view is no longer the prerogative of the intellectual elite; it is the professional future of
knowledge workers in Australia and elsewhere (Healey & Jenkins, 2009). Hence, knowledge workers of the future will need the capacity to draw on a mix of generic and technical knowledge and skills. In the past, progressive educationists, such as John Dewey (1859-1952) in the US and Maria Montessori (1870-1952) in Europe have promoted the enactment of educational processes, such as inquiry and project/problem-based learning, conducive to what is now commonly referred to in the educational psychology literature as far transfer of knowledge (Snowman, Dobozy, Sevak, Bryer, & Bartlett, 2009).

The Fordist Mode of Knowledge Production: Near Transfer of Knowledge

In a typical Australian undergraduate teacher education course, the most common pedagogical approach utilised to introduce students to new (or not so new) knowledge and skills is through well-structured problems with known, correct answers, often derived following pre-defined processes that are clearly outlined in contemporary textbooks and lecture handouts and well-rehearsed in tutorial sessions. Often no systematic check is performed to ascertain what students’ prior knowledge is and students are repeatedly exposed to similar kinds of knowledge and skills as they slowly move through the levels of the education system (see Tagg, 2010 for a critique on the American higher education system and the dismal progress made since the publication of the 1983 National Commission on Excellence in Education report, A Nation at Risk). Hence the learning material is perceived by the well-socialised students to be palatable and easily digestible, but foremost knowledge gains are easily testable (Jonassen, Strobel & Lee, 2006). This linear process of problem solving modelled by the teacher and ‘learned’ by the student is what I refer to here as classical ‘knowledge telling’ and near transfer of knowledge. Paolo Freire (1972) has also referred to this form of education as “the banking system” where the teacher makes regular deposits and the student is required to retrieve correctly, the processes and information acquired to demonstrate knowledge and skills in various learning areas. Hence, knowledge is perceived as a commodity, a product, to be transferred from one person to another. To be in possession of knowledge means to have acquired it through a process of transactional exchange: the teacher teaches and the student learns what the teacher teaches. Such as system of education, so I argue, requires of students attention; discipline; and good working memory. It is effectively socialising students into dependency on the teacher’s input education strategy (knowledge telling), well established and practiced in school education and higher education (Dobozy, 2009; Healey & Jenkins, 2009; Tagg, 2010; Zlotkowski & Duffy, 2010). This method of learning and teaching does not require of students to think independently, creatively or critically. ‘Dependent learning’ is slowly being fostered in traditionalist classrooms and is, as a matter of fact, one of the key characteristics of traditional schooling, which gradually and persistently nurtures students into a need to depend upon the system and the teachers to learn something or anything (Mohnan, 2000).

Convincing arguments explaining why dependent learning seems to be so popular and widespread in formal education at all levels, including institutions of ‘higher’ learning, are provided by Cavanaugh, 2006; Chhem, 2000; Brew, 2010; Ellis, Burke, Lomire, McCormac, 2003, Gray, 2010; Hong & Lin, 2010; Jenkins & Healey, 2010 and others. I have deliberately placed the ‘higher’ in inverted commas, to emphasise that dependent learning is not higher order, but merely lower order. The theorists cited above all seem to alert to the fact that classical teacher-centred and content-driven education is foremost economical, risk-free and controllable/testable, and as an added bonus, so Chhem (2000) argues, is able to feed the ego of teachers who can ‘showcase’ their knowledge to students and each other, making them feel valued, important and knowledgeable. Moreover, as students are rewarded for easily
retrievable correct answers and not necessarily for original thought and action they in turn reward the teachers with favourable student evaluations, boosting teachers’ egos leading to grade inflation and quality assurance problems (see Babcock, 2010). As Cavanaugh (2006) notes:

“Not only do faculty members feel that grades affect student evaluations, but also there is a considerable amount of research that has found that grades actually do affect the evaluation that students provide ... instructors who give lower grades receive lower student evaluations ... instructors can 'buy' higher student evaluation scores by lowering the grading standards or by making the course easier” (p. 180).

