Significance of a multimedia resource in the professional learning of preservice teachers

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Abstract
This phenomenological inquiry seeks to understand the complexity of teacher professional learning through analysis of the use of a multimedia curriculum resource in initial teacher education programs. The study follows seven preservice teachers at three points over the course of an eighteen month period to gain understandings of how they are making meaning of their becoming teacher journeys. For the purposes of this paper only one aspect of the doctoral study is reported on due to the limitations of space. Consequently, this paper focuses on the findings of the significance of using a multimedia curriculum resource, known as QuILT, for professional learning. The qualitative study used questionnaires that included open-ended questions and semi-structured interviews with each of the seven preservice teachers at three points over an eighteen month period; as well as artefacts such as their QuILT related assessment. The paper reports on the findings that the multimedia resource and its pedagogical use provide a rich professional learning environment for preservice teachers.

Keywords: professional teacher learning, motivation, multimedia resource, multimedia pedagogy, student engagement

Introduction
This phenomenological inquiry seeks to understand the complexity of teacher professional learning through analysis of the use of a multimedia curriculum resource in initial teacher education programs. This paper is highly relevant to current teacher education debates that focus on deepening our understandings of how teachers learn (e.g. Darling-Hammond & Bransford, 2005; Feiman-Nemser, 2008). The study investigates the complexity of learning to teach that can be conceptualised around four broad themes – learning to think like a teacher, learning to know like a teacher, learning to feel like a teacher and learning to act like a teacher...and [these] contemporary frameworks ...underscores the interconnections of content, process and contexts in learning to teach. (Feiman-Nemser, 2008, p. 698)

The study follows seven preservice teachers at three points over the course of an eighteen month period to gain understandings of how they are making meaning of their becoming teacher journeys (Britzman, 2003; Robert V. Jr. Bullough & Gitlin, 2001; van Manen, 1991). For the purposes of this paper only one aspect of the doctoral study is reported on due to the limitations of space. Consequently, this paper focuses on the findings of the significance of using a multimedia curriculum resource, known as QuILT, for professional learning.

The qualitative study used questionnaires that included open-ended questions and semi-structured interviews with each of the seven preservice teachers at three points over an eighteen month period; as well as artefacts such as their QuILT related assessment. The three points coincide with the beginning of their initial teacher education; at the end of the particular course, Learning and Teaching, where the multimedia resource was used i.e. six months into their one or two year initial teacher education programs; and some twelve months later after graduating or as they were completing their two-year teacher education program. The data collected were analysed within a three stage process as identified by LeCompte and Schensul as item, pattern and constituents that indicated levels of abstraction (LeCompte & Schensul, 1999). These levels of abstraction were achieved following the qualitative analysis activities of data reduction, data display and drawing conclusions and verifications (Miles & Huberman, 1994). To make meaning of the coded data, techniques within inductive data analysis (Lincoln & Guba, 1985) were used that allowed for interpretation of data (Creswell, 2002; Patton, 2002). From these interpretations and application of theory from the literature, models emerged that are “essentially simplifications of complex realities” that help to provide insights and understandings of the phenomenon and initial theory building (Walford, 2001, p. 148). For the purposes of this paper, the primary data sources used are related to two word images that represent the views on learning with QuILT from the perspectives of two of
the preservice teachers that participated in the study. The following section provides a brief contextual background to the study.

The QuILT context for the inquiry
QuILT (Quality In Learning and Teaching) is a two disc CD ROM multimedia curriculum resource that was used in a professional education studies subject (called Learning & Teaching) within initial teacher education programs at an Australian university. QuILT was based on numerous (over 300 episodes), brief (2-4 minutes) digital video clips of authentic primary and secondary classroom practice as well as separate interviews with students and their teachers about many aspects of learning and teaching. Table 1 presents an overview of QuILT’s nine Focus Areas that provided the organisational structure for sorting the digital video clips and the stories that they represented. QuILT was designed by a small group of faculty members over a period of approximately two years to support their teaching of professional education studies. Although I wasn’t involved with the design of QuILT, I have used it in my teaching and provided feedback on the resource to the designers. Furthermore, I didn’t teach any of the research participants for the Learning and Teaching subject where QuILT was used.

The aim of the QuILT design encourages preservice teachers, through purposeful inquiry, to actively make meaning from the digital clips and to construct their personal professional understandings of learning and teaching, which is assumed they will use to inform their professional practice of teaching. The design of QuILT draws on the narrative tradition (Connelly & Clandinin, 1990) and the metaphor of ‘learning is like crafting a patchwork quilt’ conceptually frames the design of the resource. Comparison with three key constructivist influenced frameworks for instructional design (J. Herrington & Oliver, 2000; Honebein, 1996; Knuth & Cunningham, 1993) reflects that QuILT as curriculum resource is deeply embedded within constructivist principles (refer to Table 2).

