Chapter 19
Developing Relational Epistemology Through Relational Pedagogy: New Ways of Thinking About Personal Epistemology in Teacher Education

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Abstract Personal epistemology research over the past few decades has helped us to understand better the nature of effective learning and teaching in teacher education. However, personal epistemology has been based predominantly on psychological frameworks in which knowledge and beliefs are individually constructed. In this chapter, we present a social constructivist perspective on the development of epistemological beliefs in which beliefs are constructed through interactions with social and learning contexts. We argue for the term "relational epistemology" to be used rather than "personal epistemology" to better reflect the role that external and internal relations play in the social construction of epistemological beliefs. From this framework, we then report on research into early childhood professionals' beliefs that provide new ways of thinking about the referential and structural dimensions of relational epistemology and how these might be facilitated using an extended model of relational pedagogy in teacher education.

19.1 Introduction

The student population in higher education is increasingly characterised by diversity in socio-economic backgrounds, sexual orientation, gender, ethnicity, and ability. Such diversity requires new ways of thinking about tertiary teaching that might help students to manage the complexities of an ever changing and pluralistic world (Baxter Magolda & Terenzini, 2004). Kuhn and Udell (2001) suggest the goal of higher education should be to help students deal with these complexities by teaching the tools of wisdom, which include critical thinking. An important aspect of critical thinking is that students are able to reflect on and evaluate evidence and make informed decisions in their professional work. Thus, it is important that a focus on thinking processes, not just the curriculum content, is included in higher education to help

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students deal with ill-defined problems in complex settings. Kuhn and Udell argue that the beliefs which students hold about the nature of knowing and knowledge, known as epistemological beliefs, are the basis on which critical thinking can be promoted.

Within teacher education programmes, student teachers' epistemological beliefs are often not addressed (Nespor, 1987). In fact, teacher education has often been framed in terms of a factory model in which specific content and skills are expected to be demonstrated (Griffith & Benson, 1991). Similarly, Wood and Bennett (2000) believe that teachers' professional development has often been conceived of as a set of specific skills and competencies to be obtained at key points along a career pathway. These views do not acknowledge the importance of learning processes through which knowledge is personally constructed based on the evaluation of evidence. In teacher education programmes, it is increasingly apparent that we need to focus greater attention on the nature of beliefs of pre-service teachers that are known to influence practice (Lawrence, 1992; Pajares, 1992; Richardson et al., 1991; Wood & Bennett, 2000). Specifically, Wood and Bennett (2000) proposed that beliefs related to teachers' personal epistemology should be addressed in professional programmes. They suggested that teachers' professional learning is "inadequately theorised and there is a lack of clarity about the type of theoretical framework to guide their development" (p. 635). This chapter will theorise about teachers' professional learning using a social constructivist framework to explore new ways of thinking about personal epistemology. We then propose an approach to developing sophisticated epistemological beliefs in teacher education programmes through relational pedagogy.

19.2 Personal Epistemology

Personal epistemology refers to beliefs about knowing and knowledge at the individual level (Hofer, 2005). Kitchener (2002) described personal epistemological beliefs as "folk epistemology" or an individual's "untutored" views about the nature of knowledge (p. 89). Hofer (2005) defined personal epistemology as "an identifiable set of dimensions of beliefs about knowledge and knowing, organised as theories, progressing in reasonably predictable directions, activated in context, operating both cognitively and metacognitively" (p. 98).

Over the past few decades considerable research related to epistemological beliefs has suggested that beliefs evolve in complexity over time in the context of higher education. Personal epistemology influences a range of aspects of learning and teaching but education also influences personal epistemology (Hofer, 2004; King, & Kitchener, 2004). Early research by Perry (1970) showed that as students progressed through their university course they evidenced more sophisticated beliefs. At first, students described dualistic beliefs that reflected black and white, absolute knowledge. This absolute and categorical way of knowing meant that knowledge could simply be received from an external source without being evaluated. Once students realised that absolute truth did not exist, they came to believe

that their own opinion counted as knowledge and that conflicting views of truth may be equally valid. This was referred to as multiplism. Next, with the development of relativistic beliefs came an understanding that the individual is an active maker of meaning and knowledge is complex, tentative and evolving.