Although it has been assumed in the past, that knowledge telling and ‘teaching to the test’ will be sufficient to prepare students, in due course, for more complex learning and the solving of ill-structured and complex problems, research in problem-based learning classrooms has shown that this is not the case (Dobozy & Michaels, 2009; Hong, Jonassen & McGee, 2003). Well-structured, teacher-controlled explorations of new topics, concepts and ideas may be successful in preparing students for upcoming high-stakes tests but are not successful in teaching students how to approach authentic, complex and multifaceted problems. To achieve far transfer of foundational knowledge and skills (e.g. the usefulness of mathematical formulas, effective information gathering processes, decision making on the basis of sound evidence etc), students and teachers will need to learn to appreciate the difference between ‘knowledge telling’ and ‘knowledge creation’, otherwise the knowledge workers of the future will be ill-prepared for “the inquiring society into which we are rapidly moving” (Jenkins & Healey, 2010, p. 36). However, this appreciation is only a first step in changing teaching approaches.

In spite of the widespread rhetorical support of social constructivist learning principles in school and teacher education in Australia and elsewhere, there is persistent evidence that classical teacher-directed and content-driven practices still dominate (Healey & Jenkins, 2009; Mason & Holt, 2009; Mohnan, 2000). The likelihood that this will change in the current economy climate and ‘businessification of higher education’ (Dobozy, in press) is slim. The need and advantages of constructivist modes of knowledge production is explored next.

Constructivist Modes of Knowledge Production: Far Transfer of Knowledge

Much work is being undertaken to document educational reform that can support the development of future knowledge workers and enhance their higher order thinking skills through reasoned argumentation, as these skills are recognised as being vital and invaluable in the 21st century globalised knowledge society (Scheurer, Loll, Niels & McLaren, 2010; Tagg, 2010). Metacognition is at the centre of effective far transfer of knowledge and the improvement of individual and collective student knowledge production (Amalathas, 2010).

According to constructivist learning theories, learners of all ages construct understanding from a variety of data sources in a social, cultural and physical context, building on prior knowledge and past experiences of knowledge production processes. All forms of constructivist learning theories (e.g. Piagetian and Vygotskyan) emphasise active and independent engagement with information, what Siegried Schmidt (2010) refers to as “cognitively autonomous individuals”. Schmidt contrasts with a system of ‘knowledge telling’ that he describes as “an implementation of knowledge into the pupils’ cognitive systems” (Schmidt, 2010, p. 7). Through active engagement, discussion and debate and social participation in learning, the (meta)cognitive skills
are modelled by more experienced members of the learning community and are developed, enhanced and co-produced through communication and interaction in an attempt to solve the cognitive challenge at hand.

To achieve the necessary deep immersion required for the development of metacognition, the learning and assessment tasks in which students engage will need to be meaningful, authentic real-world tasks and participants will need to have legitimate roles in performing them (Dickinson & Summers, 2010; Schmidt, 2010). For example, higher education students might be involved in authentic inquiry learning projects with definite outcomes and a product, such as poster, report or conference/class presentation (Herrington, Reeves & Oliver, 2010). An added advantage is that students are more likely to be intrinsically motivated to engage deeply with the problem task when the content of learning is personally relevant and meaningful to them (Brew, 2010, Endo, 2009).

To promote metacognition, teachers should encourage students to engage in inquiry learning and problem solving (Spronken-Smith, 2010) as just two approaches that foster metacognition. Leadership teams at all levels of formal education need to encourage teachers to move away from didactic teaching and instead learn why they should offer problem-based learning tasks and incorporate inquiry into their programs. Although students will require help with the development of effective and efficient strategies and metacognitive activities necessary for far transfer, the educational literature provides ample evidence of the need and long-term effect of non-traditional, post Fordist modes of learning and teaching (Dickinson & Summers, 2010; Gray, 2010; Healey & Jenkins, 2010; Slavin & Lake, 2008). However, this is easier said than done.

