

Exploring Teachers' Enactment of the Technology Curriculum

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Abstract

There are persisting tensions around how technology teachers in New Zealand are impacted by the discourse within which they teach, particularly when aiming to address the differing social and academic needs of the students in their care. Recent literature which focuses on the nature of technology education indicates that further research should consider teachers' perceptions of the subject as well as how school responses support the enactment of technology education. The purpose of this paper is to report on the early stages of a research project which will highlight how four teachers view or position 'knowledge' when critically engaging with the curriculum. This research draws upon critical policy and discourse analysis within a qualitative and case study methodology to generate data which represents the range of interpretations of the curriculum, as influenced by the experiences of the teachers. The research will support change in their own setting through teacher-driven professional development which aims to support participant representation, empowerment and transformative practice.

Keywords: *Critical, knowledge, teacher perceptions, tensions, student needs.*

Introduction

Education in New Zealand is heavily influenced by a governmental agenda which advocates for economically focused outcomes. In technology education, this has led to a curriculum with persisting tensions around how teachers in New Zealand are impacted by the discourse within which they teach, particularly when aiming to address the differing social and academic needs of the students in their care. The purpose of this paper is to report on the early stages of a research project which will highlight how teachers view or position 'knowledge' when critically engaging with the curriculum in order to challenge the dominant discourse and a self-perpetuating cycle of pedagogical enactment.

From past to Present

New Zealand's schooling system has been strongly influenced by colonisation and a British philosophy. Historically, British public school structures were adopted, with many secondary schools reflecting elitist perspectives and endorsing the view that the working classes were pre-disposed to more menial tasks. In 1905, the first technical school was opened, which offered practical subjects for those students who were deemed unsuitable for the academic nature of secondary schooling, thereby directing them into the trades (McLintosh, 1966). Such an attitude mirrored the philosophy of England and Wales where technical education was historically aligned to economic and political agenda as well as employment. It is argued here that this attitude persists in New Zealand today, influencing teachers' engagement with and enactment of the current curriculum (Reinsfield, 2014).

In 1995, the New Zealand curriculum (Ministry of Education [MoE], 1995) took a new direction and aimed to establish technology education as a core subject rather than a means of occupational training. Ferguson (2010) argued that advocates for this new approach indicated that "from the outset, technology was seen as something distinct from technical education, [e.g. workshop, craft and home economics]" (p.6). This curriculum signalled a shift away from the acquisition of technical skills towards a focus on understanding the factors influencing the process of manufacture, the aim of technological literacy and knowledge with an emphasis on authentic learning and the reciprocal relationship between technology and society. The technical element persisted, but there was an emphasis on the meaning behind knowledge, learning

preferences, problem solving approaches as well as citizenship. Despite attempts to counter the stereotypical view of technology education, raise its academic profile and generate new understandings of its purpose, the subject remained technical in nature and traditional perspectives in the classroom persisted (Biggs, 2006).

In 2007, the revised and 'future focused' New Zealand curriculum (MoE, 2007) directed that education should reflect the "changing diversity of society, within a context of global, social and technological change" (p.4). It also stated that "Each board of trustees, through the principal and staff, is required to provide all students in years one to ten with effectively taught programmes in technology" (p. 44). This implied that the place of technology education as part of the core curriculum was potentially, within the curriculum framework, more secure.

The current technology curriculum (MoE, 2007) consolidates an epistemological shift which began in 1995. Technology education moved from being a collection of subjects that had technical and vocational beginnings which respond to market driven needs, to a 'learning area' that is increasingly theoretical and conceptual in nature. This technology curriculum saw the introduction of two new strands, Technological Knowledge [TK] and the Nature of Technology [NoT], indicative of a further re-positioning in the nature of the subject and potentially its new found security. In their review of technology education in New Zealand, Jones and Compton (2009) indicated that the drivers for national curriculum change at this time were influenced by international research trends and policy thinking rather than a reflection teachers existing or consolidated understandings or practices.

Technology education in the New Zealand context is distinct because curriculum development has focused on content rather than the way that it has been communicated to practitioners (Williams, 2013). There is some disparity in the way that the different stakeholders view and position its purpose. For example, the establishment of Trades Academies in 2011 and the introduction of the Youth Guarantee Scheme in 2013 (Tertiary Education Commission [TEC], 2014) suggests a considered political shift towards vocational pathways rather a general approach to technology education as presented within the national curriculum (MoE, 2007).

