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# **Motivation to learn about teaching and learning materials: and their use during teacher education in Australia**

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#### **Abstract**

Most research on teacher education has not considered the situated learning contexts and identities of pre-service teachers as they learn in different school and university settings in Australia. Especially problematic are the conflicting discourses that shape learning in these varied contexts. This paper explores aspects of motivation about the learning of teaching practices and pedagogy in the different learning environments of teacher education and school practicum; specifically the development of pedagogy and teaching practices around the use of textbooks and teaching and learning materials and the area of providing resources for student learning by teachers.

Using Nolen's concept of motivational filters that student teachers develop to select and reject teaching practices, the paper undertakes a qualitative research project to explore such filters in the area of developing pedagogy in the use of teaching and learning materials.

The research presented in this paper demonstrates that the experiences student teachers are being provided with in relation to pedagogies related to teaching and learning materials are unstructured, fragmented and contested.

The motivation to learn about teaching and learning materials and their role in learning and development is dependent on the utility filters developed in school fieldwork and reflects the socio-cultural context of the school.

The critical questions for teacher educators is how do new and developing teachers learn how to mediate teaching and learning materials for their students, and in what form and learning context will this mediation learning take place.

## **Introduction**

Research on teacher education in the United States is exploring the differences in learning in teacher education coursework and in teacher education fieldwork in schools. This research (Nolan et al 2007, 2008) uses a sociocultural theoretical frame to explore the differences in these two learning contexts. This paper applies this research to the Australian context, in learning how to use teaching and learning materials in teacher education.

Although the integration and design of practicum and fieldwork is a major component of teacher education and has received considerable research interest in the literature; the sociocultural contexts of these two different learning environments has received little research focus. In particular, the motivational aspects of learning, in the different sociocultural contexts of school and university, has only received research emphases in the recent work of Nolan and her co-researchers (2007, 2008).

Motivation in learning has usually been conceptualised as an individual phenomenon, but a new, sociocultural research movement (Walker, 2009) has advanced the proposition that motivation in learning contexts is social in nature. In teacher education, the motivation to learn and the skills developed will be significantly influenced by the role of context in motivation, and scaffolding provided in different learning environments, and the learning artefacts and tools that are present in each learning environment.

Following Sivan (1986), Walker, Pressick-Kilborn, Arnold and Sainsbury (2004, 2005, 2007) in a series of studies have shown that motivation in the classroom is influenced by the ways that 'individuals selectively internalise values and standards from their interactions with others in the zone of proximal development as they engage in 'the academic' practices of the classroom' (Walker, 2009 p.3).

Sociocultural approaches to learning emphasise that this process of internalisation is active, constructive and transformative. As a result, 'goals, standards and values are actively modified and changed by the learner in the processes' of mastery and appropriation as student teachers learn and develop

(Walker, 2004). Walker's recent sociocultural approach to motivation also considers that externalisation through action, behaviour and language is also an active and transformative process 'so that standards, values are transformed as learners externalise them in interaction with peers and others' (Walker, 2001).

This paper will explore aspects of motivation about the learning of teaching practices and pedagogy in the different learning environments of teacher education and school practicum. More specifically, the aspect of pedagogy, explored in the paper, is the development of pedagogy and teaching practices around the use of textbooks and teaching and learning materials and the area of providing resources for student learning by teachers.

### **Conceptualising university and fieldwork experiences in teacher education**

Nolen et al (2007) have advanced the notion of motivational filters that are used by pre-service teachers to evaluate, choose and reject (*filter out*) teaching practices and pedagogical approaches they incorporate into their teaching repertoire.

These motivational filters are dynamic and complex. They emerge from pre-service 'teachers' experiences in multiple learning contexts' (Nolen, et. al.2007)) The components of these motivational filters include 'developing pre-service teachers' teacher identity, their relationships with those promoting the practices and the perceived fit of the promoted practice with pre-service conceptions of the real world of teaching' (Nolen et al 2007).

The key thrust of this research on motivation to learn in teacher education was to situate the development of pre-service teachers' motivation to choose and reject pedagogical practices in different learning contexts.

In particular, this research situated pre-service teachers learning in two vastly different contexts:

- a) In teacher preparation courses, classes and programs at university;  
and
- b) In fieldwork in schools, with teachers, students, classes and school professional communities of practice.

