An exploration of factors influencing tertiary IT educators' pedagogies

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Abstract
This paper presents factors that influence and shape tertiary IT educators underpinning teaching philosophy. This work is the first part of a larger project investigating ways tertiary IT educators think about their teaching and develop their practice focusing on experiences and influences of technology, and the emergence of digitally based pedagogies. A qualitative grounded theory approach utilised semi structure interviews as the data source. Preliminary investigation identified four emergent themes from the data. The theme, 'pedagogical foundations' is explored in this paper. This theme provides details of tertiary IT educators' underpinning ideals, values and philosophy of teaching, grounded by thoughts, reflections and comments of their experiences. Exploring these ideas can improve the quality of teaching, better utilise new and emerging technologies, and nurture contemporary student-centred learning environments.

Keywords: pedagogy, IT academics, teaching philosophy, qualitative research, grounded theory.

1 Introduction
Pedagogy is a complex and vague term. Its meaning has been the source of debate in the discourse of many educators over recent times. This is partly due to the volatile higher education teaching and learning environment within which tertiary educators currently operate. This changing environment has manifested a shift from the traditional didactic teacher-focussed approach, to a technology-enhanced student-centred collaborative approach.

Developing an understanding of pedagogy and the factors influencing its formation can help to improve teaching practice. Harris (2005) claims that most academics (apart from those in education schools) do not have a background or formal training in education theory and pedagogy. Many educators are overwhelmed by the complexity of pedagogy (Ramsden, 2003). Harris (2005) found that by introducing academics to education theory and pedagogy, such as Bloom’s taxonomy, the academics were better equipped to begin improving teaching and learning outcomes. These authors promote the notion that an awareness of teaching philosophy can better equip educators in a tertiary educational context.

There are many factors influencing pedagogy formation. This provides the impetus for the research reported in this paper. By unravelling the notion of pedagogy and its development, through research, it is proposed that we can build an understanding of factors that may help improve teaching practice. The work of Ramsden (2003) and Harris (2005) provide supportive evidence for the importance of this research.

An additional and important consideration is that various disciplines have different pedagogies. Disciplines such as medicine and law have reported distinctive pedagogies. Shulman (2005) terms these signature pedagogies. In our research, we investigate current pedagogical influences of tertiary IT educators.

This paper reports on phase one of a two-phase study. Phase one of the study focuses on factors that influence tertiary information technology (IT) educators’ pedagogical development. Phase two of the study will investigate tertiary IT educators’ experiences of using technologies in teaching and the role technology plays in shaping their pedagogies. The specific research question being investigated in phase one is:

How do tertiary IT educators develop their pedagogy?

The structure of this paper is as follows. Section 2 reviews the literature relating to defining pedagogy, and factors influencing its development. Section 3 gives a justification for the use of the grounded theory research approach. This is followed by a detailed description of the implementation of a Straussian Grounded Theory (GT) study in Section 4. The results of this study are presented in Section 5, discussed in Section 6 and followed by conclusions in Section 7.

Four categories emerged from the GT analysis. The category which describes teachers underpinning ideals, values and philosophy of teaching, and their thinking behind the practice, is discussed in this paper.

2 Pedagogy Research
The aim of this section is to examine current research pertaining to pedagogy in a tertiary education environment. The literature shows that over time educators’ views of the concept of pedagogy have become more complex and show a divergence from teacher-directed instruction to student-centred learning. The context for this research is a tertiary education environment...
setting; however, other educational levels will be encompassed in an informative basis. Understanding the evolution of pedagogy will assist in providing us with pedagogical themes and identify the development journey.

2.1 A Review of Pedagogy

Pedagogy is a complex, misunderstood, ill-defined word, with its meaning evolving overtime (Canning, 2007). According to Beetham and Sharpe (2007) “despite its etymological connection with children (paidia), contemporary use of the term has lost its exclusive reference to childhood while retaining the original sense of leading or guiding to learn” (p. 1). Academics have needed to alter their thinking and recognise how pedagogical concepts and practices have altered (Schilb, 1999). For centuries the pedagogy of the classical curriculum was a dry and sterile pedagogy of grammar instruction, whereas contemporary thinking is one of ideas, values, critical thinking, moral deliberation, and logical reasoning (Gregory, 2001).