Table 1: Overview of QuILT Focus Areas*

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Brief synopsis of content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learning &amp; Teaching Sequences</td>
<td>Observe and analyse learning/teaching episodes that provide a range of different approaches to beginning, developing and concluding lessons.</td>
</tr>
<tr>
<td>2. Student Learning &amp; Teacher Purposes</td>
<td>Engage with case studies of three teachers implementing a unit of work.</td>
</tr>
<tr>
<td>3. Planning Units for Learning</td>
<td>Reflect on teacher insights into planning of units and selection and use of resources.</td>
</tr>
<tr>
<td>4. Student &amp; Classroom Management</td>
<td>View material on classroom organization &amp; student and classroom management. Decide how you would deal with particular disruptive behaviours.</td>
</tr>
<tr>
<td>5. Teaching Individuals &amp; Groups</td>
<td>Explore how teachers take account of difference in dealing with individuals &amp; groups in their classrooms.</td>
</tr>
<tr>
<td>6. Development of Learners</td>
<td>Focus on, and make comparisons of, what students are doing at particular year levels &amp; gain insights into learner capabilities.</td>
</tr>
<tr>
<td>7. Questioning for Learning</td>
<td>Study the purposes &amp; technical aspects of questioning at an individual, group and whole class level &amp; see how teachers handle student responses.</td>
</tr>
<tr>
<td>8. Evaluating Learning</td>
<td>Consider ways in which teachers monitor student progress, keep records for assessment &amp; reporting, and involve students in these processes.</td>
</tr>
<tr>
<td>9. Building a Teaching Repertoire</td>
<td>Evaluate your emerging beliefs about quality in learning &amp; teaching and decide upon the principles that will guide your practice.</td>
</tr>
</tbody>
</table>
Preservice teachers engaged with QuILT during the *Learning and Teaching* subject within their respective programs to assist them to articulate their emergent teacher identity at their early stage of becoming a teacher. QuILT was used as a curriculum resource individually, as well as in discussions in smaller peer groups (5-6 preservice teachers) and as a class (25-30 preservice teachers) where discussion was guided by their lecturer. During the period of the study, about half of the subject’s assessment was associated with preservice teachers working with the QuILT curriculum resource and completing Action Planners (guided tools for reflection embedded within each Focus Area of QuILT) for selected Focus Areas where preservice teachers unpacked key themes within the Focus Area and how it was informing their developing teacher identity.

Seven preservice teachers volunteered to participate in the study and each was given a pseudonym. They were either undertaking a postgraduate initial teacher education program of one or two years for teaching in primary or secondary schools. The age of the preservice teachers ranged from 22–34 years of age. In the initial questionnaire all self-rated themselves as competent in computer-related technologies and were willing to try a range of ICT for their learning.

**Table 2: Comparison of constructivist influenced instructional design frameworks and affordances of QuILT**

<table>
<thead>
<tr>
<th>Synthesised principles</th>
<th>Knuth &amp; Cunningham (1993)</th>
<th>Honebein (1996)</th>
<th>Herrington &amp; Oliver (2000)</th>
<th>QuILT reflects constructivist principles, for example, it...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructed knowledge</td>
<td>1. All knowledge is constructed.</td>
<td>1. Provide experience with the knowledge construction process. (students negotiate their interest in learning context/topics etc)</td>
<td>6. Promote reflection to enable abstractions to be formed. 7. Promote articulation to enable tacit knowledge to be made explicit.</td>
<td>encourages preservice teachers to construct their professional knowledge about the nature of quality in learning and teaching.</td>
</tr>
<tr>
<td>Multiple perspectives</td>
<td>2. Many worlds are possible, hence their will be multiple perspectives.</td>
<td>2. Provide experience in and appreciation for multiple perspectives.</td>
<td>4. Provide multiple roles and perspectives.</td>
<td>encourages preservice teachers to observe/interpret/examine multiple perspectives of learner and teacher in the classroom.</td>
</tr>
<tr>
<td>Authentic / situated learning</td>
<td>3. Knowledge is effective action. (knowledge is acquired in situated context)</td>
<td>3. Embed learning in realistic and relevant contexts. 4. Encourage ownership and voice in the learning process. (student-centredness of constructivist learning)</td>
<td>1. Provide authentic contexts that reflect the way the knowledge will be used in real life. 2. Provide authentic activities. 3. Provide access to expert performances and the modelling of processes.</td>
<td>uses QTV to show authentic episodes of learning and teaching; &amp; interviews of thinking and feeling. shows teachers modelling practice in QTV; use of quilt-making metaphor to develop professional knowledge and skills in teaching (modelling processes)</td>
</tr>
<tr>
<td>Learning is collaborative/social</td>
<td>4. Human learning is embedded within social coupling. (social constructivism)</td>
<td>5. Embed learning in social experience.</td>
<td>5. Support collaborative construction of knowledge. 8. Provide coaching and</td>
<td>encourages two levels of collaboration: a) individual construction of professional knowledge with (virtual) QuILT</td>
</tr>
</tbody>
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* Descriptions taken from material on QuILT CD ROM package
<table>
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<tr>
<th>Learning through diverse knowledge representations</th>
<th>5. Knowing is not sign dependent. (multiple sign systems &amp; multiple representations of knowledge)</th>
<th>6. Encourage the use of multiple modes of representation. (multiple sign systems)</th>
<th>uses audio, visual and text to represent the authentic classroom as the situated context for the professional learning of preservice teachers.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflection and change</td>
<td>6. World views can be explored and changed with tools.</td>
<td>6. Promote reflection to enable abstractions to be formed.</td>
<td>uses computer based tools &amp; traditional tools in subject workshops to support professional learning (incl. reflection).</td>
</tr>
<tr>
<td>Metacognitive development</td>
<td>7. Knowing how we know is the ultimate human accomplishment. (metacognition)</td>
<td>7. Encourage self-awareness of the knowledge construction process. (metacognition)</td>
<td>encourages preservice teachers to develop metacognition through scaffolded instruction/ tools eg Notepad and Action Planners in QuILT.</td>
</tr>
<tr>
<td>Authentic assessment</td>
<td>9. Provide for authentic assessment of learning within the tasks.</td>
<td></td>
<td>encourages preservice teachers to bridge their theoretical perspectives with professional practice.</td>
</tr>
</tbody>
</table>
Data representation & discussion: learning from Isabella and William

In the remaining sections of the paper, I focus on the data of two of the study's participants: Isabella and William. Furthermore, in this data representation I use the technique of ‘word images’ which is a result of a method described and used by Clandinin and Huber (2005) and others (e.g. Ely et al 1997; Richardson 1994) to analyse the participants’ reflections on QuILT to determine the role that the multimedia curriculum resource plays in their professional learning. In this method the data are used by the researcher to compose ‘word images’ (text that resembles a poetic form) that describe how the preservice teachers engage with QuILT as they are learning to teach. Representing data as word images portrays powerful insights from the personal narratives of the preservice teachers while conveying simultaneously the affective qualities of engagement in learning to teach. This type of data analysis allows for deepening our understanding of teacher learning.