Preparing Future Knowledge Workers

Inquiry learning and problem-based learning can provide a framework for undergraduate research. Rodrick & Dickmeyer (2002) note, “undergraduate research has certainly become a buzzword in higher education” (p. 40). Australian universities seem to join what has been portrayed as an “international movement” in the reconceptualisation of undergraduate education to include research components into the typical undergraduate education curriculum (Jenkins and Healey, 2010). For the purposes of this paper, we follow Rodrick and Dickmeyer (2002) and Beckman and Hensel (2009) and define undergraduate research quite broadly as inquiry-based activity that makes an original intellectual contribution to a particular field of study. I prefer a broad definition because we are aware of the contentious nature of the current argument concerning the ‘conceptual and operational link’ between the two concepts: (a) undergraduate research, and (b) inquiry-based learning. It is outside of the scope of this paper to explore the relationship further, however, we agree with Healey and Jenkins’ (2009) suggestion that “they are certainly complementary and mutually reinforcing” (p. 22).

In an attempt to shift academic mindsets on a systems level and get buy-in from faculty and students about the shifting realities and demands of more knowledge intense work in the near future, there is a move to include undergraduate students in annual research conferences (e.g. Western Australian Institute for Educational Research, 2010) and encourage them to publish their papers in local academic journals (e.g. Issues in Educational Research). Although it is laudable to see pockets of undergraduate research being presented at local conferences and their efforts being celebrated – hence embracing “the need for judgement, and all of the critical thinking that underpin it” (Kelly, 2008, p. 23), these isolated initiatives are not sufficient to account for the inclusion of teacher education in an “international movement in undergraduate research” (Jenkins & Healey, 2010). What are some ideological
constraints, specific to teacher education? One might be the quality, depth and breadth that we could expect from such research. We contend that there is a key attitudinal barrier: the training received by teacher educators in Fordist modes of knowledge production and consumption.

**Attitudinal Barriers to Undergraduate Research**

A number of factors can hinder educational reform to include more inquiry-based learning and teaching practices in higher education classrooms. These factors include cognitive rigidity or inflexibility in thinking. Higher education faculty, who have been educated and trained in Fordist modes of knowledge production and consumption, will find it challenging to embrace pedagogical practices that require a shift in power and control of knowledge production from the teacher to the student. Equally, students who expect Fordist modes of education are likely to experience great difficulty in classrooms that use pedagogical practices more clearly aligned with social constructivist principles, such as undergraduate research assignments.

A specific kind of cognitive rigidity is functional fixedness. Individuals who have been socialised in particular ways of acting and experience functional fixedness are unable to consider alternative processes or uses for particular objects. For example, if we imagine a higher education student who may be unable to solve a particular problem, if s/he has a tendency towards functional fixedness, s/he might not consider alternatives to seeking help from the knowledge-telling teacher. A more cognitive flexible student might engage the help of other knowledgeable people, such as a relative, friend, or in the spirit of social constructivist learning and teaching, a fellow learner, converting the relationship from learner-learner to peer-tutor.

Most teacher education students are provided with ample experience in group-based learning. These experiences involve peers working together to improve some aspect of academic performance. Although peer-assisted learning is often practiced in various levels of education and has been linked to positive learning outcomes (Damon, 2008), the practice of regular and sustained peer-assisted learning is still in its infancy (Zlotkowski & Duffy, 2010). There is an acknowledgement of the need for the enhancement of creative thinking and problem-solving capacity in students, and a clear ‘roadmap’ of how to achieve the goal of developing a “research-minded population” (Brew, 2010, p. 15), namely through the strengthening of teaching and research in higher education. Therewith, so it is argued, all students are provided with an opportunity to be “immersed in an environment where their learning is based on the most recent research findings” (Brew, 2010, p. 15). However, this can be quite a challenge. Korthagen (2010, cited in Gray 2010, p. 348) notes that one of the key problems in teacher education is the ‘perennial’ theory practice gap. Compounding the problem is student resistance (Cavanaugh, 2006; Rodrick & Dickmeyer, 2002). While theorists, such as Rodrick and Dickmeyer (2002) explain that “students should receive the general message that research is pervasive in their lives and that knowing how to conduct and interpret research will benefit them in their careers” (p. 43), the way teacher education is delivered is slow to change (Bower, 2010). Nevertheless, dynamic claims such as those from Angela Brew (2010), who notes that “it is vital that we now connect undergraduate students with research clearly and explicitly, to enable Australia to be a genuinely innovative knowledge society” (p. 15), it is argued that teacher education students will need immersive experiences that enable them to connect with research in a personally meaningful way, not through simple ‘taste testing’ of research described in university textbooks, but rather through a pedagogy that is clearly student-centric and inquiry-based to avoid tokenistic adherence to newly crafted policy directives. It is my belief that students cannot develop metacognitive and research skills in a ‘knowledge telling’ learning environment. How can teachers at all levels be encouraged to ‘let go’ of old and tested pedagogical
practices, especially when there is mounting evidence that "students experience initial uncertainty with inquiry-based learning situations" (Brew, 2010, p. 19) that creates "psychological dilemmas or disjunctions in students experiences" (Abrandt Dahlgren & Dahlgren, 2002 cited in Brew, 2010, p. 19) coupled with feelings of anxiety and often anger, based on a sense of unmet entitlement to being 'taught properly' (Dobozy, 2009)? Unsurprisingly, students in inquiry-based or hybrid (inquiry/traditional) classrooms have to work harder and hence do not rate their learning experiences as highly as those in 'knowledge telling' traditional classrooms (Brew, 2010; Cavanaugh, 2006). This simple fact creates another powerful disincentive to adopt change practices in teacher education and elsewhere.