Historically pedagogy has been associated with the teaching of children as its background emanates from the Greek word ‘paid’, meaning child, and ‘agogus’ meaning leader of (Conner et al., 1996). As defined by Smith and Lowrie (2002) pedagogy refers to the teacher’s relationships with children. More explicitly, it refers to “appropriate ways of teaching and giving assistance to children and young people” (Loughran, 1999, p. 14). Traditional notions of pedagogy were associated with teacher-centred instruction (Conner, et al., 1996). This is thought to have originated from the Calvinists who believed wisdom was evil. They advocated adults monitor, control, and restrict childrens’ learning to keep them innocent (Conner, et al., 1996). In this traditional pedagogic model, teachers held responsibility for making decisions about what will be learned, how it will be learned, and when it will be learned. Teachers directed the learning (Conner, et al., 1996).

Contemporary definitions describe pedagogy as the art, profession or science of teaching (Beetham & Sharpe, 2007; Chapuis, 2003). Pedagogy is often represented as the philosophy and instructional approaches associated with good teaching (Kemmis & Smith, 2006). However, pedagogy is often seen as a nebulous concept, with some educators using it as a synonym for teaching (Conner, et al., 1996), but pedagogy means more than teaching. As reported by Ladwig and King (2003) pedagogy is about how teaching is done rather than what is taught. Pedagogy is about the teaching and learning activities teachers use and how they assess their students’ progress. Smith and Lowrie (2002) also support this concept and indicate that pedagogy can be an effective way of describing the relationships between teaching, learning and assessment in classrooms, they believe to talk of pedagogy is to talk of the appropriate ways teachers interact with learners. Beetham and Sharpe (2007) argue that some educators are still at odds with the emphasis on teaching, with their preference on the activity of learning, suggesting that in a learner-centred environment teaching should not be the focus of concern.

Contemporary writers suggest that the traditional teacher-centred view of pedagogy is not only becoming student-centred but more complex. Mortimore (1999) contends that academics’ and researchers’ notions of pedagogy have become more complicated over time. He argues that a deepening in our understanding of cognition and meta-cognition have influenced the conceptualisation of pedagogy. He describes the current model of pedagogy as being a complex one which includes relationships between the teacher, learning context, content, and learning. Chapuis (2003) suggests pedagogy requires a broad repertoire of strategies and sustained attention to what produces student learning in a specific context. Smith and Lowrie (2002) believe pedagogy embodies “the relational, emotional, moral and personal dimensions of the teaching and learning process” (p. 6). Whilst Waters (2005) endorses pedagogy as encompassing both formal and informal knowledge about teaching and learning and is reliant on both the learner and the teacher.

These authors all provide evidence of a growing conception of what pedagogy embodies. Note the gradual change from teacher-focused to student-centred learning, and the co-relationship between educator and student. It is this expanded, broader vision encompassing learning, relationships and student-centredness that will underpin this research.

2.2 Factors Influencing Pedagogy

Some of the factors that influence educators’ pedagogies include perception of teaching and learning roles, folk pedagogies, personal learning experiences, educational technology, government and institutional policy, peer evaluation, reflective practices, student evaluations, teaching and learning context, and, understanding of teaching. A brief overview of each follows.

The educators’ perspective of the teaching role is an important factor in determining teaching approach. Biggs (2007) suggests these are divided by who is in major control – the teacher or the student. These roles have been characterised in educational language as ‘Sage on the stage’ (teacher-directed) and ‘Guide on the Side’ (student-directed) (King, 1993). Biggs suggests that each approach results in very different engagement from the learner. Furthermore, the way educators have been taught is likely to have an impact on the way they teach. According to Shulman (2004) educators own learning experiences influence their approach to teaching.

Educators’ existing beliefs about teaching influence their approach (Raths, 2001). These beliefs have been termed ‘folk pedagogies’. According to Olson and Bruner (1998) folk pedagogies are lay theories or intuitive beliefs teachers have about the way students learn.

Educational technology has played a significant role in shaping many educators contemporary pedagogies. Newson (1999) coined the term techno-pedagogy describing it as models of teaching and learning associated with instructional technology. The notion of technology-enhanced teaching shows a shift in teacher’s role from controller to coach of learning (Jonassen, Howland, Marra, & Crismond, 2008).

Government and institutional policies have been reported as influencing factors on tertiary IT educators’ teaching approaches. Tutt, Sheard and Avram (2008) reported a lack of support and encouragement for IT academics, restricting them with teacher-centred policies.
which are counter to their preferred student-centred styles.

Peer evaluation and observation can provide educators with useful commentary about the quality of course content, structure, and assessment (Bain, 2004). Carbone and Kaasbooll (1998) found that peer observers could also offer feedback on teaching based organisational and communication issues providing a chance for educators to reflect and compare without the pressure of performance. Ladwig (2005) suggests that peer review can provide analysis and thinking at a pedagogical level and that this process can lead to improved educational outcomes.

Reflective practice influences the different ways educators think about teaching and function as teachers. Burn et al (cited in Marsh, 2008) found that critical self reflection is an essential tool for teachers to utilise as it helps them undertake informed action and provides a rationale for practice. Ramsden (2003) found that just thinking about teaching is not enough, the challenge is to merge the thinking and doing. Ramsden found this could have likely implications for student learning outcomes.

Evaluation tools can provide educators with an opportunity to reflect on the quality of their teaching. Kaplan (cited in Bain, 2004) suggests that by asking students the right questions, their answers can aid educators to make judgements about the quality of their teaching. Bain stresses that the student ratings are not by themselves evaluations.

Educational learning spaces are complex busy environments in which varying groups of students must be organised. Teachers require a highly developed ability to manage these complex situations, multiple activities and unpredictable events (Doyle cited in Mortimore, 1999).

Finally, educators’ knowledge of teaching can influence pedagogical development. University teaching is very complex and Ramsden (2003) proposes that most educators feel they have a better grasp on its complexities than they actually do. There are increasing demands on educators in terms of teaching skills (Biggs, 2007). Traditional approaches no longer work with a much more diverse student population. Biggs believes a fresh look at teaching is necessary.

2.3 Tertiary IT Education Context Gap

There is wealth of literature in the education field about tertiary teaching pedagogy, but a scarcity of work in the discipline of IT, particularly in an Australian context. There are a few studies that provide examples of teaching experiences of IT educators (Lister et al., 2007) but few were found that have investigated factors influencing tertiary IT educators’ pedagogical development.

The work reported in this paper is inspired from published work of several studies within the IT discipline. These include work on scholarship pursuits of IT acadeamics by Lynch, Sheard, Carbone and Collins (2005) and, work by Tutt, Sheard and Avram (2008) which presented a model of IT academics teaching experiences. Of significant influence is work by Kutay and Lister (2006), whose research aimed at facilitating a community of practice to foster ways of discussing pedagogy in a higher education IT school, and the work of Lister et al. (2007) who investigated ways tertiary IT educators understand teaching.

This section provided an outline of the background literature regarding theory and factors influencing pedagogy. The next section provides a brief outline of the research design approach.

3 Research Design

The aim of this section is to provide a description and justification of the research design approach adopted in this study.

3.1 Qualitative Inquiry

A qualitative approach has been adopted for this work. Qualitative inquiry is typically used for the exploration of social phenomena or situations in which individuals are involved with various types of processes, such as educational processes (Hazzan, Dubinsky, Eidelman, Sakhnini, & Teif, 2006; Myers, 1997). In the context of this research factors, influencing the development and formation of tertiary IT educators’ pedagogies is the phenomenon being investigated.

3.2 Interpretivism

An interpretive philosophical view underpins the work done on this project. Interpretivism is a view that cultures can be understood by examining peoples’ beliefs, their ideas, and the meanings that are significant to them. All knowledge is a matter of interpretation (Crotty, 1998). Interpretivism is an appropriate choice because tertiary IT educator’s knowledge of their world is formed through their teaching and learning experiences (epistemology).

3.3 Grounded Theory Methodology

A GT approach will be modelled on this project. According to Strauss and Corbin (1990) “A grounded theory is one that is inductively derived from the study of the phenomenon it represents. That is, it is discovered, developed, and provisionally verified through systematic data collection and analysis of data pertaining to that phenomenon” (p. 23).

GT is appropriate for research studies when all the concepts pertaining to the given phenomenon have not been identified in a particular context (Strauss & Corbin, 1990), as is the case with this project.

A review of the genealogy of GT reveals the following major approaches:

- Glaserian GT: Glaser and Strauss (1967) and Glaser (1978)

The Straussian GT approach was chosen for this project as it best matched the parameters of the research, as follows: it allows the researcher to enter the research field with preconceived ideas, a predetermined problem statement, extensive review of the literature, and an interview protocol (Charmaz & Bryant, 2007). The researcher had previously undertaken all of these tasks.

GT has been used in many discipline areas. Within the context of IT education, GT has been used in a number of studies. For example, it was used as a research
methodology to investigate IT student capstone projects (Kollanus & Isomottonen, 2008a). GT was used by Kollanus and Isomottonen (2008b) in several studies on using test driven development in extreme programming. There are also several notable studies by Kinnunen and Simon (2010) and Dunican (2006) who used GT to investigate the learning and teaching of novice computer programming.

While this section provided an explanation and justification of the research approach used in this study, the following section provides details of the implementation of the GT approach.

4 Implementation of GT

4.1 Research Approach

This section provides an explanation of the implementation of phase one of the two-phase study, applying the theoretical approach discussed in the previous section. A detailed description of the first two coding stages of GT is presented. This explains the research techniques used and in doing so illustrates the Straussian GT approach. Data gathered through phase one is presented in section 5 results.

The Straussian model of GT data collection and coding processes was applied in an integrative iterative fashion during phase one of this project. This approach was based on modelling presented by McNab (2010, p. 256) and Hoda, Nobel and Marshall (2010, p. 1). See adaptation in Figure 1.

The Straussian model of GT data collection and coding processes was applied in an integrative iterative fashion during phase one of this project. This approach was based on modelling presented by McNab (2010, p. 256) and Hoda, Nobel and Marshall (2010, p. 1). See adaptation in Figure 1.

The interview protocol consisted of eight questions divided into two sections. The first section was designed to build a profile of the teacher, and gathered information concerning, mentors, teaching career highlights, perceived characteristics of good teachers, course preparation, assessment and delivery. Questions included:

- How did you get into teaching?
- Can you describe key moments, experiences or people that have influenced your teaching philosophy?
- Can you think of any other factors (e.g. circumstances) that have influenced your teaching?
- What are the most important characteristics you believe a good teacher must have?
- How do you go about teaching a course?

These questions gathered information aimed at answering the research question, which is the focus of this paper: How do tertiary IT educators develop their pedagogy?

Data from the second section of the interview protocol will be further developed in phase two of this project, and is outside the scope of this paper.

4.1.2 Initial Coding: Open Codes

After data collection, the initial coding process was undertaken, an open coding approach, consistent with Straussian GT was implemented. According to Strauss and Corbin (1990) open coding is “the process of breaking down, examining, comparing, conceptualizing, and categorizing data” (p. 61).

The open coding process in this study consisted of several iterations. A sentence-by-sentence technique was utilised. Each interview was coded with the previous interview in mind, this is known as a constant comparative approach (Glaser & Strauss, 1967). The first interview transcript was coded in a sequential fashion. Subsequent interview transcripts were coded in an iterative fashion using the constant comparative method to revisit, revise and identify additional codes.

4.1.3 Memoing

The process of memo writing was conducted in parallel with the data collection, coding and constant comparison method. In this project, consistent with the work of Charmaz (2006), memo writing was undertaken in order to capture thoughts containing analysis, comparisons, connections about codes, and categories or relationships which link the categories. Continued writing of memos throughout the research process assisted to elevate the level of abstraction of ideas, and codes began to stand out and take shape into theoretical categories. Memos developed in MS Word were chronologically dated and themed for efficient future comparison, reflection and retrieval.

4.1.4 Intermediate Coding: Axial Codes

The final step in phase one was the intermediate coding phase. During this phase, axial coding was completed. Axial coding, as defined by (Strauss & Corbin, 1990, p. 96), is “a set of procedures whereby data are put back
together in new ways after open coding, by making connections”. The axial coding process was conducted using the following steps, commencing with the grouping of open codes (identified during initial coding) into axial codes. Axial codes were then grouped into emergent categories (themes). Each axial code was further defined through the identification of dimensions and properties and the development of a paradigm model.

The axial coding process was used to extend the analytic work of initial coding and strategically reassemble fractured data into emergent categories. Each axial code was deconstructed into a number of properties. Strauss and Corbin define properties as “attributes or characteristics pertaining to a category, and dimensions are the location of properties along a continuum (Strauss & Corbin, 1990). Dimensions will be uncovered in phase two of the project, as more data is collected and the constant comparative method applied. For details of the axial codes and properties generated in this study, refer to section 5.2.