Many developmental models since the 1970s suggest similar trajectories in epistemological beliefs. For example, Kuhn and Weinstock (2002) described absolutism (reality is replicated), multiplism (personal opinions) and evaluativism (evidenced-based opinions). Bendixen (2002) indicated that individuals develop from "simple dichotomous views of knowledge" to beliefs that are "postrelativistic" (pp. 191–192) or evaluativistic in nature. However, not all theories propose such stage-like, unidimensional trajectories. Schommer (1993) described epistemological beliefs as multidimensional and independent which means that individuals can simultaneously hold both sophisticated (evaluativistic) and naive (objectivist) views about the nature of knowing and knowledge. The dimensions proposed by Schommer included (a) Omniscient Authority (beliefs in the source of knowledge), (b) Certain Knowledge (beliefs in the certainty of knowledge), (c) Simple Knowledge (beliefs in structure of knowledge), (d) Quick Learning (beliefs in the speed of learning), and (e) Innate Ability (beliefs in the stability of knowledge). These beliefs do not necessarily develop in unison and variously influence approaches to learning and learning outcomes.

Epistemological beliefs may also influence approaches to teaching (Brownlee, 2001b). Chan and Elliott's (2004) research demonstrated that epistemological beliefs influence teachers' judgments about what knowledge is important in particular learning situations. These beliefs mediated how a teacher processes and retains certain information thereby influencing how they go about teaching. For example, when teachers hold predominantly objectivist beliefs and knowledge is viewed as certain, transferable and not needing to be critiqued then teaching is more likely to be teacher-centred and transmissive. Alternatively, teachers holding evaluativistic beliefs view knowledge as constructed and evidenced-based so it is more likely they will be constructivist and learner-centred in their approaches to teaching (Arredondo & Rucinski, 1996; Berthelsen et al., 2002). Moreover, such teachers are likely to engage in critical thinking that is clear and mindful of others (Kuhn & Udell, 2001).

19.3 Relational Epistemology

Theories of personal epistemology described so far have often reflected psychological frameworks (Pintrich, 2002) whereby knowledge and beliefs are individually constructed. In this section, we argue that the development of epistemological beliefs is based on a social constructivist framework in which beliefs are constructed through interactions with others in social contexts. A considerable body of current educational research uses social constructivist theories as the platform for understanding teaching and learning. These theories "focus on the interdependence of social and individual processes in the co-construction of knowledge" (Palinscar, 1998, p. 345). Using the terminology of Kang and Wallace (2005), we will argue

for the term "relational epistemology" to be used rather than "personal epistemology" to better reflect the role that external (social) and internal (individual) relations play in the social construction of epistemological beliefs.

In social constructivist theory it is not possible to separate the internal from the external influences. However, it is possible to foreground one aspect whilst still being cognizant of the other (Palinscar, 1998). External relations are those that involve relationships between the self and others (including the learning environment). Internal relations are those connections made between new information to be learned and prior knowledge and beliefs. The 3 P Model of Learning proposed by Biggs (1993) can be used to inform understanding about a how epistemological beliefs are constructed through external and internal relations. Biggs's model identified three ordered sets of elements that influence individuals' learning. These are Presage factors (personal and situational), Process factors (approaches to learning) and Products (learning outcomes).

Students come to a learning experience with pre-existing epistemological beliefs, abilities, knowledge, motivations, and personality traits which are described in the Fig. 19.1 as Personal Presage Factors. These personal characteristics influence, and in turn are influenced by, situational presage factors which include social relations (engagement with peers and teacher, interpersonal climate) and learning contexts (nature of task, assessment). As a result, in any learning situation students develop a context-specific perception of a learning task. These *external* connections with the social and learning contexts influence both students' context-specific construction of knowledge and their approaches to learning (Process component of Model).

