

*Brief Report***PARADIGM SHIFTS IN PRE-SERVICE TEACHER EDUCATION STUDENTS:  
CASE STUDIES OF CHANGES IN EPISTEMOLOGICAL BELIEFS.**

Joanne Brownlee  
School of Early Childhood  
Queensland University of Technology

**ABSTRACT**

This paper is a report of a work-in-progress and describes changes in epistemological beliefs for two graduate teacher education students who were part of a larger group of students involved in a year-long teaching program at a large metropolitan university in Australia. The program was implemented to encourage students to reflect on their personal epistemological beliefs (beliefs about knowing) in the context of an educational psychology unit. All students were interviewed at the beginning (Time 1) and end (Time 2) of the year-long teaching program and also asked to write journal reflections about their beliefs about knowing and teaching. The analysis of the interviews and journals for the two students indicated that they held a range of epistemological beliefs however one student described an increased focus on relativistic beliefs about knowing and teaching throughout the year, while the other's beliefs did not change.

**INTRODUCTION**

Teachers in Australia are being urged to embrace a new paradigm in education, which does not focus on simply transmission of information to students but on learning by constructing meaning (see, e.g., Baines & Stanley, 2000). From this new paradigm, future workers need to be problem identifiers and problem solvers and will succeed at their work if they are original, clever and provide solutions to problems (Education Queensland, 2010 Document, 1999). This means that, for future workers, active construction of meaning, particularly in a social context, will be vital. However, in order for teachers to facilitate such a paradigm shift within education, many may need to undergo personal paradigm shifts in their own beliefs about knowing, teaching and learning. These beliefs can also be described as personal epistemological beliefs which reflect a person's views about what knowledge is, how it can be gained, its degree of certainty, and the limits and criteria for determining knowledge (Perry, 1981). Personal epistemology needs to be "distinguished from 'epistemology' as a philosophical term" (Burr & Hofer, 2002, p. 201).

Personal epistemological beliefs were first investigated by William Perry (1970) who noticed that students moved through four main positions as they progressed through their college studies. He described these positions or "worldviews" as *dualism*, *multiplism*, *relativism* and *commitment*. Individuals who held *dualistic* views about the nature of knowledge believed that absolute truths (right/wrong) exist and could be transmitted to an individual from an authority or expert. Next, when individuals began to conceive of knowledge in a *multiplistic* way, they conceded that as well as absolute truths, there were some things that could not be known with any certainty. Such individuals believed that knowledge comprised both personal opinions and ultimate truths. The next position, *relativism*, constituted a major shift in personal epistemological thinking because individuals considered that knowledge was a reasoned construction of meaning rather than relying on intuition or personal opinion, although initially this may have occurred in some contexts only. Absolute truths could no longer exist for them because truth was considered to be relative to individuals' personal interpretations of experiences. In the final positions related to *commitment*, relativistic thinking was still a feature, but particular beliefs were more valued than others and were committed to in a flexible manner. Other research (e.g., Kitchener & King, 1983; Baxter Magolda, 1993) has found a similar range of beliefs to those described by Perry.

Personal epistemological beliefs may influence individuals' cognitive sophistication during ill-defined problem solving (Kitchener, 1983) as well as influencing other teaching /learning attributes such as persistence, comprehension, critical interpretation (see, for example, Schommer, 1990) and conceptual change (Windschitl & Andre, 1996). Ill-defined problems that reflect real world dilemmas may require an awareness and knowledge of one's personal epistemological beliefs to help interpret the problem and define the limitations of solutions (Kitchener, 1983). For example, if a teacher believes knowledge is absolute and truths can be transmitted (*dualistic epistemological beliefs*), then for both simple problems/puzzles and ill-defined problems, the solution will be to apply an algorithm or a procedure and arrive at a single "correct" solution. Conversely, a teacher who believes that knowledge is personally constructed through critical reflection (*relativistic epistemological beliefs*) is more likely to acknowledge and develop a range of alternate, well considered solutions to problems (King & Kitchener, 1994).