I created Isabella’s word image from her responses in the first interview to capture her perceptions of QuILT learning and influence on her learning (Word Image 1). William’s word image is created from his responses in his first and final interviews (Word Image 2).

Word Image 1: Isabella on QuILT learning
QuILT…it’s different
At least it’s not like all the other coursework.
It’s good because it’s new;
a different way of learning.

It’s nice not to be told things
all the time;
Instead just to work it out
a bit more
To think
Create my own opinions;
Ideas about teaching.

Thinking about who I am
as a teacher
What do I believe?
How does it all fit in?

My school practicum
helps me unpack QuILT
to understand it better.
But then QuILT
helps me to unpack my school practice
without actually experiencing all the mistakes
Safe environment for learning.

I get bored easily
Too much reading elsewhere
QuILT is different
I actually take in a lot more with QuILT
Solid learning
I can remember better.

I have used Isabella’s data because, in this study, she typifies many of the preservice teachers' feelings towards, and thinking about, QuILT. Yet, Isabella’s word image doesn’t account for all the preservice teachers views. To juxtapose differing perceptions of QuILT learning, I have used William’s data to form an alternative word image (see Word Image 2). As the data represented in Word Image 2, William is sometimes sceptical of the value of QuILT as he reflects on his learning;
yet at times, with deeper analysis, his learning associated with QuILT is incredibly insightful. Simultaneously, William’s word image creates the sense of overlapping similarities and the diversity of differences when compared with Isabella’s word image. Some of the differences are unique to William, while at other times they voice and represent the concerns of other preservice teachers in the study too.

Consequently, the word images of Isabella and William provide a narrative framework (J. Bruner, 1986; Connelly & Clandinin, 1990; Ewing, 2010) to examine the role that QuILT played in the professional learning of preservice teachers.

Word Image 2: William engaging QuILT with ambivalence
(from first interview)
I feel that QuILT works on so many different levels;
Unless you’re focussed you start taking notes off on the wrong offshoot.
Then that would be totally useless.
QuILT’s Action Planners are important
Are an actual assessment
Questions that appear on QuILT’s screen aren’t relevant to the Action Planner.
Now I totally disregard these questions
I rely on the Action Planners to get more out of QuILT.

My learning style
it’s influenced by my science background
I almost finished a PhD in science, you know,
My way of thinking is ‘What are the facts?’
I hone in on what I need to know and how it is relevant.
Not like someone who’s done Arts or History
They can go off on tangents;
Spraying things off in diverse directions.
I’ve had to learn this with QuILT but I find it difficult.
QuILT’s too abstract.

I like to interact with QuILT.
I do this by (re)presenting what I see in my own words, ways of thinking.
This is in my Notepad.
I can learn from the QuILT teachers;
I value hearing the perspectives of the QuILT students;
This is important.
I reflect on what I see
I like to stew on it, digest it
After a while, I work on my Action Planner
I try and incorporate how I teach and identify my beliefs in teaching;
Reflection allows me to get it correct.

QuILT is still unclear
Expectations are not explicit
The questions can throw you off track;
The Action Planner is being assessed.
The Action Planner is important.
It focuses you.
The Action Planners help me think
about the way I’d be teaching
Particularly important is
Action Planner for Focus Area 9.

(and from the final interview)
I hate QuILT still.
I still feel it wasn’t immediately relevant
Wasn’t sure how to answer the questions
…but I do remember it well
Particularly Focus Area 9
I still always look at that Action Planner 9
Where you get to assemble it all
and how you’re going to teach.
I like to reflect on it.

QuILT fulfils dual roles for professional learning
The way the preservice teachers perceive and talk about QuILT, as represented in these word images, imparts a way of understanding QuILT and its influences on preservice teachers’ learning. Isabella talks of QuILT as ‘different’ (Word Image 1, Stanza 1) and William perceives QuILT as ‘still unclear’ (Word Image 2, Stanza 4). Both of these sample perceptions treat QuILT as a curriculum resource. In contrast, when William talks of ‘I like to interact with QuILT’ (Word Image 2, Stanza 3) and Isabella announces ‘It’s nice not to be told things all the time; Instead just to work it out’ (Word Image 1, Stanza 2); both begin to talk of QuILT not only as a resource but a way of learning with it: a pedagogical influence. What has emerged from these word images is that QuILT plays dual roles in the professional learning of the preservice teachers: i) QuILT as curriculum resource and ii) QuILT as pedagogy, which are now discussed.

QuILT as curriculum resource
QuILT as curriculum resource is a product for learning. Resources and their nature influence the kinds of learning that takes place and types of knowledge generated. This affirms other researchers’ perspectives on resources. For example,

what counts as knowledge and understanding in classrooms is determined very largely by the range of resources that are available…[and] the status which is assigned to these resources and the kinds of learning activities undertaken in connection with them. (Pigdon & Woolley, 1994, p. 1)

Likewise, Edwards also reasons that there is a pedagogical influence of resources acting on learning, whereby learning is “increasingly [an] informed use of cultural artefacts such as …information technology” (Edwards, 2006, p. 353). The strength of computer technologies for learning is their “capacity to organise and present information in multiple ways [to facilitate] interpretation and explanation” (Pigdon & Woolley, 1994, p. 47).

Isabella identifies the novelty of using QuILT, which is not like other resources she’s used in her formal study (Word Image 1). This signals the challenge of incorporating a resource like QuILT into teacher education: will the preservice teachers engage with QuILT? Or, will the differences between their experiences of learning resources, inhibit the preservice teachers’ professional learning? These issues are now explored.

QuILT as a novel curriculum resource
As Isabella’s Word Image demonstrates, the preservice teachers accept and learn how to utilise the multimedia resource for their studies in the subject Learning and Teaching. This is the case even though the use of the interactive resource, during the study, is a new way of learning for these students. Despite some multimedia researchers’ findings (Clark & Feldon, 2005), it seems it is often the novelty that makes the QuILT resource attractive to the preservice teachers as captured by Isabella’s word image. However, novelty alone does not guarantee motivation for
valuing the resource, which is Clark and Feldon's (2005) point, and affirmed by some preservice teachers' perceptions, for example William.

Overall, the preservice teachers report that although QuILT is a novel resource, it is easy to navigate and use; and, perhaps unfortunately, they use it in a linear fashion. Usually, these linear approach descriptions by the preservice teachers follow with the explanation that they worked with QuILT in a linear manner so that they 'didn’t miss out on anything’ and/or avoid thinking tangentially because it might be on the ‘wrong track’ (e.g. see Word Image 2, Stanza 1). This may suggest that the novel format of QuILT as a multimedia resource may have lessened the students' risk taking behaviour towards its use for learning and experimenting with new ways to utilise the resource. Other researchers have also isolated the importance of risk taking by users of multimedia technologies for new ways of knowledge construction.

The implication is that existing communication paradigms may have little relevance. Risk taking to discover new ways of operating and guiding decision making has to be a necessary prerequisite for success in new [multimedia learning] environments. (Robertson, Fluck, & Thomas, 2001, p. 149)

In addition, the preservice teachers’ comments relating to the fear of missing out on content while working with QuILT does raise the issue that, at times, assessment is taking on an external motivator role for QuILT learning (e.g. Word Image 2, Stanza 1). Such a view of the assessment by the preservice teachers appears to act negatively on their learning process; shifting the learning towards the teacher’s goals rather than the learner’s needs. These preservice teachers’ comments imply that the assessment is not as authentic as desired by QuILT’s designers. This is despite the designers' innovative attempt to facilitate integrating university learning with workplace learning (Hunt, 2006) in the practicum; particularly as preservice teachers work through the Action Planners. This was an attempt by the designers to

provide authentic assessment of student learning, the learning environment needs to ensure the assessment is seamlessly integrated with the activity and provide the opportunity for students to be effective performers with acquired knowledge, and to craft products or performances in collaboration with others. (A. Herrington & Herrington, 2006, p. 8)

Consequently, the Action Planners (the basis of Learning and Teaching’s assessment associated with QuILT) aim to integrate authentically university and practicum learning. However, an aspect that may be contributing to diminish the assessment authenticity is the structural constraints of the program that force the practicum and subject learnings to separate artificially. The practicum placement in the program follows an embedded (theory first) rather than an immersion (practice first) approach (Tillema, 2004), which is traditionally not conducive to exploring strong integration of learning between the two learning environments. The complexity of using QuILT as a resource for learning to teach appears to affirm Tom Russell’s call for the need to further examine the ‘assumptions about the place of practicum in preservice teacher education’ to rethink ways of integrating practice and theory (Russell, 2005, p. 150). This consideration begins to move away from QuILT as resource to issues of QuILT as pedagogy; a theme examined shortly in this paper.

QuILT as visual and narrative resource
As a resource, QuILT particularly engages the visual senses of the preservice teachers and it seems that this, along with the narrative aspect of the digital clips, helps the preservice teachers to recall vividly scenes from QuILT and their learning (e.g. Word Image 1, Last Stanza) even eighteen months after using the resource (see Table 3). This adds further support to the idea that memory and the (re)telling of 'lived' stories play significant roles for teacher professional learning and the construction of teacher knowledge (Ben-Peretz, 1995; Clandinin & Connelly, 1995; Elbaz-Luwisch, 2005). The narrative qualities (Beattie, 2001; J. S. Bruner, 1996; Clandinin & Connelly, 1995) of QuILT play a strong role in the preservice teacher recall, particularly when combined with QuILT's visual-auditory nature (Bransford, Brown, & Cocking, 2000; Khine, 2003; Mayer, 2001, 2005).
Table 3: Temporal exploration of preservice teacher recall of QuILT and its use: key themes*

<table>
<thead>
<tr>
<th>Preservice Teacher</th>
<th>Data generated in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emilia</td>
<td>V, Ms, LT, I, LO</td>
</tr>
<tr>
<td>Gwen</td>
<td>V, Ms, LT, I</td>
</tr>
<tr>
<td>Isabella</td>
<td>V, LT, I, LO</td>
</tr>
<tr>
<td>Lauren</td>
<td>V, LT, I</td>
</tr>
<tr>
<td>Meg</td>
<td>LT, Ms, Mp, I, LO</td>
</tr>
<tr>
<td>Peter</td>
<td>V, Ms, LT, I, LO</td>
</tr>
<tr>
<td>William</td>
<td>LT, Ms, Mp, I, LO</td>
</tr>
</tbody>
</table>

* Key for Table 3: Ways of Recalling QuILT

LT = Recall of Learning Tools used in QuILT (eg Notepad; Action Planners)
V = Visual Recall of QuILT; PST states remembering clips (in general or particular episodes)
I = Recall of QuILT Influence: PST has perceived QuILT has had an Influence on her/his professional learning & creating professional knowledge
LO = Recall of Learning from Others associated with QuILT use (eg in communities of practice)
Mp = Metaphor Recall of primary metaphor ie crafting of patchwork quilt; PST uses language associated with this metaphor in describing the function and labelling of the QuILT icons
Ms = Metaphor Recall of the secondary metaphors eg navigational QuILT icons such as the school doors, arrows, lenses

NB: QuILT is embedded in the Learning & Teaching subject within the teacher education program; PST = Preservice teacher

William: engaging QuILT with ambivalence

In comparison to the other preservice teachers in the study, William is the only one who seemed to express intense negative reaction to QuILT across the study’s three cycles of data generation. In contrast to his earliest perceptions of QuILT, he constantly held negative feelings towards the resource and perceives adamantly that it did little to contribute to his professional learning as a teacher. William did not seem to engage with, and/or recall, the visual sensory characteristics of QuILT (see Table 3) and it seems his negative feelings de-value QuILT as a resource for learning. Yet, on deeper analysis of his perceptions, William is ambivalent regarding QuILT. The Word Image 2 captures his ambivalent feelings towards this resource where he initially boasted of its irrelevance and uselessness; but on further discussion, William also articulated that QuILT influences his learning to teach. It seems that a number of factors may contribute to, and interfere with, his professional learning from the QuILT resource.

What the Word Image 2 portrays is the influence of William’s years of formal study in the area of science and how this seems to be colouring his interaction with QuILT. Initially I reasoned that William is heavily influenced by a traditional positivist framework based from his science studies that is at odds with the challenges of learning from QuILT that relies upon a constructivist approach for learning. For example, William regularly expresses his belief that tasks completed for assessment purposes are more valued than other tasks (e.g. Word Image 8.2, Stanza 1). The view is also expressed by other preservice teachers in the study. This embedded and shared belief among the preservice teachers probably reflects a learned reinforcement: an outcome of years of study in a formal, often traditional, setting. This belief must be a tension with the intrinsic learning behaviour expected with the constructivist designed QuILT resource. In contrast, preservice teachers often would tell of their hours of work while using QuILT because they would find other and interesting things to observe, interpret and reflect upon. This signals evidence of a more
intrinsic oriented learning behaviour, encouraged by a constructivist approach, towards learning with QuILT, which seems more in keeping with the resource’s design intentions.

Furthermore, I contend that William’s communicative use of language (and his perception) that the Action Planners are important because they are focused and contribute to assessment, reveals his interpretation that is influenced by his scientific biography. His use of words like ‘correct’ and ‘wrong offshoot’ indicate one Truth or one way of doing/knowing and a scientific, positivistic perspective (refer to Word Image 2).

But such reasoning fails to explain why two other preservice teachers with science backgrounds don’t convey such strong negative reactions to QuILT as a resource. Isabella comes to the subject with a Bachelor Applied Science (Geology major) and Gwen has a Bachelor of Behavioural Science. While preservice teachers are influenced by their background (‘biography’ or ‘life histories’: Robert V. Jr Bullough, 1997), it seems that the greater influence is the willingness of the learner to work with a resource. It seems that both Gwen and Isabella find positive ways to engage and connect (affectively and cognitively) with the QuILT resource for their professional learning. They have a willingness to take the risk to learn how to use the resource for their learning. They have a higher degree of conation or the desire to want to work with QuILT (Mezirow, 1991).

For some reason William (and the years of science study may be a factor influencing his behaviour) did not intuitively value the multimedia resource – even though he gains meaningful insights about learning to teach from its use – and in so doing, his willingness to learn from the QuILT resource diminishes. As William develops mistrust for QuILT as a resource for learning, it seems there is a need to explicitly engage William with QuILT. Perhaps William’s view of learning is challenged by the innovation of QuILT as a resource, which does not seem to fit his definition of a resource borrowed from his lived biography (Britzman, 2003; J. S. Bruner, 1990, 1996; Robert V. Jr. Bullough & Gitlin, 2001); or perhaps he also needs to engage in reflexivity to critically examine his personal stances and their biases as they influence his beliefs and actions (Johnson, 2004).

A similar idea is explored by Janette Griffin (2006) in her exploration of the way learners perceive learning and enjoyment; and whether they perceive that enjoyment and play can also constitute learning. Griffin raises her interest in exploring how learners’ perceptions of learning influence their attitudes and approaches to learning.

If [for example] people hold strong beliefs and values about the nature of learning itself and about different learning settings, influenced largely through their formal schooling, their openness to lifelong learning through less formal settings may be impeded.  
(Griffin, 2006, pp. 147-148)

This may offer one explanation to William’s often ambivalent attitudes and perceptions of learning from QuILT. As Isabella’s word image reveals: QuILT is different. QuILT offers ‘playing’ with a ‘less formal setting’ (Griffin, 2006) for professional learning.