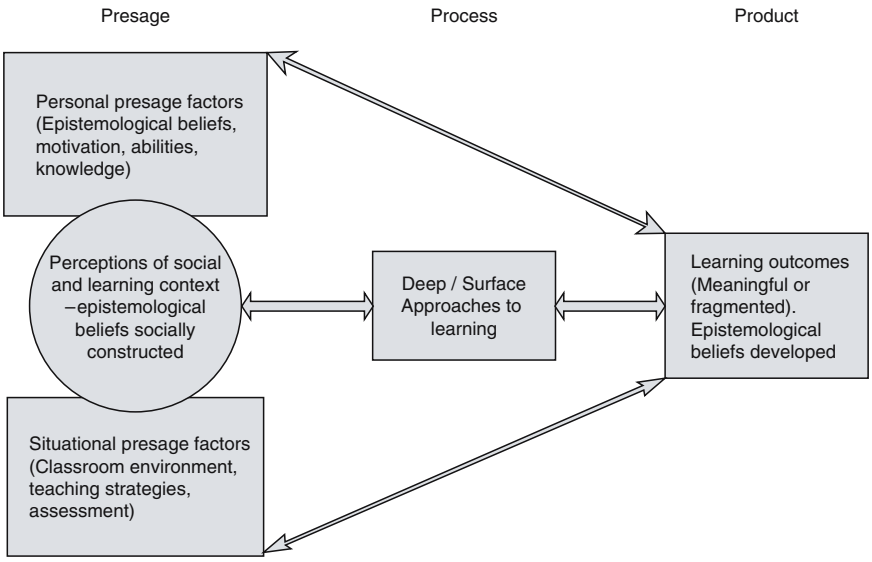

Fig. 19.1 The social construction of epistemological beliefs adapted from 3 P Model of Learning (Adapted from Biggs, 1993)

Brownlee (2001b) found that evaluativistic epistemological beliefs were related to deep approaches to learning, which require *internal* connections to be made between new information and pre-existing beliefs/knowledge. It is likely that deep approaches to learning will result in greater depth of understanding in a particular learning task and more likelihood of the development of an evaluativistic stance in the development of epistemological beliefs (Product component of the model). Students using surface approaches to learning often use repetition as a strategy to learn and are more likely to hold objectivist epistemological beliefs that focus on the reproduction of knowledge. Surface approaches to learning do not allow internal connections to be made between prior knowledge/beliefs brought to a new learning task and the new knowledge which the task was designed to achieve. Thus, learning outcomes are likely to be more superficial and fragmented and objectivist beliefs are reinforced (Product component of the model). Objectivist epistemological beliefs are still held and continue, as personal presage factors, to influence future learning.

Kang and Wallace (2005) also take a social constructivist view of epistemological beliefs by describing both internal and external relations in the construction of epistemological beliefs. They refer to epistemology as relational because of "the relationship between the knower and the known" (p. 142) which reflects the internal relations discussed earlier in this section. We would argue this might be restated as "relationships between *knowers* and the known" to capture more effectively the social nature of learning. However, Kang and Wallace also state that a particular "epistemological stance" (p. 143) is taken during the teaching–learning process as a result of existing epistemological beliefs and the specific learning context. This suggests that Kuhn and Wallace also see epistemological beliefs being constructed on the basis of external relations. Using Kang and Wallace's terminology, we argue that "personal epistemology" can be described as "relational epistemology" to reflect the role of both the external (social and learning contexts) and internal relations (individual connections between new and prior knowledge/beliefs) in the construction of epistemological beliefs.

We believe that, to date, epistemological belief research has focused on the referential or meaning of epistemology beliefs. In response to Schraw and Sinatra's (2004) and Hofer's (2005) call for research that investigates the nature of epistemological beliefs in more depth, we propose a more detailed analysis of relational epistemology. This analysis includes a focus on both the referential and structural dimensions of epistemological beliefs as a way to better understand how to promote the development of a more evaluativistic stance for students in teacher education programmes.