Despite the clear and mounting evidence reported that undergraduate research has a number of benefits, such as improved retention rates, more engaged learners, increased intrinsic motivation, increased academic performance and better prospects of postgraduate study (Brew, 2010; Healey & Jenkins, 2009), attitudinal barriers to undergraduate research cannot be negated. They will persist as long as critical mass is not achieved and sustained system-wide student-centric pedagogical practices in teacher education is attained. But, the tension between different ideological perspectives concerning 'good teaching' persist making it difficult to arrive at a position of consensus and standardised approaches to teacher education (Gray, 2010). So, why focus on teacher education rather than medicine, engineering or nursing education? The answer is simple, students are, so we have argued, slowly, steadily and successfully nurtured from pre-primary school onwards into dependent learning. This socialisation process chain will need to be broken and exchanged with new links and elements that will, in due time, form a new chain. I focus on teacher education, because the educational socialisation chain is systematically developed and strengthened through a students’ progression from school education to higher education. A chain that inducts students into inquiry-centred learning experiences (Healey & Jenkins, 2009), not only in higher education, but also school education, where students can learn to engage in higher order thinking, rendering them ready to embrace a higher education culture that practises student research and inquiry. Therewith, the 'higher' in higher education can be justified and reinstated, challenging students to develop independence of thinking, problem-solving, decision-making and evidence-based and ethical judgement in a creative and collaborative learning environment, mirroring practices of research communities all around the world.

Enabling mechanisms and policies for research/inquiry-based learning means opening an avenue for shifting mindsets of teachers and teacher educators. As humanity is facing increased and new, as yet unimaginable challenges, known problems of overpopulation, growing inequality, and global food security demand novel and innovative mindsets ready to explore strategies that are new and untested. A number of research teams experiment with theories and practices of how to populate neighbouring planets (Levine, Garvin, & Beaty, 2010) and develop nanomachines, such as jumping DNA robots (Kagan, Campuzano, Balasubramanian, et al., 2011) that may, in the not so far distance, help cure human illness. School education in Australia and elsewhere can ill-afford to be trapped in 'knowledge telling practices' not equipping students with critical questioning, and creative problem-solving skills in heterogeneous team environments.

Conclusion

In this paper, I have argued that traditional teacher ‘knowledge telling’ mindsets need to be challenged and exchanged with attitudes to learning and teaching that enables the engagement of students in research and inquiry, contributing to increasing informal peer-assisted learning and collaborative knowledge building through the exertion of effort and active meaning making. Moreover, I have discussed the view that attitudinal barriers to the introduction and greater dissemination of
undergraduate research are slowly and steadily nurtured into teachers and students as students are socialised into dependent learning. Hence, attitudinal barriers to undergraduate research and inquiry learning provisions in initial teacher education need to be perceived as a systemic problem that demands systemic solutions. Small pockets of innovative practice are unable to contribute to cultural change and sustained educational reform. In a move to professionalise the future workforce, paradigmatic changes are required to the way in which teacher education is perceived and delivered, so that school education can and will stop doing what it has done successfully for so long: ‘knowledge telling’.
References:


