

Learning about teaching: a longitudinal study of beginning teachers.

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ABSTRACT

In 1991, eighteen beginning science teachers volunteered to participate in an ongoing study into their pedagogical development. This paper extends the findings from the first two years' work as it outlines the teachers' views of their third year of full-time teaching. The results of the third year of this study further enhances the view that teachers' pre-service training is not so much 'washed out' (Zeichner & Tabachnick, 1981) but repressed as the conditions of teaching restrict their practice.

With greater content familiarity, confidence, and a sense of belonging in their school, the teachers in this study demonstrate how their views of teaching and learning begin to direct their practice. They appear to have reached a point in their development where they feel in control of their teaching and are able to teach in more challenging ways in order to enhance their students' understanding.

This paper discusses how these teachers approach their classroom practice through a developing confidence in their ability to 'teach' rather than 'tell' their students about a topic.

INTRODUCTION

This paper reports on the study of a group of teachers in their third year of full-time teaching and is part of a longitudinal study which was initiated when the participants completed their pre-service education program (Dip.Ed.). The study was designed to follow the participants for as long as possible in an attempt to document their view of their development as science teachers. Results of the first and second year of this study have already been published (Loughran, 1992; 1994) and at the time of writing, data from their fourth year was being collected.

Zeichner and Tabachnick (1981) described the attitude shift that teachers made as they moved from University teacher education into the teaching profession. They accounted for this shift by describing the effects of University teacher education as being washed out of the student-teachers as they became socialized into the profession.

In many instances there certainly is a discernible shift in student-teachers' attitudes as they move into full-time teaching. However, I argue that this shift is not so much a 'washing out' but a repression of the ideas they grappled with during their pre-service teacher education as they attempt to re-align their thinking and expectations with the demands of teaching.

METHOD

The research approach was designed to gain an understanding of how the participants learnt about their role and adjusted their approach to science teaching as they became more experienced practitioners. Data collection was from semi-structured interviews conducted late in the third term or early fourth term of each school year. The interviews were organised in a form intended to prompt the participants to reflect on their experiences of teaching and learning (see interview protocol, Appendix 1).

The original cohort (n=18) for this study was drawn from a group of Dip. Ed. graduates from 1990 who started full-time employment in 1991. This cohort initially comprised fifteen teachers from Monash University and three from other institutions; some of the Monash graduates were working with other first year teachers who were also keen to be involved in the project. Therefore, the number of participants totalled eighteen. Of the eighteen volunteers from the first year, fourteen remained in the profession and completed their second year of

full time teaching in 1992. In 1993 the original cohort had been reduced to twelve. The remaining participants taught in a variety of school settings. Nine were teaching in metropolitan schools and three were teaching in rural schools. All of the rural placements were in Government schools while eight of the metropolitan placements were in non-Government Independent or Catholic schools.

Due to a concern about the decrease in the number of participants (related to the hope that this project would follow a group for a considerable period of time), more volunteers were sought during 1993. Fortunately, five more teachers were happy to be a part of the study and this group was also interviewed. This group comprised two rural Government school teachers, one metropolitan government school teacher and two metropolitan Independent school teachers. The data used for this paper is drawn from the interviews with all of these seventeen teachers.

Participants were sent a copy of the intended interview protocol (Appendix 1) two weeks prior to being interviewed. It was anticipated that this would give the participants an opportunity to consider their responses to the questions in advance and to formulate their thinking so that they would be better able to articulate their views during the interview.

Interviews were of approximately one hour's duration. All of the metropolitan school interviews were conducted by a research assistant, the author conducted three of the rural school interviews. Through the interview protocol (Appendix 1) issues ranging from the influences on their approach to teaching, determinants of good (and not so good) lessons, student learning, the role of pre-service teacher education and teaching as a career were discussed. Examples to support their claims were continually sought and the questions were organised to validate their views in different ways and from different perspectives.

The procedure facilitated reflection by the individuals and enhanced the recall of episodes and experiences during their year of teaching. This approach to data collection is one way of obtaining the teacher's view of their own practical knowledge, attitudes, beliefs and values (Feiman-Nemser and Floden, 1986). All interviews were audio-taped and transcribed. In reporting on this research, participants have been given pseudonyms. Transcripts were coded and analysed using the computer software program NUDIST. The value of the NUDIST program is that it allows the researcher to recall information across a number of pre-coded fields and to compare and contrast such data.