19.4 Referential and Structural Dimensions of Relational Epistemology

Any phenomenon, including epistemological beliefs, has both a referential (meaning) and structural (organisational) dimension according to Marton and Booth (1997). These dimensions are intertwined – meaning is dependent on structure and

vice versa. Using the phenomenon of "learning" as an example, an individual might think that learning is about observation by which one learns through modelling the behaviours of others. This is the referential dimension of that phenomenon for that individual. However, in order for something to have meaning it also needs a structure. The structural aspects include different elements that contribute to the whole conception of the phenomenon, in this case, a conception of learning. For example, individuals who think learning is about observation may describe a number of facets about how observation is implicated in learning and how these facets are related. So, observation might be described as the means through which individuals make meaning from their experiences or as the sequence of actions that allows individuals to reproduce observed skills. How these different aspects of observation are related to each other might also be described. Thus, an understanding of learning has both referential and structural dimensions and these are intertwined in the manner in which any individual makes sense of the phenomenon. To date, the epistemological beliefs research has primarily focused on the referential aspects of beliefs but both the meaning and the structure need to be considered to understand relational epistemology as a phenomenon. The referential and structural dimensions of relational epistemology will now be discussed in turn.

19.4.1 Referential Dimensions of Relational Epistemology

The referential dimension of epistemological beliefs is based on the relationship between knowers and the known. This means that how we assign meaning to the different types of epistemological beliefs (e.g., objectivist, multiplist, evaluativist beliefs) is informed by the extent to which individuals consider themselves to be receivers of knowledge disconnected from the meaning-making process or active constructors of knowledge connected to the meaning-making process (Kang & Wallace, 2005). The nature of the relationship between knowers and the known is the referential basis upon which epistemological beliefs are described as relational epistemology.

Over the last decade, our research has investigated the referential dimensions of epistemological beliefs in Australian childcare workers (Brownlee et al., 2006; Berthelsen et al., 2002; Brownlee & Berthelsen, 2004, 2006; Tickle et al., 2005). Some of these beliefs are similar to those already described in the literature, namely objectivism, multiplism, and evaluativism (Kuhn & Weinstock, 2002). However, recently we interviewed 77 pre-service childcare workers completing a 2-year full-time Diploma of Children's Services. Students were interviewed about their beliefs about knowing and knowledge using a scenario about a dilemma for childcare practice based on the work of Stacey et al. (2005). The scenario was used as a concrete stimulus to enable students to reflect on their epistemological beliefs in relation to the situation described. The semi-structured questions used in the interview about the scenario related to beliefs about knowing and knowledge as described by Hofer and Pintrich (1997).

In Australia, childcare workers are trained through Institutes of Technical and Further Education (TAFE) and private providers within the Australian Vocational Training and Education (VTE) system to teach young children in long day care settings. Across many industries, vocational programmes (e.g., for childcare) are based on nationally endorsed standards for recognising and assessing students' skills. It is a Competency-Based Training (CBT) approach to vocational training that places the major emphasis on what the person can do as a result of training (the outcome). Competences are role derived, specified in behavioural terms, and the assessment of learning requires performance as the primary evidence that learning has occurred (Smith & Keating, 2003).

A number of these students revealed new ways of thinking about epistemological beliefs that have not been evident in the epistemological literature to date. In addition to the beliefs typically reported in the literature, namely objectivist and multiplist beliefs, students described *complex* and *practical evaluativism* (Brownlee et al., 2006). In complex and practical evaluativism, there was an active process of analysis based on a critique of theoretical and practical evidence respectively. Each of these forms of evaluativism will be discussed now in more detail.

Complex evaluativism describes a set of beliefs in which knowledge is conceived of as tentative, evolving, and evidenced-based. The relationship between the knower and the known is such that multiple theoretical perspectives are actively considered, compared and a critique is made in order to arrive at an informed perspective. This construction of knowledge is the basis of an informed understanding or opinion and is similar to evaluativistic (Kuhn & Weinstock, 2002), relativistic (Perry, 1981), contextual (Baxter Magolda, 1993), and constructed (Belenky et al., 1986) ways of knowing as described in the literature. For example, Amanda indicated that theoretical knowledge needed to be analysed and evaluated in order to develop her own opinions.