In this approach the university teacher education course with classes, experiences, peers, and faculty that constitutes a teacher education program is termed *TEPworld*. *Fieldworld* is constituted by the pre-services teachers' practicum and school fieldwork contexts which includes other student teachers, cooperating and mentoring teachers, school students and classes, Heads of Department and other educational leaders and practitioners in schools.

Following Lave and Wenger (1991), these university and school worlds constitute different communities of practice. They are socially constructed and reproduced, and depend on the development of intersubjectivity through

interaction, as participants undertake the learning process that permits movement from the periphery to the core of the community of practice and the concomitant development of professional identity.

In explaining learning in these two different situated learning contexts, Nolan et al (2007) are mindful that these two different worlds may contain activities, practices, values and assumptions that conflict with each other. Educational attitudes, pedagogical behaviours and perceptions of head teachers, teachers and school staff, sometime vary strongly with the educational attitudes and behaviours promoted by university faculty of education staff. In some cases this results in certain student teacher behaviours and attitudes being encouraged in university education study (in *TEPworld*) and the same attitudes and behaviours being discouraged by teachers in the school (in *Fieldworld*). This paper reports on such conflicts in the way that teacher education prepares new teachers for using teaching and learning resources.

Nolan et al show that pre-service teachers must learn to manage such conflicts as they negotiate and learn in each different learning context. Pre-service teachers must recontextualise learnings that are often in conflict in the different situated contexts of university study and fieldworld practicum experiences in schools. Nolan et al also argue that such conflicts are a significant factor in teacher education and require student teachers to undertake significant recontextualisation, as they develop skills and knowledge in the different learning contexts that teacher education provides.

Pre-service teachers are developing as professionals in a number of communities of practice and communities of learners. Once their teacher education is complete, they will forge their own future professional and pedagogical practices, in the new context of early career teaching in a new school environment. As a result, they 'pick and choose' from among the practices promoted in *TEPworld* and *Fieldworld*.

### **Use of textbooks and teaching and learning materials in teacher education**

How do student teachers learn to select, evaluate, choose, procure and access, mediate and develop teaching and learning materials on which to base their lessons and teaching programs?

Teacher education programs in Australia promote the idea that good teachers do not use published textbooks and teaching and learning resources available in the market and used in schools, but have the responsibility to prepare their own teaching and learning resources for their students to use in school lessons (Horsley 2007).

In a major US study of the use textbooks in teacher education, Loewenberg-Ball and Feiman-Nemser (2005) highlighted the fact that teacher education programs usually actively discourage the use of textbooks and commercially published teaching and learning resources. Although teacher education courses exhibit great variety from context to context and nation to nation, in

the view of Loewenberg-Ball and Feiman-Nemser (2005) teacher education programs in the United States promote an ideology that views textbooks in the following ways:

- As deficient in matching learners needs and teachers' priorities;
- As inappropriate as resources in a technological age;
- Using textbooks in teaching and learning activities and planning is unprofessional;
- Using texts is not a characteristic of 'quality' teaching;
- As inferior to student teachers own knowledge of subject matter and teaching and learning activity;
- As boring and inappropriate for diverse learners; and
- 'Good Teachers Don't Follow Textbooks' (Loewenberg-Ball and Feiman-Nemser 2005).

This ideology permeates the operation of teacher education courses. This ideology also supports a range of practices that devalue the role of teaching and learning materials. In particular, student teachers in their university courses are provided with few experiences in relation to selecting, evaluating, and learning to mediate the use of textbooks and commercially published teaching and learning materials that are used as the knowledge and activity source in lessons.

However, a number of studies have shown (Horsley and Laws 1993, Horsley 2001, Horsley 2009, Loewenburg-Ball and Cohen 1996; and Loewenberg-Ball and Feiman-Nemser, 2005) at the least in Australian and the United States, that textbooks are influential in the preparation of new (pre service) teachers.

Despite the apparent universal condemnation by curriculum developers, teacher associations and teacher educators alike, textbooks prepared by commercial publishers are used significantly by teachers and student teachers during practicum and fieldwork experiences, particularly for structuring lesson planning, and as a critical source of subject content to be taught.