Personal epistemological beliefs are considered to play an important role in influencing the development of knowledge and other beliefs because they may be considered to be central values or theories (Hofer & Pintrich, 1997) that are functionally connected to most other beliefs and knowledge, including beliefs about teaching. Hofer and Pintrich (1997) postulated that students' beliefs about the nature of knowledge (certainty and simplicity of knowledge) and the nature of knowing (source of knowledge and justification for knowing) "...should be considered the core of an individual's theory, while the other beliefs about learning, teaching and intelligence may be related to the core dimensions but are peripheral to an individual's theory. . ." (p. 119).

Considering the filtering role of personal epistemological beliefs, it might be expected that individuals who have more sophisticated beliefs about knowing, that is that individuals construct truths, would also conceive of teaching in a similar manner. This means that they may be likely to conceive of teaching from a constructivist perspective. Constructivism refers to a particular set of beliefs about knowing and learning that understanding exists only for the individual who actively creates such beliefs. Therefore, individuals actively transform the new information in some way so that it becomes linked to prior knowledge. The common characteristics across all philosophical perspectives of constructivism include the use of cognitive tasks that link new to prior knowledge, attention to individualised learning outcomes, and a recognition that learning is context-specific (Tynjälä, 1997). Conversely, individuals who have more naïve beliefs that focus on truth as absolute and categorical might be expected to conceive of teaching from a more transmissive perspective in which individuals receive and acquire information rather than construct personal meaning.

There is ongoing debate concerning the validity of relativistic beliefs as a developmental end point (Goldberger, 1996a). Goldberger (1996a, 1996b) recognised that in certain cultures relativistic ways of knowing may not be appropriate, although she defended the superiority of such developmental ideals within the American context, which reflects multiple perspectives of knowing. Similarly, it could be argued that there is a need to be aware of, and reflect upon, multiple perspectives in an increasingly pluralistic Australian society. This study will reflect the view that relativism is an ideal for teaching and learning in the Australian context. Throughout the current study the term *sophisticated* will refer to those beliefs that truth is relative, changing, and actively constructed by the individual. The term *naïve* will be used to refer to individuals who have a tendency to believe that truth is certain, absolute and able to be transferred by an authority. This terminology is commonly used in the personal epistemological beliefs literature (Kardash & Scholes, 1996) and is not intended to reflect a view that relativism is universally superior as a developmental end point.

If we accept the premise that teacher educators need to help teacher education students develop sophisticated beliefs, then teacher educators need to focus on student teachers' personal epistemological beliefs in teacher education programs. Although most teacher educators would recognise the importance of helping student teachers to develop these beliefs, often teacher education programs do not provide the scaffolding to facilitate this development.

## THE STUDY

A teaching program designed to facilitate the development of personal epistemological beliefs was implemented with 29 pre-service graduate teacher education students who were completing a Graduate

Diploma in Education, at a large metropolitan university in Australia. The Graduate Diploma in Education (primary) was a one-year course that prepared individuals with undergraduate degrees to teach in primary schools. This paper is a work-in-progress and provides an in-depth analysis of the personal epistemological beliefs of two student teachers who took part in the 1997 teaching program and the changes that took place in their beliefs throughout the program.

As part of the year-long teaching program, student teachers reflected explicitly on their personal epistemological beliefs in journal entries. Furthermore, the student teachers were required to reflect explicitly on their beliefs in relation to the educational psychology unit they were studying. For example, when discussing the topic of cognitive development, student teachers also reflected on the development of intellectual functioning from an epistemological perspective (e.g., the work of Perry, 1970). Personal epistemological beliefs were tracked throughout the course by analysing interviews (at the beginning and end of the course) and journal reflections. The selection of the two student teachers for in-depth analysis was based on their varied initial personal epistemological beliefs.

There were 2 interviews throughout the year. At Time 1 (the beginning of the year-long unit) and Time 2 (the conclusion of the year-long unit) student teachers were interviewed regarding their beliefs about knowing and teaching. These interviews took between 35 and 60 minutes, with the average being approximately 40 minutes in duration. They were conducted on the university campus and audio taped for later transcription. Time 1 interviews were conducted in the first two weeks of semester before any discussions about beliefs took place in the tutorial sessions. The Time 1 interview audiotapes were transcribed verbatim by the student teachers in the hope that this process would help them to think about their beliefs. The Time 2 interviews were audio taped and transcribed verbatim by the researcher.