> I suppose probably taking on board what the experts said, having a look at another source and seeing what they've said and probably try and come up with my own understanding of what they are trying to teach me. I don't know if anyone could be an expert in the area because it is always changing. You always learn more. There is always something that they haven't thought of. (Amanda)

Students with *practical evaluativistic* beliefs indicated that multiple perspectives were actively considered, compared and evaluated. However, these perspectives were not theoretically based but related to the vocational context. This indicated that there was a meaningful relationship between the knower and the known. However, the evidence they analysed was about experts' views about strategies for practice in the childcare field. These beliefs are referred to as *practical evaluativism* because the students did not analyse knowledge to create an "informed opinion or understanding" but rather analysed strategies to develop "informed practice". For example, Ashley indicated that he would analyse experts' experiences to see what would work for him.

> (If experts disagree)… the first thing I think is what works best for me… you just read over them a lot to see where they are coming from. Kind of think of what would happen if you actually used that. And even just sometimes reading a bit more background

> towards it… And, it is just looking at what they are basing it on; just kind of look at everybody's point of view because at some point they will work because they have obviously published it. (Ashley)

These practical evaluativistic beliefs were sometimes described in terms of practices that "felt right" to the student. Other students valued a "majority rules" approach. In this approach, students considered that they would base their practice on how many experts supported a particular teaching strategy. For example, Natalie thought that knowledge could be based on the consensus between experts' opinions.

> Research a bit more and see if anyone else disagrees with them. Or raise points [on] both sides and then if this side has more arguments … but this side also could be right. I think you should research the topic through many experts and if the opinion is the same or if it's all linked then you could use it. (Natalie)

Subjectivist beliefs were also noted in our research. These students believed that knowledge comprised personal opinions that did not need to be evaluated or evidenced-based. The relationship between the knower and the known is one of being separate from the meaning-making process. These students did not engage in a critique of other perspectives to create an informed perspective. They relied on their intuitive beliefs or personal opinion. These beliefs are similar to multiplistic (Kuhn & Weinstock, 2002), multiplism (Perry, 1981), transitional (Baxter Magolda, 1993), and subjectivist (Belenky et al., 1986) ways of knowing. For example, Nerida did not believe one could question others' opinions about teaching practices in childcare because children were so individual and any opinion about best practice could be valid.

> There are no right answers in child care, because you have to get out there and find things for yourself. Once again, textbooks aren't always right. You have to find out what works for you, what works for the children. You are obviously going to clash with some people with your opinions, but you just have to, like everything, take it on board and just respect that. You might not agree with it but their opinion is valid and it is up to you whether you take it on or just take it as just their opinion. (Nerida)

Finally, students with *objectivist* beliefs, described knowledge as able to be "given" to another. These beliefs are also commonly reported in the literature. There is no need to analyse evidence, but simply accept "truths" from others. The relationship between the knower and the known is one of being a receiver of knowledge and being separate from the meaning-making process. Students believed that they could rely on being given information from experts whose knowledge they believed was "right". These beliefs are similar to absolutist (Kuhn & Weinstock, 2002), dualistic (Perry, 1981), absolute (Baxter Magolda, 1993), and received (Belenky et al., 1986) ways of knowing. Sherree exemplifies this view of knowledge and knowing:

> Sheree: Everybody needs to be qualified so that they all know the same things and not applying different ways of doing things, and because it is somebody else's children. I think be qualified, so you can provide quality care and be true to the parents.
>
> Interviewer: I just want to try and make clear the link between the qualifications and being true to yourself and to the parents. How is that related to the concept of truth?
>
> Sherree: Because you are doing things the right way. It's not necessarily truth, but you're providing quality standard of care that you are meant to.

> Interviewer: How would you consider accreditation and those sorts of things as truths or are they separate from truth?
>
> Sherree: It's because they're right, that's what child care is run on. So it's like the right way.