### **Impact of competing ideologies on use of teaching and learning materials in teacher education and schools**

An initial effect of the teacher education ideology that teachers do not use textbooks is that teacher education students do not interact with the range of published materials, such as textbooks, used in schools in teacher education. Rather than have the opportunity to overview the entire corpus of resources that are produced by the education systems that develop textbooks and teaching and learning materials (paper based and online learning materials), teacher education students are only introduced haphazardly to a small range, usually promoted by certain staff.

As a result, there is little opportunity to develop skills in evaluating and selecting textbooks and other paper based teaching and learning resources

for different audiences and diverse student groups. Also this fragmented approach makes it difficult to provide systematic introduction to adapting and modifying textbooks for groups with diverse learning abilities and cultural backgrounds. The result of these processes means new teachers lack skills in matching their students to appropriate textbooks and teaching and learning materials. Rather they are encouraged in teacher education to prepare their own resources, despite the absence of students to which these resources will need to be tailored.

The focus on ICT in teacher education extends to courses that developing knowledge and skills in using ICT and embedding ICT into teaching programs, lesson planning and classroom practices. Teacher education students learn that paper based resources such as textbooks are destined for the internet trash compactor.

The concentration in teacher education is on student teachers developing their own teaching and learning programs, and then developing the teaching and learning resources to support student learning in each class. This approach also results in an induction into extended scale photocopying as a method of providing resources for school classes. Photocopying resources for classes is a critical feature of how Australian teachers provide materials for their students. In 2006 alone, NSW teachers photocopied 449 million pages of school textbooks to distribute in class. The staggering amount of photocopying reflects a number of features about how teachers and schools resource lessons

### **Data sources**

In-depth interviews were held with ten pre-service student teachers from teacher education courses from three different universities in New South Wales, Australia. These participants were in the mid to final stages of their teacher education courses. All had completed a minimum of one practicum experience where they had undertaken practice teaching and other fieldwork in schools. Two of the participants had completed their teacher education and were awaiting teaching appointments. Two of the participants were at the final stages of their teacher education course. The remaining participants were between the middle to the end of their teacher education courses. Seventy percent of the participants were secondary teacher education students from the subject area specialisations of English, Maths, Science, Business Studies and Art. Three of the participants were primary teacher education students. The students were interviewed twice during the last half of their teacher education courses. The participants were undertaking teacher education courses during 2005, 2006 and 2007.

### **Research methodology**

Nolen et al's research (2007) identified a range of what she termed motivational filters that reflect the 'active choices' about what to learn in teacher education courses. Furthermore, these filters are used by teacher education learners to question promoted pedagogies and reflect on them

using their prior learning and developing identity. Teacher education students do not internalise all the teaching practices and behaviours promoted in teacher education. They 'filter out' many of these promoted practices and behaviours in the process of transformation and appropriation that contributes to their own identify as developing teachers.

The Nolen study proceeded to identify a range of motivational 'utility' filters and argued that 'making a utility judgement or other decision about what to filter in or out is based on a complex relationship of individual in context, across multiple conflicting contexts.' These filters included the students' interests and experiences, relationship with teacher education staff and student peers, memories and histories. In relation to fieldwork experiences the filters refer to practices they attribute to successful learning of classes they observed and pedagogies and practices they developed in their own practicum classes that led to student learning and engagement, and their own developing identities as student teachers who contribute to student learning and development. 'The utility filters are used to screen out promoted ideas and practices that they do not feel will help them as teachers'.

Utility filters are not solely individual, but public. There are often debates about promoted practices and ideas, so to some extent the promoted pedagogies and teaching practices are tested through debate. As well, such debates reflect and influence difference between pedagogies and teaching practices espoused in teacher education and those found in practice. Finally, teaching practices and pedagogies are the subject of specific directed experience in teacher education, where student teachers are asked to implement them in practice and then reflect on their practice in context.

In the words of Nolen at al ' student teachers' students and practicum experiences at school have an obvious influence on her representation of the teaching context and thus her openness to certain practices promoted in *TEPworld*. By trying out a new *TEPworld* practice the student teacher also influences *Fieldworld*'.

The same negotiation in social context also works for practices promoted in *Fieldworld* and which are brought back to *TEPworld* 'potentially influencing the community norms and beliefs and causing peers to reconsider their own filters.'

The research methodology was to interview student teachers about the practices of using teaching and learning materials in University classes and courses and in school fieldwork. The interview focus was not just on practices but ideology and messages, and was directed in such a way that student teachers would be forced to respond to the different practices and conflicted messages they observed or identified in *TEPworld* and *Fieldworld*.