A major benefit to having a research assistant conduct the interviews (beyond the time factor) was that it reduced the likelihood of participants saying what they thought the researcher might want to hear. This was important because only three of the participants were not Monash graduates. All of the Monash graduates had had close contact with the researcher during their pre-service program.

The research assistant and the researcher conducted the first metropolitan interview together then analysed the outcomes. Through this process they compared their views of their developing hypotheses

so that their future interviews might pursue issues in a comparable manner. After approximately half of the interviews were completed, this form of validation was again initiated as the country school data was compared to the metropolitan school data. In this way, both the researcher and research assistant were sure that they were in agreement about their individual interpretations of the data as it was unfolding for them.

FINDINGS

Nearing the end of their third year of full-time teaching, the participants in this study described the changes in their approach to teaching in terms of being better organised, more confident and more relaxed about being a teacher. Although responses of this nature are not in themselves surprising, the reasons which underpin them are indeed interesting. All spoke about their teaching in relation to their understanding of student learning so that their attempts to teach science were driven by a perceived need to make the work practical and relevant to their students.

In the first two years of this study there were signs which hinted that this was occurring but that it was being hindered by some of the conditions of the teaching workplace (Loughran, 1994). It appears as though it has taken almost three years of full-time teaching for this view to fully surface and to direct the teachers' work. Becoming comfortable with the teaching role is a gradual process and coming to grips with it may be a new phase in a teacher's career. Dianne, who in the previous two years was uncertain about teaching as a career, demonstrates how she has now come to view her development. The following quote is indicative of the views of the teachers in this study.

Dianne: I suppose I've probably accepted my profession now. And I feel really at home in the science classroom, very much at home, I'm much more willing to scrap a lesson that I don't believe is reaching it's objectives and take a different route that will get the knowledge and the learning across and I feel very comfortable with that now. So I suppose I've just relaxed in my subject and it was really good, yeah. Seeing what kids like and how they respond is for me the most important thing to see, so I'm thinking I'm learning, well they like to learn under these circumstances they like this sort of presentation so that's the way I'll get them and that's the way I'll get them into science. So it's been really good, yeah, I'd say I've grown more probably this year than I have in the last few years as a teacher,

yeah, so it's been really good.

Becoming more at ease, or more relaxed, with being a teacher is a catalyst for the development and understanding of a number of aspects of the teaching role. The confidence associated with knowing more about what is happening and why, and having more control of it oneself, directs these teachers' approach to lesson preparation, teaching and learning, relationships with students and the satisfaction they draw from their work. All of these themes are explored in the findings of this study from the participants' perspective and are largely driven by their ability to now better control the many conflicting demands placed on them as teachers.

Lesson planning

Thirteen of the participants in this study spoke about the factors which they perceived as influencing their approach to lesson planning. Not surprisingly, time was often cited as a major influence on the way

they went about planning their lessons; six of the thirteen noted this as the most important influence on their planning. However, beyond the fact that lesson planning had to be organised and prioritised amongst the many other competing components of a teacher's time, the emerging reason why insufficient time for planning was a problem appeared to be closely related to the teacher's view of student learning rather than solely an organisational component of preparing class material. Therefore, time to reflect on how to organise a lesson in order to enhance student learning was an important factor.

Although most of the participants in this study were relatively comfortable with their grasp of their content knowledge (now in their third year of teaching) it became more obvious throughout the interviews that making more of the relationship between teaching and learning was implicit in their planning for a lesson. Being comfortable with the content knowledge is important here because as Carlsen (1993) points out, there is a considerable change in teachers' approach to teaching as they move from unfamiliar to familiar content. This is observable in the cognitive level of teacher questions and is linked to their subject-matter knowledge. Low-level questions and teacher domination give way to higher level questions and more student control when a teacher is content knowledgeable.

These teachers felt as though they had a good grasp of the necessary content knowledge so beyond their perceived classroom practice, they were concerned about their 'real' practice in that if they did not have adequate preparation time then it was likely that their teaching might take a form that was in direct contrast to their views of student learning. Hence, although Carol is able to outline how she thinks a learning experience should unfold for her students, she also notes that

this is not always what happens, especially if she does not have enough time to plan her lessons.

Carol: Well it has to be some kind of a puzzle. It has to be something that they can solve or it has to be something they can touch or play with or there has to be data there that they have to find [out] what it is. It has to be a challenge and not too easy and not too hard. And I guess sometimes when I plan things, I start with something easy at one end and get progressively more difficult so that they get confidence with the more easy things and rotate round to the more difficult things...I haven't been as satisfied with my 7 to 10 teaching this year as I have been, well I guess particularly [compared to] my first year, and I think that is just a reflection of the amount of time I feel like I've had to spend on it.