As part of the axial coding process a paradigm model was developed. Paradigm modelling is recommended by Strauss and Corbin (2008) to be useful in providing answers to questions of context and developing insight into a phenomenon (Dunican, 2006). In this project it was used to deconstruct and reframe data uncovered in the ‘pedagogical foundations’ category. It was used to gain insight into pedagogical development in terms of the conditions in which pedagogy is reflected upon, by the interactions causing the reflection, and, the resultant change. For details of the paradigm model developed in this study, refer to section 5.2.

During the proposed second phase of the project, the GT process will be continued, utilising a theoretical sampling data collection technique. The selective coding approach will be applied iteratively and integrated with the GT memoing technique and constant comparison method, until data saturation point is reached, at which point memos will be sorted and a theory developed.

This section has provided a description of the practical application of GT implemented in phase one. The next section will provide details of results of phase one, in particular, the category ‘pedagogical foundations’, which emerged from this analysis.

5 Results

This section provides results of the analysis conducted in phase one, in particular, a description of the emergent category, ‘pedagogical foundations’. This discussion outlines details of the category’s axial codes, descriptions, properties and paradigm model.

5.1 Open Coding

As previously described, the open coding process consisted of several iterations. This first pass of the data identified 111 open codes (free nodes). This is consistent with other GT studies, which typically generate a large number of codes during the first pass (Kinnunen & Simon, 2010).

5.2 Axial Coding

The axial coding process, the second pass of the data, consisted of several iterations. During these iterations both axial codes and open codes were identified, some were refined and some were new, this is consistent with Strauss and Cobin’s approach documented in the latest version of their methodology (2008). Kinnunen and Simon (2010) also found this to be true when completing the axial coding phase of their project.

Four categories emerged from the axial coding process as follows:

- pedagogical foundations
- teaching practice
- technology adoption
- techno-pedagogical nexus

The ‘pedagogical foundations’ category will now be described in detail. Seven axial codes were used to describe this category. Refer to table 1 for details. The ‘pedagogical foundations’ category describes teachers underpinning ideals, values and philosophy of teaching. This includes thoughts, reflections or comments that demonstrate the thinking behind the practice. This category tells a story of factors and influences which underpin why educators teach the way they do.

<table>
<thead>
<tr>
<th>Axial Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causal factors</td>
<td>The relationship, counsel, guidance, and lessons learned from various teaching role models such as mentors, professional development activities, formal education experiences, conferences etc...</td>
</tr>
<tr>
<td>Discipline preference</td>
<td>Identification of learning and teaching techniques tailored to various sub-discipline areas and how that translates into educators own experiences and preferences</td>
</tr>
<tr>
<td>Educational language</td>
<td>Examples of educators using educational language to describe practice</td>
</tr>
<tr>
<td>Pedagogical development constraints</td>
<td>Perceived obstacles and fears constraining or limiting the development of pedagogical philosophy</td>
</tr>
<tr>
<td>Quality teaching attributes</td>
<td>Thoughts, reflections and comments about attributes of quality teachers and what constitutes quality teaching practice</td>
</tr>
<tr>
<td>Reflective focus</td>
<td>Describes elements educators reported reflecting on in relation to the development or influence of their teaching philosophy and underpinning values</td>
</tr>
<tr>
<td>Understanding of students</td>
<td>Encapsulates educator’s reflections and perceptions and emulation of student learning approaches</td>
</tr>
</tbody>
</table>

Table 1: Axial Codes

Within each, axial code of the ‘pedagogical foundations’ category a number of properties were identified these properties form the characteristics or features that distinguish this category. Refer to table 2 for details.

<table>
<thead>
<tr>
<th>Axial Codes</th>
<th>Properties</th>
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<tbody>
<tr>
<td>Causal factors</td>
<td>mentor influence</td>
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<tr>
<td>Causal factors</td>
<td>mentor influence</td>
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Table 2: Axial Properties