Because of the marked differences in approaching the use of teaching and learning materials in these two student teacher learning contexts it was expected that the utility filters identified in the Nolen at al study would be extant in student teacher responses to the conflicting practices.

As well, it was expected that the interviews would reveal practices internalised as the student teachers negotiated the best ways to use teaching and learning materials in their pedagogy after the student actively constructed and transformed the promoted pedagogies and practices they encountered, in the various contexts of teaching practice and university study. It was hypothesised that the responses to the interview questions would include the practices that the student teachers chose themselves, and those that they filtered out.

### **Discussion: examples of filter development and the transformation of practice in context**

1. *Comparing competing messages, ideology and discourses about teaching and learning materials and textbooks in TEPworld and Fieldworld.*

Teacher education students were asked about the messages that they received about the use of textbooks and teaching and learning materials, the use of textbook and teaching and learning materials in their teacher education courses and any specific experiences that they could recall. They were also asked to compare and contrast these with their experiences and practices whilst undertaking practicum and professional fieldwork in school contexts.

The message passed to some teacher education students in *TEPworld*, was that *“it was up to teachers to evaluate teaching and learning resources”* but that this set of skills was not explicitly addressed in teacher education. For one student the message was that *“schools are bombarded by resources, but it is very difficult for teachers to evaluate them.”* Some students expressed the view that the message that they received from teacher education was *“use the resources that you need, but use of textbooks is up to you”*.

However, all of student teachers in this study suggested that they received either no message about the use of textbooks and teaching and learning materials or messages that were highly negative.

Ninety percent of student teachers reported that their teacher education courses incorporated no commercially published textbooks or teaching and learning materials. Comments like *“nothing”* or our *“course concentrated on how to be a good teacher and use a quality teaching framework”* were common. One student teacher noted that in her courses *“all teaching and learning resources were seen as tools, not crutches and that their teacher education course did not support use of commercial textbooks”*.

There was unanimous response by student teachers that whereas school textbooks and teacher education materials were not used during teacher education courses at University they were a major factor and used consistently during practicum experiences.

Ninety percent of student teachers reported that they did not use school textbooks in their teacher education courses. Comments included *“didn’t use any school texts in my University teacher education courses”*; *“didn’t use them much at uni”*; *“we used one school textbook in our curriculum (method course) to plan programs on but did not use any other school teaching and learning materials in our courses”*.

During practicum however, student teachers reported considerable use of school textbooks and teaching materials. One science student teacher reported using textbooks during practicum as a result of the way the school planned to teach certain topics based around the availability of a new text. Her responses reflect the use of filters; in her case to filter out the approach to teaching and learning resources in teacher education to prepare her own resources for each lesson. However, her experience of using the science textbooks allocated and mandated for this class led her to further refine the utility of this pedagogy. *“Although following the textbook was useful for this class; I needed to prepare extra material for the better performing students in this class that went beyond the textbook allocated. I now see textbooks as very useful, but they need to be modified and changed for the kids in the class”*. In this way she is internalising the way that the school supports teaching and learning through providing text resources, but also transforming this approach based on her own experiences in using these resources to meet the learning needs of the students in her class.

In rejecting *TEPworld* practices as a result of school experiences, she expressed a degree of concern at the wide gap between pedagogies promoted in *TEPworld* and those practices in *Fieldworld*, in particular the neglect of teaching skills related to the use of teaching and learning resources with students.

An Art student teacher noted that she was surprised to see the resources at the school, *“all the textbooks were in a cupboard in the staff room. However in my art teaching class at uni we had only used one excerpt from one text’ As a result I went through all the textbooks in the school, inspected them all and spent a day a week developing programs around them for my teaching. When practicum was complete, I purchased a set of the textbooks myself”*.

This student teachers’ utility filter based on perceived efficacy of school pedagogical practices, continued to develop in response to the demands of practicum and also planning units of work and lessons during assignment for her university courses. She went on to describe the development of her teaching practices in the area of teaching and learning resources as being based on her experiences in school practicum. She used this time to develop a complete set of textbooks and teaching and learning materials for teaching Art.