Insufficient time for preparation was also seen as a major factor in relation to unit planning. To be able to complete a unit in the time allocated a teacher needs to be able to distill the most important aspects of the learning rather than to rush through and complete everything in the syllabus in a superficial manner. Therefore, if there was insufficient time to cover the syllabus fully, the ability to determine the most important concepts within the unit and to teach them in an appropriate manner was paramount.

Anne: I think the major one is the time factor thing. How many units do you have to fit in over a certain period of time and then on top of that you find that you lose lessons all over the place for all sorts of activities so you have to sacrifice your plan and just do the best at the time. So I would sit and think right what do I want students to learn for this unit and have a brief overview in my mind sometimes write that down have a look at the objectives that we have, talk to someone about what they would teach in that unit and then go back and

make up my mind what series of things that I want to go through...So I think that time factor first of all, and then you can work out the real objective of the unit and go on from there.

The way these teachers view lack of time as an issue has now shifted from the way they perceived it in their first and second years of teaching. The focus on the relationship between learning and teaching has become much stronger and (except for two interviewees) they appear to have moved beyond concerns about their ability to control a class and their content knowledge as they strive to help their students understand the content they are learning. Even though this has always been a concern for them, in this their third year of teaching it is more so the reason why insufficient time is a problem. Their understanding of teaching is shifting from concerns about themselves to concerns for their students, more particularly, concerns about issues which impact on their students' learning.

This became even more apparent as their views on teaching and learning were explored in more detail through examples of their recent classroom experiences.

Views of student learning

One of the interesting aspects about these teachers' views of student learning was that rote learning of propositional (factual) knowledge was merely a starting point for learning; this is in contrast to the often held student view that science is about knowing facts. There was a strong feeling that good learning involved much more than simply knowing information, good learning involved being able to use that information in different ways and in different contexts. Therefore, descriptors such as the application of knowledge, relevance to the real world, practical knowledge, linking and problem solving were terms which were often cited. The major reason why these approaches were important to these teachers related to their developing understanding of the impact of their practice on their students' learning. For them, telling did not equate with teaching, and hearing did not equate with learning.

Recognising how this developing understanding of teaching and learning is situated in the context of this (longitudinal) study is important. Although the views are not necessarily new for each of these teachers, the reason why they hold them is significant. They have come to understand that as teachers they need do things that help learning to occur and that this needs to be much more than rhetoric. They are now more comfortable in their role as teachers and the influence of their understanding of student learning is no longer one amongst many competing aspects of their work (eg. completing the syllabus, classroom management, learning content) as it may have been in the past. They are able to think about what they have experienced and how that has influenced their understanding of their students' learning.

Joshua: Just the last few days I was helping out a student who's just got off the boat [refugee] and he's struggling with his English...that's been a bit of an eye opener...if you're good at relating to someone, not being say a transmitter or a teller or whatever but sort of seeing what they're doing at the same time, that's important.

Gary: I rely more I suppose now on what I've seen of kids rather than what I've been told...I think more about the kids that I've seen and how they learn...[I had a unit where] they had to present a brochure and you can see that if they'd thought about it and had written it so

that it is not just a slab out of a book, actually explained what's in there, that's learning...

They are beginning to articulate a philosophy about learning which influences their approach to teaching; although the ability to articulate it seems to be influenced by the interviews. Much of what they think and believe is implicit in their practice; it is not until they are interviewed that they make explicit this type of thinking.

Being able to make the learning accessible to students and being able to relate it to what the students already know is an approach that is percolating to the surface in these teachers' practice as their confidence is further enhanced through experience. Teaching a concept to students is not so much a matter of how well the teacher explains it, it is also a matter of how well the teacher can design a situation which helps the students to understand it by linking it to their existing knowledge.

Mark: Just that they have to feel it and I really feel strongly that they have to anchor it to something they know. So my number one job is to have some experience to anchor it on. So like potential energy, the way I go about that is I hold a brick above some kid's head, not necessarily intimidating, but they tell me they don't know anything about potential energy so I go up there and hold a brick above their head and I ask them where they'd prefer me to drop it from, 2 cm or 200 cm, then they tell me what they know about potential energy.