<table>
<thead>
<tr>
<th>Axial Codes</th>
<th>Properties</th>
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<tbody>
<tr>
<td>Discipline preference</td>
<td>logic based</td>
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<tr>
<td></td>
<td>skills based</td>
</tr>
<tr>
<td></td>
<td>theoretical</td>
</tr>
<tr>
<td>Educational language</td>
<td>learning theory</td>
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<td></td>
<td>methodology</td>
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<td></td>
<td>teaching theory</td>
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<tr>
<td>Pedagogical development constraints</td>
<td>industry experience</td>
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<tr>
<td></td>
<td>self confidence</td>
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<tr>
<td></td>
<td>technology</td>
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<tr>
<td></td>
<td>university policy</td>
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<tr>
<td>Quality teaching attributes</td>
<td>communicator</td>
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<td></td>
<td>empathy</td>
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<td></td>
<td>entertaining</td>
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<td>honest</td>
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<td></td>
<td>passion</td>
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<td></td>
<td>respect</td>
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<tr>
<td>Reflective focus</td>
<td>student learning</td>
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<td></td>
<td>teaching knowledge</td>
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<td>technology use</td>
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<tr>
<td>Understanding of students</td>
<td>engagement</td>
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<td></td>
<td>motivation</td>
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<td></td>
<td>learning approach</td>
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Table 3: Paradigm Model

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phenomenon: Pedagogical Foundations</td>
<td></td>
</tr>
<tr>
<td>Conditions</td>
<td>Educators reflect on teaching approach in response to publication of allocated teaching load, (particularly for a new course not taught before), when interacting with students, and when using technology to facilitate teaching and learning.</td>
</tr>
<tr>
<td>Interactions and Emotions</td>
<td>Educators read literature, attend conferences and discuss concepts with other IT educators,</td>
</tr>
<tr>
<td>Consequences</td>
<td>Reflection and change in practice arises in response to educator’s experiences, and interactions.</td>
</tr>
</tbody>
</table>

6 Discussion

The aim of this section is to provide an analysis and discussion of the ‘pedagogical foundations’ category. Seven axial codes emerged from the data, these codes describe factors influencing the development, growth and formation of tertiary IT educator’s pedagogies and form a scaffold of support upon which tertiary IT educators reported in this study build their practice.

6.1 Causal Factors

Causal factors describe determining or causal elements or factors. For example education is an important determinant of one’s outlook on life (Farlex Inc., 2011). In terms of this study, causal factors reported include, the influence of and relationships with mentors, engagement with the literature, and participation in professional development activities.

A strong relationship with mentors from early on instils a sense of collegiality and a preference for working with others in team based teaching and learning environments.

“I always tend to work with other people, rather than in isolation, in some ways I have had lots of mentors”

Educators’ own learning experiences from very early on help them to discern between approaches and develop a tool kit of their own learning and teaching techniques.

“I found him fantastic because he just had that really good teaching style”

“very enthusiastic, always available to talk to you about things, even beyond what was actually being taught in the course at the time ... made an impact on me”

Educators found they assimilated valuable techniques, which enhanced their teaching practice through attendance at conferences, professional development activities, observing others, and, participating in peer review sessions.

“I went to a conference and they highlighted the idea of early assessment”

“I watched her give a presentation one day, I watched her pause, and I thought ah yes that’s effective”

Educators indicated they apply research techniques and use the work of others to guide and direct their own practice.

“So I went through and decided, ok, what are the topics that we need to go through. What’s a good order, I looked in text books, and online and I looked at other courses that people had delivered”

“the educationally critical aspects. Somehow they need to be determined. Often it’s by reading the research of other people”

This data provides evidence that causal factors play a role in shaping tertiary IT educator’s pedagogies. In order to maximise the potential of mentoring relationships, it is important to build an environment, which fosters both formal and informal connections between teachers. In addition, educators can benefit from peer review and observation of other teachers in action (see Carbone & Kaasboll, 1998). This observation is supported by the literature, confirming peer reviews provide professional
development opportunities for teachers and a forum to share information about teaching (Marsh, 2008). Educators need ready access to current discipline based educational literature, training programs and support to attend practice based teaching and learning conferences where current theoretical frameworks, tools and techniques are shared.

Possible implications of causal factors: Tertiary IT educators could benefit from access to an environment that fosters relationships with mentors, facilitates access to teaching and learning literature and encourages attendance at professional teaching and learning development activities.

6.2 Discipline Preference

The participants reported three reasons why they were attracted to teaching sub-discipline areas of IT: the theoretical knowledge, the underpinning logic of the content, and having success learning it during their own educational pursuits.

Educators indicated they liked teaching sub-disciplines of IT due to the theoretical content or the logical thinking required.

“I placed a very heavy emphasis on understanding rather than memory work, and, I was interested in how things worked from the theoretical point”

“programming is a completely different way of thinking, it’s very logical”

An underpinning theme reported by educators was the attraction in having been successful in their own studies. The knowledge that they could do it well was an empowering factor for wanting to teach it.