Another reason that may further explain William’s ambivalent engagement with QuILT relates to what Jan Herrington and her colleagues (2003) identify as the need to facilitate a learner’s ‘willing suspension of disbelief’ prior to engaging with an online resource where learners allow themselves to immerse in the created digital world and accept it as real and legitimate for learning. They argue that online authentic learning environments can facilitate this willingness to accept and learn from such resources if support for learners is incorporated into the design process (J. Herrington, et al., 2003). I argue this can apply across any complex multimedia learning environment whether it is an online or CD ROM format. In this case, William’s ambivalence with QuILT suggests that on occasions, he has an unwillingness to suspend belief and so can’t see QuILT as a ‘real’ world appropriate for his learning.

Hence, for William to engage constructively with QuILT as resource for learning to teach, he may need a more explicit way to show how ‘playing’ can also be learning. Drawing upon the other researchers’ findings as discussed previously (Britzman, 2003; J. S. Bruner, 1996; Robert V. Jr. Bullough & Gitlin, 2001; Griffin, 2006; J. Herrington, et al., 2003), this requires the teacher educator/s to work with William to encourage him to reflect, articulate and confront his learning
perceptions and how they are influencing his understandings of learning processes; then further challenge him to broaden his views as to when learning might be happening. William frequently spoke at length in interviews for the study about his interest and belief in student-centred learning. Consequently, it might have been effective to take the time to explore with William the deeper construction of professional learning embedded within QuILT, particularly through the metaphor of quilting (used by the designers), as this may have appealed to his yearning for a broader understanding of learning. It may have helped him to value QuILT as a trustworthy resource for his professional learning and thus become willing to suspend his disbelief of the resource ‘world’.

**QuILT as pedagogy**

Initially I worked with the data to comprehend the interaction between the preservice teachers and QuILT as a multimedia curriculum resource. This led to analysing the data to see how the preservice teachers engage with the resource as discussed above. However, as I revisit the data time and time again, I recognise that focussing only on the physical resource is missing a great deal of the bigger picture in understanding how the resource contributes to the preservice teachers’ professional learning. There is a need to engage with exploring the conception of a ‘teacher education pedagogy’ where

the relationship between teaching and learning in the programs and practices of learning and teaching about teaching might be purposefully examined, described, articulated and portrayed in ways that enhance our understanding of this complex interplay. (Loughran, 2006, p. 3)

Discovering and coming to an understanding of QuILT from the designers’ viewpoint, I became aware that the very essence of QuILT is constructed from the designers’ insights of good teacher education pedagogy. Acknowledging this, I analysed the data for insights into how the use of QuILT, or QuILT as pedagogy, is shaping preservice teacher learning. Pedagogy is a contested term, often used narrowly and subsequently difficult to define (Edwards, 2006; van Manen, 1991). Both van Manen and Edwards offer sociocultural views of pedagogy which broaden understandings. Edwards defines pedagogy as a relational activity of active meaning-making that informs and transforms practice.

[A] pedagogic act involves those who are teaching in informed interpretations of learners, knowledge and environments in order to manipulate environments in ways that help learners make sense of the knowledge available to them. It is an intense, complex and discursive act, which demands considerable expertise. (Edwards, 2006, p. 345)

Similarly, van Manen (1991) deliberates on learning and pedagogy and he also argues that pedagogy incorporates the study of the act of teaching and the factors that influence the teaching and learning. Such broad understandings of pedagogy align with the emergent research field of educational informatics, which is concerned with the relationships between people, information, ICTs, learning and professional practice at the level of individual and social action, and diverse organisational and institutional settings. (Levy et al., 2003, p. 299)

The data analysis has taken on this broader focus of pedagogy, which presents a richer role of QuILT for preservice teacher professional learning. Unfortunately, related pedagogical factors such as investigation into the roles of teacher educators and supervising classroom teacher mentors are limited in this study to perspectives generated or implied by the preservice teachers. Nevertheless, the study does engage in an inquiry of pedagogical influences. In particular, I focused on examining the factors that intersect between preservice teachers, QuILT multimedia, learning, and the communities of practice associated with QuILT. What becomes evident is that QuILT is not only a product for learning (QuILT as resource); it is also, and significantly, a learning process: QuILT as pedagogy.

**QuILT as becoming pedagogy**

Learning is the opportunity for growth, which gives a person “new shape and direction to his or her being or identity”; this self awareness is “a process of becoming” (van Manen, 1991, p. 33).
Accordingly, learning to teach is a process of becoming. The preservice teachers create new professional identities and new self understandings associated with that identity: it is a *process of becoming* and self knowing (Beattie, 2001; Robert V. Jr. Bullough & Gitlin, 2001; Loughran, 2006; Palmer, 1998); and “a time of formation and transformation, of scrutiny into what one is doing, and who one can become” (Britzman, 2003, p. 31).

As the word images highlight, all the preservice teachers in the study explicate QuILT’s influence in their process of becoming a teacher. For instance, QuILT stimulates Isabella to deliberate who she is as a teacher. She reveals uncertainty as she attempts to unravel the complexity of her professional identity (Word Image 1, Stanza 3). Providing another example, William speaks of QuILT providing perspectives that allow him to reflect or ‘stew on’ and ‘digest’ his understandings, which inform his developing professional beliefs in teaching (Word Image 2, Stanza 3).

**QuILT as phronesis pedagogy**

Korthagen and his colleagues (2001) propose a ‘realistic approach’ to teacher education that is underpinned by the conception of knowledge as phronesis. In Ancient Greek philosophy phronesis, unlike episteme (the scientific form of knowledge), recognizes knowledge to be born in experience: a “practical wisdom” or “understanding of specific concrete cases and complex or ambiguous situations” (F. A. J. Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001p. 24). The concept of phronesis has correlations with Schön’s ‘swampy lowlands’ of professional knowledge and practice (SchÖn, 1983, 1987).