There are numerous examples of data similar to this throughout the teachers' interviews. What seems to be emerging is a stronger link between their views of learning and their views of teaching and these views cover a wide range of approaches. Interestingly though, one view of learning is not held to the exclusion of others. The teachers have an understanding that the students in their classes learn in different ways and that they need to teach in ways that will include everyone. This inevitably sets up a situation which may be difficult to reconcile. How does a teacher organise a learning environment when the students have alternative approaches to learning to those which the teacher prefers? How do situations like this impact on the teacher's views of teaching?

These issues are at the heart of the struggle of helping students to learn and become increasingly important as the teachers' confidence allows them to reconsider what is really happening in the classroom. A situation which may have gone unnoticed in the first year of teaching, or been a threatening/risky situation in the second year of teaching, is now a dilemma that is recognised and may be addressed in the third year of teaching. Through being more comfortable with the teaching role it would appear as though the ability to reflect on one's experience, and to learn from that reflection so that one's views about teaching and learning are reshaped, becomes a more important influence in the organisation, preparation and actions of practice.

The way that this dilemma arises may be from two different perspectives. On one hand it might be as a result of the teacher's view of learning directing the pedagogical approach to the classroom experiences. On the other, it may be that the students' practice of learning influences the teacher's approach, overriding his/her view of learning. Both of these perspectives were evident in the teachers in this study. For some (such as Mitchell who taught in a large well established Private school) the perceived need to respond to the students' expectations of learning as training, encouraged them to challenge the students' view of learning in an attempt to help them

gain a better understanding of the content; even though the students were uncomfortable with this approach, "This 3rd year I've been trying to influence the way they learn I suppose rather than them influence the way I teach." For others it was more a matter of accepting that the students' approaches to learning, which may have been in conflict to their own, needed to be taken into account a little more than was perhaps the case in the past. Catherine explains the later in her interview.

Catherine: It amuses me because I guess I always wanted to teach in a different style. I think as much as I'm fighting it I guess I'm reverting more to the traditional style of you know working from the text book and very traditional methods of teaching. Yet I feel that I need to make sure that I've covered different styles of learning because not all kids learn the same way. So I guess for every idea I want to get across I'm giving different ways of teaching it, whether it be reading and answering questions and then an activity and then notes from the board, just to make sure that I've totally covered what I've done. I think I've had experiences of, because I like to teach through you know, role plays and making posters and you know fairly dynamic ways of teaching there are some kids who don't cope with that. The really introverted child doesn't learn from that because they're so worried about being, you know, the centre of attention or whatever that is. And I guess for that you can't just go for the majority.

Interviewer: And you feel that what you call the traditional methods are more efficient in achieving that aim?

Catherine: Not more efficient, I still believe they're a very inefficient way to teach but there are some kids that like to learn that way because that's what they're secure with. Even, I guess it's just a training thing that they need to get used to learning in a more active involved way and that you don't have to write everything down so you can study it the night before. If you learnt it at the time of doing it then you probably really should not have, you know, a whole pile of notes. But because of the way kids are used to learning they feel much more secure with having something written down in front of them and they feel more secure when they've read and answered a lot of

questions on it because that's what they're used to doing. And you've got to make them feel secure in a classroom otherwise they don't learn anything

Throughout the interviews the notion that people learn in different ways and that this needs to be taken into account in teaching was constantly being put forward by these teachers. Their views encompassed a number of approaches to learning similar to those traditionally described in text books on educational psychology but without using that type of language. For example, White (1988) describes seven elements of memory that he considers important in learning. These elements of memory are: propositions, strings, images, episodes, intellectual skills, motor skills and cognitive strategies. Sixteen of the interviewees in this study outlined their view of student learning using generalised categories encompassing these seven elements of memory. They described learning as: knowing (factual recall), doing (application of knowledge, physical manipulation of apparatus), understanding of context/relevance (relating knowledge and learning in one area to another) and questioning how learning occurs (thinking about thinking). Although they were not using the language of White (1988) these teachers appeared to be referring to learning from a similar perspective.

Of the four generalised categories listed above, thinking about

thinking, although it was discussed, did not appear to direct their teaching to anywhere near the same extent as the other three. This may be as Gary says, because, "when you're learning you think about how you're doing it, but once you've learnt you don't consciously think about it, you just do it." Therefore it raises an interesting question. Although these teachers clearly recognise that students learn in different ways, and that their learning influences the way they teach, why does this not extend to the thinking about thinking (metacognition) that enhances learning? Perhaps during their third year of teaching, being relaxed enough about their practice to hand over more of the responsibility for learning to their students by encouraging them to think about their learning is still a little too risky. Or, perhaps they are doing this but do not have a language to communicate this to others. In the next section which outlines the relationship between their pre-service experiences and their current practice, Joshua hints that it may be a mixture of both but drawing a conclusion at this stage is not really possible; even though it is interesting to speculate.