“I think that I felt more on top of the content”

“I mean I was successful at it and I think that was the reason that I decided that I wanted to continue”

This data suggests that educators feel most confident in teaching content that they are familiar with and that suits their own learning approach and interests, whether that is theory based, logic based or skills based within the IT discipline. By enjoying what they are teaching, and feeling confident in their knowledge of the content, tertiary IT educators are more likely to deliver quality teaching and learning outcomes.

Possible implications of discipline preference: Tertiary IT educators feel most confident teaching content they are familiar with and find interesting.

6.3 Educational Language

The participants described a range of teaching frameworks and theories reported in literature but did not appear to be consistent with the language required to connect their descriptions to identifying educational labels. For example, problem-based and applied learning, student-centred learning, constructivism, and learning styles were all described using everyday language. This is consistent with observations of other researchers (see Harris, 2005).

Educators described attributes of constructivist learning theory without providing the label.

“They go to a lecture, maybe do the homework problems, build up that foundation, build on it for the next portfolio. So it’s a building process”

“I would try and design it so that they could work on small parts each week, and encourage them in the class”

Educators understood the need for applied real world problems, but without providing the labels.

“to get good understanding of the way in which IT is used in the world”

Use of educational language will encourage exploration of the theoretical frameworks underpinning these, leading to a more sophisticated informed approach to solving teaching and learning problems. We encourage this with our students, for example, one participant reported the following about a programming class:

“I had them working on terminology, because I’m a firm believer in that they understand what the terms are and that they can talk about them”

By modelling this behaviour ourselves alongside the expert language of our disciplines, we move into the realm of expert teaching and learning educators.

An environment, which encourages tertiary IT educators’ use of contemporary teaching and learning language will strengthen the use of educational terms in collegial discussions. Use of educational language facilitates a move in educational decision making from a sub-conscious level to a conscious level. It is important to be aware of why we teach the way we do. Intuitive practice is a great base however, by becoming aware, we can access and trial a range of strategies and approaches which can lead to better learning outcomes for students.

Possible implications of educational language: Tertiary IT educators could benefit from using contemporary educational language and conscious decisions to access a range of teaching and learning strategies.

6.4 Pedagogical Development Constraints

Educators reported being constrained in their practice by a number of factors including a lack of industry exposure, lack of self-confidence in front of students during teaching, frustration with technology and infrastructure, and limitations imposed by university policy requirements. These factors worked to undermine their sense of satisfaction and control, and in some cases led to perceptions of unsatisfactory teaching and learning experiences.

A lack of real world commercial experience was reported as a concern. Teachers reported no real world commercial IT experience with which to enrich teaching and learning experiences.
“I have never been involved, apart from minor projects, with the commercial and business side of IT”

“I just think that a well rounded lecturer will have research interests and research experience, will have commercial experience, to get good understanding of the way in which IT is used in the world, as well as a good theoretical knowledge of IT”

Some educators reported a lack of self-confidence and feeling under pressure when teaching students, and claimed that this affected the quality of the students learning.

“when you are out the front of the class you are in a stress situation, and I find when I am doing solutions on the board that sometimes I make mistakes, and I think those mistakes are particularly confusing for the weaker students”

Educators reported a lack of confidence in technology reliability, useability and prior negative experiences when using technology.

“I’m too afraid of everything going wrong. I didn’t buy a CD player until they had been on the market for four or five years, I am a generation behind in my games consoles, I just have never been the person to go out and grab the technology straight away. I let someone else find all the problems first then adopt it”

“I ran into some issues using a multimedia unit a couple of years ago so I tend not to use that anymore”

“with the console, you can actually see the image of what’s on the screen in front of you I tend to stick pretty close to the console”

There was a sense of inflexibility at traditional teacher-centric teaching and learning policies as not accommodating contemporary pedagogy.

“You must have a fifty percent exam and that changes assessment from being formative to being summative, and when it is summative it is too late to fix problems and so I would prefer to have portfolio sessions, mid semester test, and a final test, and have the final test not actually worth very much at all”

This data suggests that there are inhibiting factors, which restrict tertiary IT educator’s ability to enact their preferred pedagogy. Educators need an environment where they can access career long connections with industry. This will enable currency, and embedding of real life experiences. A reliable technology infrastructure is essential to solicit and maintain educator confidence and encourage explorative practice. A move from teacher-centric policy to learner-centred policies will provide educators with flexibility to develop innovative practice. This is supported by Tutty, Sheard and Avram (2008) who found many IT academics are constrained by current government and institution policy resulting in unsatisfying teaching and learning experiences for both teachers and students.