The interviews were semi-structured with questions that enabled information to be gained about specific beliefs and also allowed student teachers to discuss topics openly within such parameters. The questions related to beliefs about knowing were similar to those used by Belenky, Clinchy, Goldberger, & Tarule (1986) in their study of women's ways of knowing. In particular student teachers were asked to describe their beliefs about the nature of truth and how it was obtained. The questions related to beliefs about teaching were similar to those used in the T&LiTE project (1994). The questions asked were

Sometimes people talk about "searching for truth." I'm not sure what they're talking about.

What are your views?

In learning about something you really want to know, what is the role of an expert?

Can you describe what you think good teaching is?

Can you tell me about how you perceive the relationship between teaching and learning?

Can you tell me about your views on who is responsible for learning?

Can you describe a teaching experience that you have had that was particularly good for you?

What did you do?

In the context of this study, beliefs about knowing refer to an individual's dominant or default beliefs. Student teachers were asked to comment on their beliefs in a global manner, rather than in a specific context. Therefore, it was expected that responses that were not focussed on a specific domain of knowledge would be indicative of their default or general beliefs about knowing. When asked to describe teaching, student teachers discussed teaching in terms of primary school children. The name and personal details of each of the participants have been changed to maintain confidentiality. Some quotes have been edited to improve readability. The two students, Collin and Cheryl, will now be discussed in terms of how his/her beliefs changed over the year. Beliefs about teaching will be compared with beliefs about knowing in order to investigate further the nature of their personal epistemological beliefs.

### *Collin*

Collin was 25 years old at the time of the study. He had completed a Bachelor of Business four years prior to commencing the Graduate Diploma in Education and had experience in tutoring primary school children, after school care and supervising holiday clubs for children. Throughout the two interviews, he described predominantly dualistic beliefs. This means that he believed that individuals received absolute (right/wrong and universal) truths from an external source. However, as the year progressed he did acknowledge that these truths could be discovered by individuals rather than being passed on by a teacher. Therefore, there was a move over the year from passive to active reception of

truths. The following excerpts from the first interview with Collin indicate his strong dualistic beliefs about knowing.

Beliefs about knowing. I feel that there are **right answers out there** and I'm not saying that I am always right, but if I am very happy with, like I am very sure of my opinion then unless someone can prove where my reasoning is wrong then I think that's the right answer.

Beliefs about teaching. I think good teaching is basically that students are interested in what they do and may be you keep them interested in learning more and also you get them to learn as well . . . **even with some understanding there is a degree of things you need to learn by rote.** (Interview 1)

Collin describes how he needs to help children to find the right answers for themselves, which reflects a more active view of how individuals receive truths. His views do not appear to have changed throughout the year. In fact when asked specifically about changes in beliefs during the final interview he had this to say:

Not really changed as much as being more, I don't know how exactly to say it, being able to describe it better. So it hasn't changed I have just learnt how to be able tell people that, or just understand it more myself. (Interview 2)

The difficulty experienced as a result of having to reflect in journal entries was evident throughout the year.

I don't really get much out of the journal entries. I don't think I have learnt a lot from using journal entries and it hasn't really modified how I would teach or anything like that. (Interview 2)

Individuals with more dualistic beliefs may find such reflection difficult. Reflective thinking may not be required for the simple cognitive process of assigning information to one category or another. Therefore, students may feel uncomfortable and possibly threatened, when asked to engage in higher order thinking that requires them to criticise, evaluate or express their own views (Beers, 1984). Schommer (1993) and Ryan (1984) reported that the more students conceived of knowing as dualistic, the more likely they were to gauge their understanding based on factual standards.

### *Denise*

Denise, 28 years of age, had completed a Bachelor of Environmental Science five years prior to starting the graduate diploma. Denise has children of her own and has been involved as a parent helper in her children's classrooms.

In interview 1, Denise held a mixture of beliefs about knowing that individuals construct reasoned truths and that absolute truths existed. She also held mixed beliefs about teaching that comprised both constructivist and transmissive views of teaching.

Beliefs about knowing. D: Truth to me is an absolute. So, yes, I think they are looking for a complete, "That's it. There's no question about it!" **I think there are right answers.** I think there are actual things where there is leeway in certain areas. I would say in some things there are absolutes.