Pre-service experience

Zeichner and Tabachnick (1981) suggested that student-teachers' attitudes gained during their University course work were 'washed out' as they moved into full-time teaching. In contrast, the results of the

second year of this study suggested that pre-service education is not so much 'washed out' but repressed (Loughran, 1994) as the conditions of teaching restricted their practice.

In this analysis of these teachers' third year of teaching, it would appear that repression has given way to a form of subconscious assimilation. Through these teachers' interviews the relationship between their current practice and their pre-service education course was discussed. In many ways they have established an approach to teaching that largely accords with the philosophy undergirding their Dip. Ed., but for many they would not readily recognise it in themselves if it were not for the interventive aspect of this research project; hence the subconscious assimilation of the espoused Dip.Ed. approach into their everyday practice. This is particularly evident in their developing view of learning and is hinted at in the previous section. The basis of one of the foundation subjects in the Diploma in Education at Monash University, Teaching and Learning (TAL) is formed around White's (1988) view of learning. Although the teachers in this study do not state this as an influence on their current thinking, it does appear to be an approach to thinking about learning which 'makes sense' to them and which they continue to interpret and perhaps adopt in varying ways as their own. They do not state that their view of learning is derived from their TAL course or that White's (1988) view is to the forefront of their thinking, but the philosophy which underpins this view continually resurfaces. Far from being washed out, it appears as though the general philosophy of the course has become a part of their approach to teaching even though they do not consciously relate this to their Dip.Ed. experience.

All of the interviewees were asked questions such as, "What about your Dip.Ed. experience and the way it is influencing you now, is there still an influence from the Dip.Ed. days? Should there be an influence?" Two of the participants felt that Dip.Ed. did not influence their current practice, three described the influence as diminishing or being replaced by their learning from their teaching, the remainder spoke about their Dip.Ed. as still influencing their practice. Some of the participants spoke about specific instances/units which they thought were "a waste of time" or "something

that had to be done", but overall, the majority spoke about the program as still influencing their approach to teaching.

Those that did not view the Dip.Ed. as influencing their current practice, or as a diminishing influence spoke about it in ways similar to that described by Dianne. Yet it is interesting to note how her initial assertion about the influence of the course seems to change as she relives some of the positive experiences that she remembers. In many ways, this is indicative of those that were uncertain or negative about the influence of their pre-service teacher education program. As

they spoke about the influence of the course, positive memories tended to resurface and these memories led the interviewees to modify their initial statements. Clearly in the following quote from Dianne (which is perhaps the most critical of all the participants), her initial statement is tempered by her following recollections; and some subsequent teaching actions.

Dianne:...it could have been me, I wasn't ready to learn from it, I don't know, but I've never found that it's [Dip.Ed.] influenced my teaching at all. More with my science class, I found, I reckon he hit the mark. I thought extremely valuable...[yet] in another class and I can't even remember it's name so that's how important it was...I just think Dip.Ed. ought to be more structured to what science was doing, producing teachers instead of sitting around gabbing about what you think, mucking around with all this philosophical crap - to put it nicely. And now that I am here in the classroom I know why I'm here and I do my job and I think that's what they did. So how has it affected me, well, they gave me the idea that science can be a hell of a lot of fun and you can teach it really well...I think it's infected me I think back to physics for non physicists...when he went to the top of the Dip.Ed. building and dropped a cannon ball and a beach ball, or whatever it was out of a window, and did that sort of thing, you know I've taught that to nearly every physics class I've ever taught about anything because of that....So if they put more of those learning experiences with teachers who are really with it, then Dip.Ed. would be powerful.

The majority of the interviewees however spoke about their Dip.Ed. as a positive influence on their teaching and as a foundation for their thinking about teaching. It had given them an opportunity to conceptualise an approach to teaching that involved much more than relaying information. Through this understanding of what teaching could be they were working to what they wanted their teaching to be. It was something that helped them to shape their pedagogy in ways that were congruent with the philosophy of their pre-service education program. As the following quotes demonstrate the importance of an underlying view of teaching and learning as articulated (and hopefully demonstrated) in their Dip.Ed. is important in influencing their approach to teaching today.