The tensions that exist between policy and practice can be reflected through discourse, which can be distinguished here as the advocated for rules or convention, as well as the language being used by individuals in social situations (Codd, 1990). The discourse within a school or community is likely to have direct implications for a technology teacher's ideologies, engagement with and interpretation of the curriculum, as well as their consequent practice.

Methodology

The research project will focus on the challenges that four teachers face when engaging with the technology curriculum and negotiating any shifts in practice. The approach is underpinned by the philosophy that teachers, when motivated and empowered, are capable of taking independent action by using systematic inquiry in their professional development and to inform their pedagogical practice.

The research aims to situate the interrelated tensions between technology education, politics and social change. Critical theory will be utilised because it asserts that all knowledge is historical and political in nature and shaped by differing human interests as they adapt to the time or context. There is acknowledgement that human interests are diverse, sometimes contradictory and that knowledge can appear inconsistent in nature.

Knowledge within this construct aims to generate alternative forms of understanding which are driven by a democratic purpose, in the interests of social justice and of those who may perceive they are oppressed. For example, if teachers are required to compromise their ideological position or are hindered in their pedagogical 'risk-taking', they are likely to perpetuate the

dominant discourse. In other words, unless a climate of pedagogical risk taking is encouraged, teachers are less likely to be innovative in their practice.

Data generation for this research relies on several primary sources, namely the New Zealand curriculum document (MoE, 2007) and its supporting materials (MoE, 2010), individual semi-structured interview/s, video recorded department meetings, self-report reflections, as well as teacher generated resources. The stages of the research are listed below.

| Overarching question: | | |
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| How do technology <i>teachers' perceptions</i> influence their <i>enactment</i> of the New Zealand curriculum? | | |
| Stage | Data generation method | Data analysis |
| <i>Stage 1:</i> <i>Interpretation of the curriculum</i> | Policy documents Teacher generated resources | Critical policy analysis Document analysis |
| <i>Stage 2:</i> <i>Teacher perceptions</i> | One semi-structured interview Self-report data (web-cam or written) Teacher generated resources | Critical discourse analysis Text analysis NVivo coding analysis tool |
| <i>Stage 3:</i> <i>Enactment of the curriculum</i> | Collaborative research which focuses on personally observed department meetings and lessons at the beginning and end of the teaching as inquiry process. | Critical discourse analysis Observation analysis |

Figure 1 Summary of the research process

Currently, one semi-structured interview per participant has been conducted, where each of the four teachers was asked to reflect upon their teaching of technology education. The rationale for these interviews was to generate a baseline of understanding through the self-disclosure of each teacher's background, experience, values and perceptions of the nature and purpose of technology education in New Zealand.

By generating baseline data around the ontological views held by teachers of technology, the research has developed some initial findings of the differing perceptions around the nature of technology education in order to later consider how this is reflected in participants' approaches to the mandated curriculum. The future focus is on how teachers critically engage with curriculum text, to explicate self-knowledge about their theories of teaching and enacted pedagogy.

Initial Findings

Initial findings indicate that technology teachers are likely to align with a combination of ideologies. Shiro's (2008) four ideologies are the starting point here and are defined as the scholar academic; the social efficiency; the learner centred and the social constructionist. For the purposes of this paper, the ideologies are contextualised below:

1. Scholar academic (Knowledge-driven)

A technology teacher may be situated in a school where scholarships and student academic outcomes are prioritised.

2. Social efficiency (Socially-driven)

A technology teacher aligns with the view that the purpose of the subject is to train students to be functioning members of society and can see the value of vocational education for some students.

3. Learner centred (Student-driven)

A technology teacher focuses on the needs of the individual, basing the learning on a student's growth of their intellectual, social, emotional and physical attributes.

4. Social reconstructionist (Philosophically-driven).

A technology teacher views the purpose of education as a means with which to facilitate the construction of a more just or equal society.