Central to Korthagen and his colleagues’ (2001) model of the realistic approach to teacher education is that preservice teachers respond to learning in one of three ways: gestalt formation (e.g. holistic learning from experiences); schematization (e.g. re-thinking of gestalts to apply to practice); and theory building (e.g. personal theorising of practice with professional knowledge or phronesis). Moving from one level to another requires multidimensional reflection (Zeichner & Liston, 1996) and level reduction. The model aims to integrate experiences in practice with theory. [The] realistic approach, which means that the educators work with realistic examples taken from the student teacher’s recent practice, and simultaneously attempt to deepen their experiences, link them to theory, and facilitate the use of theory in their teaching practice of tomorrow. (Tigchelaar & Korthagen, 2004, p. 666)

Table 4 displays the data analysis of how the seven preservice teachers described their use of QuILT and shows there is evidence for the Korthagen and colleagues’ model of three phases of learning: gestalt formation, schema building and some degree of theory building, particularly towards phronesis. To illustrate further, William’s Word Image captures the essence of building schemas while working with QuILT (Word Image 2, Stanzas 4 and 5). These deliberations demonstrate early opportunities for William to engage with his personal and idiosyncratic theory making process or phronesis. Likewise, Isabella also reflects on QuILT’s new way of learning where she uses her (vicarious) QuILT experiences to create her opinions and ideas about teaching that are informing her professional identity (Word Image 1, Stanza 2, with contextual support in Stanzas 1 and 3).
Table 4: Phases of learning that QuILT pedagogy supports*

<table>
<thead>
<tr>
<th></th>
<th>(Re) Gestalt forming</th>
<th>Disrupting gestalts</th>
<th>(Re) Schema building</th>
<th>Phronesis</th>
<th>Reflection</th>
<th>Meta-cognition</th>
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</thead>
<tbody>
<tr>
<td>QuILT Notepad</td>
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<td>QuILT Action Planner</td>
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<td>CoP: QuILT</td>
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<tr>
<td>CoP: Peer</td>
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<td>CoP: Practicum</td>
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* CoP = Communities of Practice; table derived from data analysis of the seven preservice teachers’ responses over time

Moreover, preservice teachers consistently report that they value their working with QuILT’s Action Planners. As Table 4 indicates, the Action Planners guide the preservice teachers in their reflection on their learning about teaching. The Action Planners help them to articulate their gestalts, or their changes in their gestalts, and how these gestalts inform their schema building for their practice. Occasionally, as the preservice teachers made significant connections between their practicum experiences and their QuILT learning, they articulate early phronesis-type thinking in their Action Planners. Some preservice teachers begin to think metacognitively about their own learning processes as they work with Action Planners. These preservice teachers reflect on their increasing efficacy in QuILT learning as they employ metacognitive strategies.

**QuILT as Communities of Practice pedagogy**

As summarised in Table 4, while the preservice teachers engage with the QuILT communities of practice (the classrooms from the QuILT primary and secondary schools), they form gestalts about learning and teaching; begin to think and build knowledge about schemas for their practice; and reflect on their thinking and developing knowledge about learning and teaching. As they engage with the QuILT communities of practice, the preservice teachers use the QuILT Notepad (embedded function in the QuILT resource) as an instrument to document their observations and early thinking. Preservice teachers indicate its use to develop their gestalts about learning and teaching. As an example, William explains he interacts with QuILT; learning from the diverse perspectives presented by the QuILT teachers and school students. He uses these perspectives to reflect and construe meaning to these (vicarious) experiences and to inform the construction of his teacher knowledge (Word Image 2, Stanza 3).

The peer community of practice (see summary for Peer CoP in Table 4), which takes place in the Learning and Teaching subject’s workshop, is a critical place for disrupting the preservice teachers’ gestalts about learning and teaching. This pedagogical strategy provides for a confluence of multiple perspectives that allows preservice teachers to reflect on and reframe (Freese, 2006; Russell & Munby, 1991; SchÖn, 1983, 1987) their thinking and the problems or issues they worked upon earlier as individuals. The peer community of practice is an important pedagogical process allowing for collaborative learning and assists in processes of change by disrupting gestalts and, with the use of reflection, has implications for (re)schema building. Tillema (2004) also finds peer learning as a significant pedagogical intervention to encourage dialogic relations. Collaborative learning in teams provides a “starting point for exploring new concepts or strategies”, and fosters “generating new knowledge” (Tillema, 2004, p. 154). If preservice teachers engage in the peer collaboration activity deeply, there are opportunities for them to work towards phronesis. This implies that teacher educators also have a role to assist preservice teachers to understand the processes of learning from and with peers through explicit teaching of cooperative learning (Boud, Cohen, & Sampson, 2001; Cohen, Brody, & Sapon-Shevin, 2004). Consequently, learning to teach
encompasses learning at the “individual and community levels [that] are both independent and interactive” (Shulman & Shulman, 2004, p. 267).

Two-way street metaphor
What is most surprising from the data is the learning dynamics of the practicum communities of practice and QuILT (summarised in Table 4: Practicum CoP). Initially, based on my insights into situated learning theories (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991; Putnam & Borko, 2000), I thought engaging with QuILT would provide preservice teachers with vicarious and authentic learning experiences to prepare and assist them in making sense of their forthcoming practicum (‘real’) experiences. While this does happen, there is also an unexpected flow of two-way traffic for learning. For some preservice teachers it is the practicum community of practice that helps them to make meaning of QuILT, which in turn, helps them to engage with the latter phases of learning in Korthagen’s model: schema and theory building (F. A. J. Korthagen, et al., 2001). Isabella’s Word Image (Stanza 4) provides a seamless example when she describes the complex interactions between her QuILT and practicum learning.