Mitchell: Educationally, I'd like to try and break out and do something, so that's a driving force and that's why I've been doing these things in the fourth form this year, and that's I suppose that's almost, you can trace that back to the Dip.Ed. influence in the way that we were taught back then and it's a way that I like things. See I saw the benefits of it and I've just wanted to, I suppose, to see it for myself, see if I could do it...I'm happy with the way that Monash trained me in that new way of thinking, whereas a lot of them [other teachers] are having to adjust how they think...so I'm happy in that way. They gave me a good basis to work from...

Leanne: It [Dip. Ed.] wanted me to teach so to, to make the kids think, to make the kids understand things and understand concepts not just facts. It wanted me to create interest, make teaching interesting, [make] learning interesting for the kids and [it] wanted me to enjoy teaching too and it wanted me to enjoy seeing kids learn.

Ron: I think Dip.Ed. has sort of, especially with Science, has shown me the optimum that you're trying to aspire to, the sort of classroom that you're try to aspire to...

In many ways it is this expectation of how teaching can be that influences these teachers' pedagogy and although there are instances which they recognise when their espoused philosophy does not match their actual practice, attempting to bring the two closer together more frequently does appear to be to the forefront of their thinking.

Teaching and learning is however much more complicated than any individual section of this data can demonstrate. The number of factors impinging on a teacher's approach to teaching varies as the demands of the job similarly continually change, in fact it may be that these interviews are snapshots in time which demonstrate the state of flux in teaching and learning. One important facet which influences this state of flux through most of their work is the relationship that they have with their students. The way they develop these are continually mentioned as important in shaping their teaching and their students' learning.

Relationships with students

The affective domain is sometimes overlooked when exploring the links between teaching and learning and it is important to remember how teacher-pupil relationships can shape the interactions which occur in a classroom. All of the interviewees spoke about the importance of the relationships they developed with their students and most thought they had now arrived at a good understanding of what they thought was an appropriate balance between their personal and professional persona in the classroom. Like Jason, most found that they had learnt from their previous two years of teaching in ways that had allowed them to be more comfortable with the way they worked with, and reacted to, their students.

Jason: I think that perhaps in the first year maybe I was bit too friendly with some kids, I sort of was a bit over eager I think. I think I'm perhaps trying to get a balance. I think maybe last year I was bit the other way. I thought my first year I was a little bit eager so last year I sort of backed off a bit tried to distance myself a little bit from the kids so that I wasn't, you know, trying to be too much of mate or whatever. And then this year I think I got a better

balance between the two of them, so yeah, I think I'm sort of getting the hang of that too.

Being able to find an appropriate balance between being too friendly or too stern was important to these teachers as they sought to find a middle ground which would allow them to teach in ways that they thought would satisfy both themselves and their students. Relationships with students influences the nature of the interactions within a lesson and the way in which classes are planned, therefore developing them in satisfactory ways is important if students' learning is to be enhanced.

Through developing an open and honest approach to individuals, most of the teachers felt that they were better able to then determine the needs of their students as they had more insights into their thinking. This then helped them to plan pedagogical experiences that would be

more meaningful and appropriate across the range of students in the class.

From these teachers' perspective, planning a lesson takes on new significance when the relationship with the students is considered. By better understanding the nature of the individuals in the class, by them feeling more able to discuss their ideas and to risk speaking up, the likelihood that they would make more sense of the content being taught is increased. All of this revolves around the atmosphere created in the class and this is a result of the teacher's ability to understand and work with the students. Responding to this is then a crucial skill and, for these teachers, they felt that in their third year they were really coming to grips with how to build relationships in ways that had a positive impact on the teaching and learning environment in their classrooms.

Interviewer: So when you're planning your lessons, what are the factors that really determine the plan of the lessons.

Jenny: Students. By far, it's the girls, it would be students, their levels of ability, their usual behaviours in class, that's often taken into account, and basically what those students prefer. You get a feel for what individual students prefer in terms of the teaching and learning strategies and I know the students in that class, and so if this particular concept or idea is a difficult one I adapt the teaching strategy to those students.

This influence of interpersonal relationships between teachers and students is also important in terms of job satisfaction. Only one participant was of the view that teaching was not satisfying and this was largely due to the fact that he felt as though he was working with a group of students who were not particularly interested in learning, he was struggling to develop a good working relationship with his students. The remainder of the participants were satisfied with their

work and this again appeared to be a reflection of their own sense of acceptance from their students. Through the development of this sense of belonging and acceptance came a feeling of professional satisfaction which in turn encouraged them to further develop their skills, hence reinforcing their perception of the value of their work.