To summarise, the referential dimensions of epistemological beliefs can be described as relational epistemology because of the way in which knowers relate to the information to be learned (the known) in social contexts. In complex or practical evaluativism, our research has demonstrated a connection with the meaning-making process through an active process of making a critique of theoretical and practical experiences respectively. It is not surprising that practical evaluativism is evident in the responses provided by these students. They were engaged in a CBT course which was focused on demonstrating specific skill outcomes in their learning. A CBT model of training is more likely to promote a relationship between the knower and the known which is more focused on the analysis of skills and strategies rather than theoretical knowledge.

The differentiation of evaluativism into complex and practical ways of knowing may help us to consider the impact of education and training on beliefs. More research is needed to explore how teacher education programmes facilitate practical evaluativistic beliefs and to what extent these beliefs change once students engage in professional practice. Does it matter that students are evaluating practice rather than knowledge when they are engaged in practice? What implications are there for how students conceive of their own learning and children's learning at the end of their pre-service teacher education programme? These are important issues that need to be explored further in relation to the model of training and education processes that students experience.

19.4.2 Structural Aspects of Relational Epistemology

To date, research on epistemological beliefs has focused on the referential aspects but, as indicated previously, both the meaning and the structure of epistemological beliefs need to be considered to make sense of relational epistemology as a phenomenon. The structural aspects of relational epistemology are now discussed as a way to extend our understanding of the phenomenon.

In a study of pre-service teacher education students, Brownlee (2001a, 2004) analysed the structural dimensions of epistemological beliefs using the Structure of Observed Learning Outcomes (SOLO) taxonomy (Biggs & Collis, 1982). There are five levels of organisation in the SOLO taxonomy which can be used to investigate the relationships between aspects (structure) of a particular phenomenon. These are

- Prestructural organisation which reflects no understanding of the phenomenon
- Unistructural organisation in which the learner focuses on a single aspect of the phenomenon under investigation

- Multistructural organisation in which the learner shows understanding of a number of aspects of the phenomenon but does not make connections between those aspects
- Relational organisation in which individuals are able to differentiate the various aspects of the phenomenon and relate these aspects in a way that develops a coherent whole
- Extended Abstract organisation where a relational understanding of the phenomenon is able to be applied to understanding an entirely different domain of knowledge

Brownlee (2001a, 2004) found that a *Unistructural* organisation was usually evidenced by individuals who held objectivist epistemological beliefs. They described knowledge as absolute and categorical. In the following example, the student espoused beliefs about knowledge as absolute and universal. This organisation of her beliefs was consistent across the entire interview:

> Things that are pretty much laid out as in, "I believe in absolute truths".… The best way I can give it is as an analogy – if you have a white board and you look at the white board it is white but if somebody else looks at the white board through rose coloured glasses they think it is rose where in fact it hasn't changed the fact that the white board is still white. (Brownlee, 2001a, p. 286)

Individuals with subjectivist beliefs discussed knowledge in absolute categorical terms (objectivism) and as personal opinions (subjectivism). There was no relationship evident between these sets of beliefs. This was considered as *multistructural* organisation. It was if these individuals held conflicting and separate beliefs about knowing throughout their interviews, as evident in the following example.

> I still think that there are some things that are, you know obviously true, maybe like some of the maths. Like some things are black and white but generally truth still for me comes from taking what is around you and putting your own interpretation on lots of things. So I guess you are listening to other people and making some judgements I suppose about what you believe about that. (Brownlee, 2001a, p. 286)

Finally, individuals who evidenced evaluativistic beliefs about knowledge throughout their interview often referred to a range of beliefs (evaluativism, subjectivism, and objectivism) but there was an integrating theme to their beliefs across the interview. They kept returning to the view that there was not a single reality and that reality was a personal construction based on evidence. This was a *Relational* structure in beliefs with a common theme of evaluativism.

> I think that is all tied in with my beliefs about not being an absolute right or an absolute wrong and people are entitled to their own opinions as long as their opinions are valid, are reasoned out. They are not just an opinion off the top of their head. They have actually reasoned out their opinions and said well I think it is because of such and such; so I think knowledge is a very personal thing as well. (Brownlee, 2001a, p. 286)

The phenomenon of epistemological beliefs has been described so far as relational epistemology. The referential aspect of relational epistemology reflects the relationship between the "knower and the known" (Kang & Wallace, 2005, p. 142) in which connections are made, or not, to the learning object. The structural

aspect of relational epistemology reflects the extent to which the various types of epistemological beliefs are related to each other within the epistemological belief system.