Interviewer: What do you mean by "leeway in other areas"?

D: **Probably an example I think is whether you like blue or whether I like blue is completely irrelevant. You're not right and I'm not wrong.** You have to come back to how you relate it to the world and how you see the world as well. I can sit and listen to a lecture, **and what I get out of it and what someone else gets out of it can be two different things.** I would presume that the main key points should be similar. So everything above and beyond that, you would say, **"No, that's not completely true", or "That hasn't looked at that aspect of it."**

Denise seems to be espousing a range of beliefs about knowing- dualism, multiplism and a more reasoned construction of truth. By Journal Entry 3 there seems to be movement towards a focus on relativistic beliefs.

My reflections look to the experts, in the context of personal experience and reasoned logic. So I consider I also have a relativistic viewpoint because my writings reflect that children are individuals, situations change and discipline is dependent on many variables and that each style requires you to reason logically to discover its implications. (Journal Entry 3)

In Journal Entry 8 and Interview 2, the focus is more clearly on relativistic beliefs about knowing and constructivist perspectives of teaching, indicating further development in personal epistemological beliefs.

Beliefs about knowing. Change – **truth is different things to different people. Truth is based on a perspective of life experiences, what values you have, socially derived, changing not absolute.** The expert is a resource not finite, more concentrated information in one area. With children, in year 4 the expert (teacher) is always right whereas in Year 7 the expert can be wrong, challenge (teachers). Changed from dualistic to more relativistic and multiplicity.

Beliefs about teaching. Good teaching (involves) ongoing evaluation of practice and students, listening to students, continual learning. Teaching and learning is a two-way process. **Not imparting correct knowledge but allowing meaningful understanding to develop, allow experimentation and construction of knowledge and mutual respect. A teacher motivates, stimulates, facilitates.** (Journal Entry 8)

Denise has described a change in focus in her beliefs about knowing and teaching over the year. At the beginning she described some relativistic views on knowing but there seemed to also be quite a focus on more dualistic views as she herself acknowledged in a number of journal entries. However, throughout the year a clear change in focus towards relativistic beliefs about knowing and constructivist beliefs about teaching emerged.

## CONCLUSIONS AND TEACHING IMPLICATIONS

This work -in-progress has traced the development in beliefs about knowing and teaching for two pre-service teacher education students over a year-long teacher education course. These individuals were part of a larger group of student teachers who participated in a teaching program that was designed to help them to reflect on and possibly reconstruct their personal epistemological beliefs. Detailed investigation of these student teachers' beliefs throughout their interviews and journal entries revealed a paradigm shift for Denise, while Collin maintained more dualistic beliefs about knowing throughout the year.

It could be expected that student teachers who have more relativistic beliefs about knowing reflecting the construction of reasoned truths might also conceive of teaching as a process of constructing knowledge - a constructivist view. Similarly, those who hold more dualistic beliefs that individuals receive absolute truths, might be expected to conceive of teaching from a transmissive perspective where individuals tend to receive information rather than construct their own meaning. In this study, both student teachers' beliefs about teaching reflected their beliefs about knowing. The responses given by these two student teachers offers some support for the notion of a relationship existing between beliefs about knowing and beliefs about teaching, although it is not clear whether such consistency would be evident in a group of student teachers with a broader range of beliefs about knowing or if asked to reflect on a particular learning context. This will be investigated further with the analysis of other interviews and journal entries.

Teacher educators may need to encourage student teachers to reflect on their personal epistemological beliefs and to find ways to help them to focus on the relativistic aspects of such beliefs. However, it may also be possible to change student teachers' behaviour, which may then lead to a change in beliefs over time (Unger, Draper & Pendergrass, 1986). Assessment is a key factor in determining students' learning behaviour and subsequently beliefs about learning in particular contexts (Biggs, 1996a). Biggs (1996b) described constructivist alignment of teaching objectives and assessment procedures as a way to help students engage in meaningful learning. If constructivist teaching objectives are married with assessment approaches that complement these beliefs, then such alignment is likely to have a backwash effect and result in meaningful approaches to knowing and learning (cf. Biggs, 1996b). Constructivist alignment of assessment and objectives may help those student teachers with more dualistic beliefs to engage in meaningful learning to fulfil assessment requirements. Hence, a change in learning behaviour that is the result of assessment demands may help student teachers to focus on the more relativistic beliefs within their repertoire of beliefs.