Possible implication of pedagogical development constraints: Tertiary IT educators’ pedagogies may be inhibited by a lack of confidence in technological infrastructure and traditional university teaching and learning policies.

6.5 Reflective Focus

Teachers reflect on learning that they see occurring in their classes and this shapes their approach in future teaching and learning encounters.

“Last year teaching the same course I found that during tutorials students were often working on their portfolio questions with each other, and that kind of talking is good, so I’m not too sure whether on the alternative weeks whether some sort of group assessment discussion task might be appropriate, that I emphasize assessment is what makes them work”

The opportunity for some continuity in teaching the same or similar courses gives tertiary IT educators time to reflect on their approach so that it can be refined and improved in future iterations of teaching.

Possible implication of reflective focus: Tertiary IT educators may benefit from the opportunity to teach the same or similar content to enable reshaped teaching approaches to be trialled.

6.6 Quality Teaching Attributes

Commonality was observed in the notion of what makes a quality teacher. Educators identified a caring empathetic approach, honesty, enthusiasm, and passion as being the main attributes for great teachers.

“Well they have to be a good communicator, and to different levels, so it can’t just be, being able to, they have to be able to explain things in ways that various different people understands”

“keep it entertaining, so you will engage the students”

“but admitting to something when you are out of your depth”

“demonstrating a passion for my students, and for what I am teaching”

“enthusiasm an absolute must. If the teacher doesn’t seem to be interested in the topic it is very hard to expect the students to be enthused about it either”

“treat students with respect”

In research by Biggs and Moore (1993), these attributes appear as items in the top fifteen functions of great teachers. Biggs and Moore emphasise that these attributes are consistent with the social side of teaching and the connection to students. Given our notion of pedagogy as becoming student centred, it is essential contemporary teaching and learning environments foster
and encourage growth of these attributes, by helping to shape teaching in student focussed way.

**Possible implication of quality teaching attributes:** Tertiary IT educators could benefit from access to teaching and learning environments (communities of practice) which foster and encourage development of these values.

### 6.7 Understanding of Students

Educators reported trying to imagine the learning process for students and model their practice around this. In this way educators’ pedagogies are influenced by their understanding of students needs.

“I have been more interested in thinking of ways in which I could help students to understand”

“I’ve always thought about students. Are students going to be able to cope with this? Have they got sufficient support to be do this?”

This data suggests that teachers make assumptions about student learning and mould their practice around these. The difficulty here is getting it correct. Marzano (2007) suggests “A teacher’s beliefs about students’ chances of success in school influences the teacher’s actions with students, which in turn influence student’s achievement” (p. 162). Marzano suggests this is perhaps one of the most powerful factors influencing teaching because educators are typically unaware – this is an unconscious activity. It is important then for educators to be encouraged to spend some time reflecting on their approach.

**Possible implication of understanding students:** Tertiary IT educators could benefit from a conscious awareness of making assumptions about student learning in order to avoid limiting learning options.

### 7 Conclusion

Current research suggests that educators’ understandings of pedagogy have become more complex, and show a move toward technology-enhanced student-centred practices. A variety of influences on pedagogy have been reported in the literature (see section 2.2).

Using a Grounded Theory approach, results from our study show a number of factors that influence how tertiary IT educators develop their pedagogy. Findings from our study suggest that tertiary IT educators think about their teaching and develop their practice in distinct ways, through prioritisation of aspects of teaching and learning that they deem important. One surprising finding was IT educators’ approaches to technology-enhanced teaching, in particular their lack of comfort with it. Keeping in mind these findings are from a pilot study of four participants, this techno-pedagogical relationship within a tertiary IT teaching context warrants further investigation.

A holistic approach to encouraging tertiary IT educators to reflect on the factors reported is suggested. By adopting an integrated approach, the key elements can be systematically incorporated in to educational support systems, policy and practice. As tertiary IT educators, we need to move ourselves from the subconscious doing to the conscious knowing.

### 8 References


Harris, C. R. (2005). Developing basic online teaching skills, encouraging experimentation. *Distance Education Report, 9*(11), 5-8.