She then arranged these by topic and used her corpus of material to prepare units of work and teaching resources for students in her practicum classes. *“I was surprised and somewhat taken aback that at University we were not*

*exposed to all the textbooks and other resources that support student learning. Many of these texts were written by practicing teachers but we were not made aware of them systematically, Only at the school was I able to examine all of these materials and develop my own photocopied text support for classes from the range of textbooks written to support the curriculum”.*

Discussions with fieldwork colleagues, her most powerfully used filter, provided her with the knowledge that the textbooks on the market in part reflected the level of the students in the classes of the teacher authors. This allowed her compare the knowledge and activities provided in the different textbooks and assisted her in collating activities and knowledge sources for diverse students in her classes.

*2. Comparing different practices in the use of textbooks and other teaching and learning materials in teacher education courses and in preparing for school fieldwork.*

Ninety percent of student teachers reported that school textbooks were only referred to in method and curriculum classes (Loewenberg-Ball & Feiman-Nemser 2005). All students reported that they received no training or instruction in the use of teaching and learning materials and textbooks. This contrasted strongly with practicum experiences.

In Australian universities most discussion about teaching and learning materials takes place in courses about literacy and numeracy, and what was once explored in using textbooks in the classroom has been subsumed into discussions about teaching literacy.

One student reported that her course had a component on literacy and significant experiences on embedding technology into teaching and also practical work in science, there were experiences planned around the use of teaching and learning resources. These consisted of learning about the underlying structure of literacy materials such as newspaper articles and some expository texts, but these were not related to using the materials with a range of students in a class.

Another comment expressed this view *“80% of our time studying to be teachers at University concerned only 10% of our teaching time, what about the other 90% of what happens in schools”* This respondent then went on to describe how she observed different teachers use different textbooks in different ways, especially with students in low ability classes that were difficult to manage and teach. *“I particularly discovered that creative use of textbooks could improve the behaviour and management of of difficult classes. At University we were encouraged to create our own teaching and learning resources. However, during practicum the lack of structure of this approach to developing teaching materials for students became obvious and the advantages of a textbook for difficult classes became obvious. I still developed some of my own materials for the students in this class, but even this was structured around the textbook that was used for this class”.*

In practicum student teachers are confronted by the fact that they lack knowledge, skills and experiences in pedagogy and teaching and learning. This creates significant dilemmas in textbook use in practicum.

Loewenberg-Ball and Feiman–Nemser (2005), Horsley and Laws (1993) and Walker and Horsley (2006) have all noted that between 75% and 85% of student teachers use textbooks to develop units of work and plan lessons. One of Loewenberg-Ball's students expressed the view that "*even though I was trained to be critical of textbooks I had no alternative*" (p. 192). Another remarked that "*teaching and planning all day long...is an overwhelming task*" (p. 193).

In particular, textbooks and commercially and professionally published teaching and learning material provide 'pedagogical content knowledge'. This consists of the topics, activities and approaches that experienced teachers have found useful in promoting teaching and learning with students.

As a result, student teachers use textbooks and teaching and learning materials to plan lessons, design activities, for reference and find textbooks useful, because they contain not only knowledge but pedagogical content knowledge, approaches that have been used with students before with success. In Australia (and in other countries) it is often not recognised by teacher educators that textbooks are written by practicing teachers, who in many cases have prepared texts based on developing knowledge sources, activities, tasks and case studies for their own students, evaluating these sources and activities with students and classroom practice and developing them further in a textbook. In this way textbooks represent a distilled pedagogic content knowledge of teaching and learning strategies that have been successfully used with some students. Textbooks differ in difficulty in some areas because the teachers who have written them have different student audiences.

80% of respondents reported that they used textbooks to plan lessons. They also expressed surprise that textbooks developed in a market for a course were very different, and reflected different teaching approaches, as a result of the fact that different author teachers based their text on the students they were teaching. Many student teachers expressed extreme annoyance that these characteristics of textbooks and teaching materials were not discussed or featured in teacher education.

All student teachers interviewed used school textbooks to learn content subject matter that they taught in schools. This was especially so in secondary teaching, but also for primary teachers in science and mathematics. One of the most indicative filters is utility, (*did it work in my prac class when I tried it out, what did my cooperating teachers say about the practice, and did they use it themselves as successful teachers*). Nine of the interview participants reported that they actually purchased school textbooks for their own learning, and to access pedagogical content knowledge for both school and practicum fieldwork and to assist in the completion of *TEPworld* assignments.