Teachers need to be the driving force behind the paradigm shift in education, which is focussed on construction rather than reception of knowledge. However to facilitate such a change in education, many teachers may also need to undergo their own paradigm shifts. Teacher educators need to be aware of how

best to facilitate such changes in student teachers as future teachers in order to play their role in the evolution of beliefs about how best to educate children.

## REFERENCES

- Baines, L. A., & Stanley, G. (2000). 'We want to see the teacher': Constructivism and the rage against expertise. *Phi Delta Kappan*, 82 (4), 327-330.
- Baxter Magolda, M. B. (1993, April). The convergence of rational and interpersonal knowing in young adults' epistemological development. Paper presented at the Annual meeting of the American Research Association, Atlanta.
- Beers, S. E. (1984, March). An analysis of the interaction between students' epistemological assumptions and the composing process. Paper presented at the Annual Meeting of the Conference on College Composition and Communication, 35th, New York City.
- Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). *Womens' ways of knowing: The development of self, voice and mind*. USA: Basic Books.
- Biggs, J. B. (1996a). Assessing learning quality: Reconciling institutional, staff and educational demands. *Assessment and Evaluation in Higher Education*, 21, 1, 5-15.
- Biggs, J. B. (1996b). Enhancing teaching through constructivist alignment. *Higher Education*, 32, 347-364.
- Burr, J. E. & Hofer, B. K. (2002). Personal epistemology and theory of mind: deciphering young children's beliefs about knowledge and knowing. *New Ideas in Psychology*, 20, 199-224.
- Education Qld, 2010 Document. "Queensland State Education 2010"  
<http://education.qld.gov.au/corporate/qse2010/>.
- Hofer, B., & Pintrich, P. R. (1997). The development of epistemological theories: Beliefs about knowledge and knowing and their relation to learning. *Review of Educational Research*, 67, 1, 88-144.
- Kardash, C. M., & Scholes, R. J. (1996). Effects of preexisting beliefs, epistemological beliefs and need for cognition on interpretation of controversial issues. *Journal of Educational Psychology*, 88, 2, 260-271.
- King, P. M., & Kitchener, K. S. (1994). *Developing reflective judgment: Understanding and promoting intellectual growth and critical thinking in adolescents and adults*. San Francisco: Jossey-Bass.
- Kitchener, K. S. (1983). Cognition, metacognition and epistemic cognition. A three level model of cognitive processing. *Human Development*, 26, 222-232.
- Perry, W. G. (1970). *Forms of intellectual and ethical development in the college years*. New York: Holt, Rinehart and Winston.
- Perry, W. G. J. (1981). Cognitive and ethical growth: The making of meaning. In A. W. Chickering (Ed.), *The modern American college* (pp. 76-116). San Francisco: Jossey-Boss.
- Ryan, M. P. (1984). Conceptions of prose coherence: Individual differences in epistemological standards. *Journal of Educational Psychology*, 76, 1226-1238.
- Schommer, M. A. (1990). Effects of beliefs about the nature of knowledge on comprehension. *Journal of Educational Psychology*, 82, 3, 498-504.
- Schommer, M. A. (1993). Comparisons of beliefs about the nature of knowledge and learning among postsecondary students. *Research in Higher Education*, 34, 3, 355-370.
- T&LiTE. (1994). The Teaching and Learning in Tertiary Education (T&LiTE) Project. A report prepared for the Teaching and Learning Committee, Queensland University of Technology by the Research Concentration in Cognition in Learning and Development, School of Learning and Development, Queensland University of Technology.
- Tynjälä, P. (1997). Developing education students' conceptions of the learning process in different learning environments. *Learning and Instruction*, 7, 3, 277-292.
- Unger, R. K., Draper, R. D., & Pendergrass, M. L. (1986). Personal epistemology and personal experience. *Journal of Social Issues*, 42, 67-79.
- Windschitl, M., & Andre, T. (1996, April). Using computer simulations to enhance conceptual change: The roles of constructivist instruction and student epistemological beliefs. Paper presented at the Annual Conference of the American Educational Research Association, New York.