It is acknowledged that a technology teacher is likely to align with more than one ideology because of the tensions surrounding pedagogical enactment in a particular school context. For example, tensions may occur if a teacher's ideologies do not align with those of the local community or the learning needs of the students. Such issues may influence the way that a teacher's practice is perceived or judged by others. In the case where a teacher does not ideologically adhere with currently advocated views either in their school, local or wider community, they can be perceived as a 'failing' teacher. This is particularly pertinent in a political climate where teacher accountability is highly valued. The research has four participants, all purposefully selected because they are based in a school with an established reputation for the delivery of technology education. To date, all participants have been interviewed and observed during the delivery of one lesson. Their experiences and alignment with the differing ideologies are identified below.

Participant One

Fred is Australian trained history teacher and has practiced there for over twenty years. He has a certificate in cabinet making and has also taught technology education overseas. He is in his first year of teaching in the New Zealand context and states "[the curriculum here is] more open ended, less prescriptive than the [Australian curriculum]...you have the opportunity to be outside the box because there doesn't seem to be a box...". When asked about his understandings of the technology curriculum and how this aligns with his thinking around the purpose of the subject in his school, he states

...The way it has been described to me is that the New Zealand curriculum went through a change some time ago...people were driving it and wanted to elevate the status of [the subject] and make it a more academic subject than the place for the 'tradie' who can't hack the theory... I guess my personal philosophy of education, regardless of the subject is that I see my job as to make myself obsolete and the sooner that I am no longer needed, the better I've done my job, so if a student no longer needs me...then I've completed my role... As a teacher I think you and I both know that you can do things and kids don't necessarily learn anything...Everything looks right and it ticks all of the little boxes but it's not innovative and the kid is just a robot in the sense that they go over and drill that hole because that's where they are supposed to drill that hole and they haven't thought "what happens if I drill that there?"...[In this context] student's learn very quickly that unless you are happy creating what is on offer, tech[nology], isn't for you.

This teacher indicates that from his perspective, the subject in his school is knowledge driven, causing him some personal tension because he is philosophically driven.

Participant Two

Bob started teaching in 1990 and has experienced all of the subject changes from shop work to workshop technology, design technology and most recently technology education. He has a national reputation for his delivery of the subject and has been involved in the development of the curriculum at policy and school level. Bob states

...when the technology curriculum came along, I was one of the few teachers that picked it up and ran with it...I look at it as they gave us a book with a set of rules in it but they didn't know what the game was going to look like...the good thing for me was that I had the chance to influence the outcome.

When describing the purpose of technology education, Bob mentions pathways to further education, stating that technology provides a means to develop "rounded-type students who are thinkers, problem solvers, self-motivated [and] organised". He describes the design of the curriculum and how its flexibility allows him to make the content fit the needs of the school and its students. Bob also talks about sharing his understandings of the delivery of the components of the technology education curriculum with less experienced colleagues, stating

...we've got to be really careful not to get [content] mixed up, because if you do, you're not delivering it properly, you're not getting the [student] understanding that you need and you are not getting the depth of [technological] practice that you need and then you're not getting the outcomes that you need...I don't want to bore [the teachers] and we have limited time [for professional development].

Initial findings indicate that Bob aligns with both knowledge and socially-driven ideologies. He indicates that there are still some challenges in the delivery of the subject in his school, stating

...[technology] doesn't suit everyone...we run our vocational pathway but in general, I think it caters for 90% of the students, especially up to [NCEA] Level One...Some of the other curriculum areas still don't understand technology, don't know the breadth of it and what we can cover...it's still got that stigma of the workshop...woodwork, metalwork type thing...but I think this school [is] now starting to develop a really good understanding because of the success we've had and the standing that we've got, nationally and within the community...

Bob highlighted the benefits of the subject from his perspective, stating that "When students have [studied technology] not only do they learn how to make things, it prepares [them] to go out and be citizens and to go into the workforce, be prepared to learn, work with people, to make decisions...".

Participant Three

Helen is a teacher from South Africa, beginning her career in home economics. She completed her first year of teaching and then moved to a University of Technology as a technician, then as a lecturer. She later moved to a teaching position, delivering home economics from new entrants level up to year thirteen in South Africa. She has been in her current role for four years, teaching science and food technology to junior secondary school students and hospitality at NCEA level one. When asked about how she has developed her understanding of the technology curriculum, she states

...Professionally, I've tried my best to get up to speed with technology, but it's been a bit hard because my family kind of come first. They always have. So, I've done whatever I can within school hours, like if I can take a day off to do professional development, I do it.