Strangely though, most of the participants had difficulty describing the elements of teaching and learning which they identified as leading them to a feeling of satisfaction. They did not appear to have a language to communicate their understanding of success in the classroom and most described their understanding as a 'gut feeling' or something that they interpreted from 'the look' on students' faces; seeing the light go on. Liz's description was perhaps one that was indicative of the majority of participants in this study and demonstrates how once again student learning is at the heart of these teachers' thinking about teaching.

Liz: I'm satisfied when the kids learn something, when the kids learn what I'm trying to get across actually. [pause] No, not always. Like if I go in there with one objective and they pick up something else just as important that doesn't worry me. You know but I like it if they learn what I'm trying to get across too. But as I said that's not always the most important thing and...um I'm satisfied if they learn it and if they remember it next time. I'm satisfied if the kids enjoy the lesson and have worked reasonably well. I'm not saying they have to say oh this is a rip snorting time, can we do it again but that they were content to work on the problem or activity or what ever they were doing.

Changes to make

In an attempt to understand how these teachers viewed their development in terms of their professional growth, they were all asked what type of professional development programs they might be interested in attending and what changes they thought they might like to make to their teaching in the future. As in previous years, time was still a major issue for most of them. Many spoke about how they would like to decrease the amount of out of school time they used to do their job, and how they thought they did not effectively use their 'free periods' in school time which ofcourse added to the problem. Time as a problem was also linked to their view of professional development. They would like time for professional development but not at the expense of their classroom teaching commitments. Half of the participants, despite their earlier descriptions of interactive and engaging teaching practice, still stated that they would like to be able to teach in ways that were more creative and more relevant for their students. Again, the underlying approach to their teaching is to continually strive to better align it with their students' learning. Even though their interviews display a

mass of data which suggests that they are continually attempting to better align their teaching with their students' learning, there is still a feeling in their minds that they can do/should do more.

Leanne: I'd like to have, ideally, everytime I go into a class something, dare I say it, interesting for the kids to do. Particularly Year 7s, they like to go in and use, maybe if they use something with their hands or work in groups or you know something different and more hands on, if I could do that all the time I would, but I just haven't got a) the time, b) the resources and also they would probably get bored with it after quite a while. I mean I try to vary it as much as I can within my capabilities. I don't know, maybe, what I'd love to do is have more interaction. Particularly like, with the kids that are generally quiet during class...they take in a lot but they just don't contribute because that's just the type of kids that they are. And if I could get them interacting not necessarily with me but with the others around them, I think that would be great, I really do.

Interviewer: Why would it be great

Leanne: I suppose it goes back to the interaction between humans rather than you know teacher student, if you can develop that and um because I think teaching that, or well, I've changed my mind what teaching is. But it's more of a development and interaction rather than you know as I said before just going in teaching in that [information], if you could help even one student develop and maybe come out..If they're really quiet and if they can even just express their opinions well, you know rather than just being a passive person, if they can interact and as soon as they can do that I think that will better equip them for out in the real world.

Three of the participants mentioned classroom management as an area in which they would like to further develop their skills. Only one spoke about further study as a real option for professional development and that was in a specialist area (psychology) where she felt University programs were essential for the acquisition of particular knowledge and skills.

From all of the interview data there was a sense that as these teachers reflected on their practice, that although they acknowledged what they thought they did well, they still readily recognised areas for continued development. They did not display any views that suggested

that they had 'made it' as teachers, rather that they were coming to see teaching as problematic and that the best they could do was to better understand this, rather than 'know it all.' Only one participant actually stated that he was happy with his teaching and could not see areas for further development. Therefore, this view of learning to teach as a continual struggle to better align teaching and

learning seems to be a positive approach to developing one's professional knowledge. Rather than considering learning to teach as reaching a particular end point, it suggests that these teachers view it as a continuum. In this case, it appears as though time and experience combine to influence the context of learning about teaching so that movement along the continuum is not so much about stages of professional development, but about learning from the experiences embedded in the professional development opportunities available through reflection on teaching and learning.

Conclusion

Over the three years of this project I have had the opportunity to observe changes in these teachers as they have learnt more about teaching. Feiman-Nemser and Floden (1986) describe the "cultures of teaching" as the way that teachers define their own work situations, hence the teachers in this study appear to have a culture of learning from experience that encourages them to continually strive to better understand and therefore develop their pedagogy. This is similar to the culture of their pre-service teacher education program so in many ways they could be described as pursuing their careers in ways that reflect the anticipated outcomes of their Dip. Ed.