This 'content' utility filter was expressed in many ways by the student teachers. The description of this content filter reflected the exigencies of planning, preparing and teaching lessons in *Fieldworld*. The following examples of content utility motivated students to purchase school textbooks and also to look closely at a range of textbooks and other knowledge sources:

- Mathematics teacher primary *"Especially on prac I used textbooks to make sure that you were on top the material to be taught"*.
- Secondary Science teacher *"Textbooks helped me understand the questions that student could ask and the steps in explaining concepts"*.
- Secondary English teacher *"Used the examples and ideas in texts about how to relate the concepts to the students' experience"*.
- Secondary mathematics teacher *"Used texts in my own learning and to gauge the level of subject matter to be covered in lessons"*.
- Senior Business Studies teacher *"I used school textbooks to brush up on my accounting as I could not remember some rules"*.
- Secondary Art teacher *I used the textbooks to situate the artist and see how their work could be incorporated into the curriculum. The text gave examples and case studies and gave me a frame on which to set an assessment task.*

The practices described by the respondents to the interviews also reflect fieldwork practice. Teachers often collect a range of textbooks to indicate the level and depth of knowledge required by the syllabus, reacquaint themselves with concepts and to access activities and tasks that can be used in program and lesson planning. In reporting these uses of textbooks during practicum, the student teachers are reflecting a motivational filter conceptualised by Nolan at al as relationships with cooperating teachers, but also reflecting the internalisation of modelling of planning behaviours observed in schools and amongst teachers.

### *3. Describe your own practices for providing resources for lessons and the origins of those practices.*

Students were asked to describe their own developing practices in this area and the origin of those practices to clarify how conflicting ideology, discourse and practices shaped their own learning. The student teachers were also asked to compare and contrast their experiences with ICT in teacher education and in school fieldwork.

These questions were also devised to explicate the use of utility filters in promoting and filtering out unaccepted pedagogies and practices.

This question was designed to elicit the knowledge sources used to develop lesson plans and teaching programs. At university in preparing units of work and lesson plans without specific students, student teachers learn the rudiments of planning, the pedagogical approach to be taken, how to structure

a sequence of teaching and learning activities, how to design assessment tasks and provide teaching and learning resources.

In school practicum student teachers frame their lesson plans around the schools program for teaching their topic at school, which is based on the teaching and learning resources at the school for this topic and program. The student teachers then used school textbooks and published teaching and learning materials to plan and develop their teaching and learning activities and tasks and lesson structures for actual students under the supervision of practicing teachers. As they described these planning processes and resources decisions, student teachers often referred to the exigencies of resources at the school.

- *“I had to use the textbook for this topic, but my cooperating teacher was really impressed when I developed some new resources”.*
- *“I was given carte blanche to develop my own resources, but my photocopying was criticised as I was printing three pages per students per lesson, and so I decided to use some of the worksheets that the other teachers of this topic were using”.*
- *“I was encouraged to develop my own resources as my department hadn’t taught this topic before, but I did access all the textbooks on the market and my cooperating teachers helped me plan the unit”.*
- *“Back at University I knew the areas of the syllabus where the units of work were weak, so I concentrated on preparing these sorts of units in my last few assignments. I used more textbooks and other sources than in my earlier units of work at the start of the teacher education course”.*

One of the issues referred to by the participants in this research that of resource constraints. At University the student teachers have access to curriculum libraries, university teachers and their resources, ICT supported and enhanced facilities, online repositories, and photocopying facilities. Some students were shocked at the lack of resources in some schools. *‘I was at a low SES school with a limit on photocopying of only 200 pages for my whole four week practicum and very few textbooks and print resources. I printed many multiple copies of worksheets and information at home or at Uni for my classes at school. Since I was bearing this cost myself I observed how other teachers coped in this resource poor environment. Eventually I used each photocopied page differently and produced collages that could support a number of lessons.’*

All of the student teachers reported that they completed compulsory courses about both ICT and how to embed ICT into teaching and learning activities. This contrasted strongly with experiences in textbooks and teaching and learning materials. Furthermore, 70% of respondents reported that the ICT instruction and learning experiences in the technology rich environment in university teacher education contrasted significantly to the lack on ICT infrastructure in many schools.

One of the features of ICT and the use of the internet is that student teachers have access to multiple knowledge sources. In particular, they have access to professional teacher association websites, curriculum and department of education website units of study, resources, lesson plans and other resources to assist in planning and delivering lessons.