Helen reflects how other teachers influence her programme, stating that

...the kids are coming in from intermediate [with] very high expectations...I [asked] “what kind of dishes did you do?” and he said “Oh, we were doing three course meals”...it’s quite difficult to get them challenged...it’s a bit undermining for the high schools...because we don’t do senior technology here. In [junior level] food technology, I’ve got to bear in mind that there are certain skills that [are] my responsibility to get through to the kids before they start hospitality.

Helen indicates some alignment with a socially-driven ideology but focuses mostly on the pragmatics of delivery, stating

...I could consolidate [the curriculum learning] a bit in another small unit, I have thought of a muffin unit, giving them a basic muffin and saying, “how can you change this now?”...but I’m a little loathe to go away from the real basic biscuit because it’s such a good place for people that don’t know anything about the kitchen, to start...

Helen’s understandings appear to be constrained by the need to develop student’s technical skills for the school senior secondary pathway in her subject area. Her perception is that the curriculum can be addressed through learning opportunities that are based on the development of skills and high quality [food-based] outcomes.

Participant Four

Margaret began her teaching career after some time in the military where she was an electronics specialist. She was an unqualified teacher for some time in the United Kingdom before moving to New Zealand and gaining a Scholarship at Waikato University to teach digital technologies. When describing her perception of the subject, she states

...when I came out four years ago, they started this new digital technology curriculum. They said “We’re going to do it” and they just went “We’re doing it now”, no four year lead in, no training...we started teaching it...they were still coming out with the standards...There’s a consensus of us, and I have to say, I’m kind of on the fence here...who think that digital needs to come out of the technology field, because we have had to shoehorn some of the things to make it fit technology...only because of the old way they teach it still really...it’s very structured...IT’s [Information technology] not structured, it’s a very fluid industry...it doesn’t really have a structure because it is all about thiking outside of the box...and if you output too much structure, you can’t go outside the box.

Initial impressions from the interview data suggest that Margaret aligns with a student and philosophically driven ideology. She articulates the philosophy behind the national curriculum document (MoE, 2007) and describes ways that she adapts her teaching to address the needs of her students in digital technology.

The baseline interviews indicate that the technology teachers can align with more than one of the Shiro’s (2008) four ideologies. Teacher perceptions’ appear to be heavily influenced by their socio-historical understandings of the nature of technology education, the way that this is negotiated within their school context and the tensions caused for their evolving professional identity. The way that teachers engage with and enact the curriculum provides an opportunity to review how their ideology is embedded, negotiated or neglected within their practice.

Where to from here?

The newly appointed leader of technology education [Bob] is arguably well positioned in terms of content knowledge. Of interest however, is how he interacts with the staff in his department to generate a common and unified vision between those with differing ideologies about the purpose of the subject.

It is suggested here that there is a need for technology teachers in the first instance, to consider how their own perceptions and individual learning needs (Ingvarson, 2002) might influence their interpretation of the curriculum. This will enable them to move towards a shared understanding of the curriculum and then a focus on student social or academic outcomes. However, the diversity of interpretations around the meaning and purpose of technology education presents a potential further barrier to the subjects enactment.

Whilst situational change may be dependent on the department and the context within which an individual is practicing, there are also organisational and community influences. In some school contexts, it may be that current models are the antithesis of empowerment, potentially perpetuating a form of organisational or individual learned helplessness (Biddulph & Carr, 1999). Where this is the case, opposition is likely to result because of the differing understandings and expectations of the subject's theoretical foundation. Staff readiness or differing leadership approaches can be utilised to facilitate change and consequently empower teachers, but only if discourse is challenged or discussed openly and in a safe environment. It is argued here that in order to facilitate change around the nature of technology education in New Zealand schools, teachers need to become more empowered and be encouraged to take meaningful ownership of their own learning needs through the development of personally driven professional development.

Conclusion

Teachers of technology represent a diverse range of views about the purpose of the subject, meaning that finding agreement around the way the subject can be taught is a complex process. This can lead to inaction or a resistance to change rather than the challenging of the dominant discourse with a view to enact the curriculum or facilitate pedagogical change. It is recommended here that there needs to be a teacher-centred approach to professional development where practitioners are encouraged to openly and critically engage with the curriculum in order to understand and interpret for their own context. The researcher intends to work with the participants to review their practice and consider which pedagogical strategies are most likely to support their students learning needs so that as practitioners we can learn from the last twenty years and look forward to the next.

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