Kagan (1992) reviewed 40 studies pertaining to the professional development of preservice and beginning teachers and in her 'Ground Rules' for understanding her work she stated that:

although the studies reviewed here are technically naturalistic in that the researchers did not impose experimental conditions, a program of teacher education does, in essence, constitute a treatment of sorts. Unfortunately, many investigators omit descriptive details of the teacher education program(s) that was involved in a learning-to-teach study...(p. 131)

This is an important yet often overlooked aspect of learning-to-teach studies. Fourteen of the seventeen participants in this study were graduates of the same pre-service education program (Dip. Ed. at Monash University) and had therefore experienced a similar 'treatment', (previously described in Loughran, 1994), and I believe this study demonstrates that this has been an important factor in their professional development. The participants emerge from a background in which concerns for student learning are richly embedded in their pre-service program, so they have indeed experienced a form of treatment.

Bullough (1991) concluded that a beginning teacher needs a clear self image if genuine professional growth is to occur. Through the pre-service program at Monash University we actively encourage our student-teachers to develop a clear image of themselves as teachers. The course is organised in a manner that addresses the anticipated

shifts in concerns from self as teacher, to concerns about students and student learning (Gunstone & Northfield, 1992; Gunstone et al, 1993).

The move into full-time teaching can then be regarded as a challenge to the views and practices espoused in pre-service education as the beginning teacher learns to accommodate the constant demands of

teaching and learning within their growing understanding of the workplace, combined with their ability to learn more about pedagogy through reflection on practice (Schön, 1983).

The participants in this study are all science teachers who now after three years of full-time teaching appear to have developed a sense of their understanding of teaching and learning that allows them to take more control of their own practice. This development is related to the range of experiences they have had in teaching: content; year levels; and students, and their current level of control is as a result of reflection on this knowledge and experience. After three years in the teaching profession the development of their practice now contains a range of experiences which support what Grimmett and MacKinnon (1992) describe as pedagogical learner knowledge, "pedagogical procedural information useful in enhancing learner-focused teaching in the dailiness of classroom action."

These teachers demonstrate that the development of their professional knowledge is based on concerns for student learning but that genuinely arriving at that point is a very time consuming task. This is an aspect of learning to teach which needs to be better understood if teachers are to be adequately supported in their beginning years of teaching. If the results of this study are indicative of learning to teach, three years of post teacher education experience is a demanding pre-requisite for pedagogues who are beginning to understand the complex nature of teaching and learning. This should highlight how important it is that we recognise the professional knowledge of teachers. Also, that appropriate research can help to articulate this within the profession as well as for those in other fields so that teachers' work might be better understood and valued.

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Appendix 1: Interview protocol

1. How would you compare your approach to teaching this year to last year's approach? Why is it different/the same?
2. If you were to think about your teaching since Dip. Ed., how would you describe the changes you have made and why?
3. How does your Dip. Ed. experience influence the way you teach now? Why? (Should it?)
4. What influences the way you teach? Any examples?

5. How do you know when you've taught a good lesson? Any examples?
6. How do you determine if students learn in your classes? Any examples?
7. Can you describe a lesson which illustrates (for you) good teaching and good learning?
8. What factors shape the way you plan your lessons and why?
9. How do you determine whether or not you are satisfied with your teaching?
10. What changes would you like to make in the way that you teach and why?
11. What type of Professional Development activities have you been involved in? What would you like to be involved in? Why?
12. What is your view of how students learn and how does this influence the way you teach? Any examples?
13. What is your image of the ideal teaching/learning situation? How can it be achieved?
14. Do you see yourself as having a career as a science teacher? Why or why not? How long do you think you will stay in the job? (Why are you still in the job?)

Thanks again.

John.

NUDIST (Non-numerical Unstructured Data Indexing Searching and Theorizing copyright Replee Pty. Ltd. Qualitative Solutions and Research P/L and La Trobe University, Bundoora, Victoria, Australia) is a qualitative data analysis program which enables the user to sort and recall coded segments of data. Therefore, responses to particular issues or questions from different individuals may be more readily summarised, reviewed and compared to determine trends within specified areas. Areas of study can be general or specific and is determined by the initial coding. The number of codes is not limited nor is the number of sub-codes which may be nested within one another.