This challenge to my initial belief stimulates a significant shift in my understanding of QuILT’s impact in the professional learning of preservice teachers. It also emphasizes the complexity of preservice teacher professional learning and reinforces the value of experience in the relationship of that learning. Likewise, Munby and Russell have investigated the ‘authority of experience’ because of their “concern that students never master learning from experience during preservice programs in a way that gives them direct access to the nature of the authority of experience” (Munby & Russell, 1994, p. 92). The authority of experience, they argue, allows preservice teachers to learn cognitively and metacognitively with their practicum experiences; rather than relegating their experiences as inferior to those authorities of experience embedded in, for example, their university educators or supervising classroom teacher mentors. In some respects, then, authority of experience as defined by Munby and Russell relates to preservice teacher agency for learning with their practicum experiences. It seems that QuILT shares or distributes the authority of experience across multiple authorities of experience (e.g. the QuILT teachers; QuILT school students; the use of (preservice teachers) peer learning in the Learning and Teaching workshops; the use of the quilting metaphor for learning to teach). This pedagogical strategy appears to enable the traditional authorities of experience (e.g. university educators or supervising classroom teacher mentors) to partially vacate the floor and share the authority of experience with many others including the preservice teachers as individuals and peers. QuILT’s pedagogy appears to encourage the preservice teachers to appreciate their authority of experience to help them create their professional knowledge. This may help to explain why the preservice teachers make connections between QuILT and their practicum experiences.

Moreover, building on the role of experience in the preservice teachers’ professional learning, the QuILT-practicum interdependency finding also supports the work of Harm Tillema. He advocates an important role for the use of reflective strategies after preservice teachers have some practicum experience.

Our findings challenge some of the held assumptions by indicating that reflection after practice may be a more professionally fruitful way of a lasting belief change than reflectively preparing student teachers before they enter their practice teaching. This study points to the dangers of reflection on beliefs which is not grounded in the student teacher’s own teaching experience. (Tillema, 2004, p. 141)

Professional Learning with QuILT
This paper examines the interactivity between preservice teachers and their professional learning while they engage with QuILT. The use of with is intentional because it signals going beyond learning from a resource. As I argue, the preservice teachers interact with QuILT as a resource and also are influenced by the pedagogical manifestations of QuILT: they learn with QuILT, not only from QuILT.

Analysis of data shows that professional learning is complex, continuous and occurring in phases, which are “recurrent in that individuals can pass through various phases in each of many different
content domains" (Shuell, 1990, p. 533). Furthermore, data (e.g. see Table 4) show connections with the Korthagen and his colleagues' (2001) three level model of professional learning within the realistic approach where QuILT's 'two-way street' (see metaphor explained above) allows preservice teachers to bridge practice with theory.

The strengths of QuILT for professional learning lie in recognising it as both curriculum resource and pedagogy. As a curriculum resource QuILT offers an innovative visual and narrative tool that helps build professional memory, knowledge and schema of teaching and learning through its use of embedded functions such as Notepad and Action Planners. As pedagogy, QuILT affords opportunity for preservice teachers to articulate their emerging teacher identity, and importantly, disrupt or challenge their initial gestalts to engage with deeper levels of thinking, reflecting, re-schema building and phronesis or theory building. This is particularly the case when QuILT pedagogy engages social learning and interaction through use of vicarious (QuILT) and 'real world' (peer and practicum) communities of practice (see Table 4). Hence, through its multiple communities of practice, QuILT as pedagogy enhances the reflection processes and phases of learning, particularly in the gestalt (re)formation and (re) schematisation. The social and community context for professional learning of teachers also reflects the growing body of research arguing that learning to teach must take place in meaningful ways within the professional community of teachers (e.g. Robert V. Jr. Bullough & Gitlin, 2001; Hoban, 2005; F. Korthagen, 2005; Lieberman & Miller, 1999; Shulman & Shulman, 2004; Stoll & Louis, 2007; Tillema, 2004).

Although this study investigated one multimedia resource, the analysis of the professional learning of the preservice teachers presents implications for teacher education pedagogy that is increasingly incorporating the vast advances of ICT and Web 2.0 technologies. This study demonstrates that the use of vicarious and narrative experiences that can be afforded by new learning technologies can enhance professional learning of preservice teachers as they engage with its authenticity. However, many preservice teachers also require their practicum experiences to assist them in making sense of, and deeper connections with, their theoretical understandings they undertake as part of their university programs (e.g. completing QuILT Action Planners as part of their assessment).

This, as is shown by QuILT as pedagogy, requires a pedagogy that provides opportunities for preservice teachers to challenge their gestalts and re-form their schemas and personal theory-building from multiple perspectives. A curriculum resource can provide an array of multiple perspectives yet it also needs to be supported by multiple forums for dialogue as it was afforded by the communities of practice in the QuILT pedagogy. Excitingly, the new era of Web 2.0 technologies creates opportunities for developing new ways of socially connecting preservice teachers to support their professional learning. Such engagement of a pedagogy that builds on the strengths of theoretical, virtual and 'real world' learning experiences in a purposeful and integrated approach that allows preservice teachers to narrate into their own storied lives and problematise what they see and think about teaching and learning, then this would assist them to begin to bridge the gap between theory and practice.

References