However, students reported significant use of these resources in initial planning in University courses and less use in school fieldwork experiences, as teaching and learning materials needed to be modified for specific groups of learners

As their utility filters developed further with more and more experience in schools student teachers reported that the use of the internet played mostly two roles in supporting their teaching and learning:

- a. to provide subject matter knowledge that is unable to be located in school texts: and
- b. to source contemporary source of information as the basis of inquiry style lessons built on a constructivist approach with multiple knowledge pathways.

Student teachers reported that they used school texts far more than other resources in developing their lessons.

## Conclusions

“Beginning teachers must learn to think about the appropriate resource base for teaching and learning, pedagogy and curriculum decisions.” In their synthesis of textbooks and teacher education Loewenberg–Ball and Feiman-Nemser (2005) suggest that resourcing lessons is a fundamental aspect of teaching and that student teachers must be aware of the breadth and depth of teaching and learning resources to:

- justify decisions in teaching;
  - use textbooks as sources of subject matter and pedagogical knowledge;
- implement curriculum;
- learn to learn from curriculum materials;
- adapt, modify, mediate teaching and learning resources for students
- develop their own materials for the specific needs of members of the class, and the class itself

Every professional must understand deeply the resources that support their work.

Access to resources also affects the use of resources in classrooms (Horsley and Walker 2006), and the features of teaching and learning resources also effects the use and effectiveness of resources that are used to support teaching and learning.

Teachers mediate the use of textbooks and teaching learning materials they use in their classrooms. This has been investigated in studies by Sikarova (2003) and Sartor (2004); who explored the way that teachers customise,

modify and change published textbooks and other associated learning materials to make them more suitable for use in specific learning situations. In Sikarova's study (2003) of the transformation of curriculum materials by teachers of mathematics and the Czech language, it was found that the most popular reason for modifying maths learning materials was to fit in with curriculum requirements, whereas the most popular reason for modifying Czech language learning materials was to make the texts more interesting. After conducting interviews with teachers of maths and the Czech language in primary and lower secondary schools, Sikarova identified the following ways the teachers modified textbook subject matter:

- making the subject matter more comprehensible for students (eg. more examples, other ways of presenting, illustrations)
- making the subject matter better organised, more transparent (eg. networking, mapping )
- making the subject matter more interesting (attractive to students)
- selecting the core subject matter
- simplifying the subject matter, making it easier
- reducing the subject matter
- leaving out complicated matters and tasks
- producing teacher prepared text

The investigation of teachers' modification of texts revealed that pedagogical content knowledge and textbook pedagogy practices were complementary in that teachers used their pedagogical content knowledge to adapt, change, select and procure and then use texts based on the perceived needs of the students in their classrooms. Sartor (2004), in an unpublished study on secondary science teachers resourcing of their teaching, also found that teachers used their pedagogical content knowledge and textbook pedagogy to select, procure and then use teaching and learning resources that matched their approach to teaching, curriculum, assessment and reporting requirements and met the learning needs of their students.

A key aspect of becoming a teacher is learning how to mediate teaching and learning materials for use in the classroom as the basis of lessons. Good teaching requires mediating the use of teaching and learning materials. Furthermore, this mediation will depend on:

- a. Access to teaching and learning resources;
- b. Understanding of students;
- c. Domain specific pedagogy and domain specific resources; and
- d. Beliefs about teaching that reflect views of what is good teaching.

The research presented in this paper is demonstrating that the experiences student teachers are being provided with in relation to pedagogies related to teaching and learning materials are unstructured, fragmented and contested.

The motivation to learn about teaching and learning materials and their role in learning and development is dependent on the utility filters developed in the school fieldwork and reflects the socio-cultural context of the school.

The critical questions for teacher educators is how do new and developing teachers learn how to mediate teaching and learning materials for their students, and in what form and learning context will this mediation learning take place.

Mediation can only be observed in the school context and involves learning how teachers represent their practice in the context of the school. But at the same time the school contexts are varied and haphazard and prevent a structured and coherent approach to mediating teaching and materials being provided for student teachers.

The research has shown that student teachers use their utility and context filters to select out and reject many of the approaches to pedagogy and practice promoted in teacher education, and have appropriated and transformed the pedagogical practices developed through school experiences in relation to the use of teaching and learning materials in teaching.

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