19.5 Developing Relational Epistemology Through Relational Pedagogy

Using this understanding of the meaning and structure of epistemological beliefs, how can we promote the development of relational epistemologies in students who are participating in pre-service teacher education courses? Such epistemologies are likely to result in more effective learning outcomes for these students as a result of their studies which, in turn, will promote better quality of practice in their future work with their own students. Teaching in higher education programmes needs to promote stronger connections between "the knower" and their existing beliefs and "the known" through internalisation of new knowledge that is evaluated and understood in a critical way. This involves active meaning-making through weighing available evidence in a knowledge domain in order to arrive as a personally reasoned stance about the knowledge that will be used to inform professional practice. Educators in tertiary education programmes who are preparing pre-service teachers for their professional work can facilitate relational epistemologies through strategies proposed by Baxter Magolda and Terenzini (2004) that include:

- Modelling an informed critique of knowledge and how evidence can be weighed
- Assisting students to practise their skills for evaluating knowledge in a collaborative learning community
- Explicitly acknowledging and being inclusive of the complexity and subjectivity of knowledge

Such active and socially constructed processes to teaching in higher education programmes require encouragement to students to:

- Reflect on their personal experiences
- Explore new ideas in a critical way
- Integrate new understandings into their existing beliefs and knowledge
- Practise using new knowledge in their professional training course

These processes are elements of what Baxter Magolda (1996) described as relational pedagogy where self and theory are interconnected. Such constructivist approaches to teaching in professional higher education programmes support the development of evidenced-based epistemologies by helping students connect and make a critique of personal experiences and theoretical knowledge (Baxter Magolda, 1993). To help students to develop such relational epistemology, educators in professional programmes must value and respect learners' prior knowledge and their style of learning (King & Kitchener, 1994), as well as supporting students to make new links between theory and personal experience.

In summary, relational pedagogy can engage students to move towards more evaluativistic thinking as they learn that knowledge is constructed through making a critique of theoretical knowledge and understanding links between their current and previous experiences. It is relational in the sense that it focuses on both a respectful *external* relationships between teacher and student and an *internal* knower–known relationship of "connecting the self to the knowledge construction process" (Kang & Wallace, 2005, p. 142). The external and internal relationships described earlier in regard to relational epistemology are supported through the focus on external and internal connections in a relational pedagogical approach.

The concept of relational pedagogy will now be extended to include epistemological beliefs reflection (both explicit and implicit) and the development of critical inquiry skills as part of a relational pedagogical approach to teacher education.

19.5.1 Epistemological Beliefs Reflection in Relational Pedagogy

Within an approach to teaching based on relational pedagogy, we advocate for an explicit and implicit focus on epistemological beliefs to promote effective learning. There is a substantial body of research that suggests that interventions which focus *explicitly* on the referential elements by engaging students in a process of reflection on their own beliefs may assist in the development of epistemological beliefs (Brownlee et al., 2001; Cano, 2005; Lyons, 1990; McLean, 2001; Nist & Holschuh, 2005; Schommer, 1994; Stacey et al., 2005). Students "who demonstrate more naive core beliefs about knowing on entry into tertiary studies may need individual instruction in the nature of knowledge, as well as study strategies. For the majority of students, epistemological instruction incorporated within first-year introductory courses is likely to enhance their outlook on the nature of knowledge and learning" (Schommer & Walker, 1997, p. 184). It is important for students to understand that sometimes evidenced-based thinking is needed to think critically and deal with ill-defined problems (Kardash & Scholes, 1996; Kuhn & Udell, 2001).

While some research suggests that explicit reflection may be productive in developing epistemological beliefs, to date there have been no reports of interventions which have also encouraged explicit reflection on the structural aspects of epistemological beliefs. This means that, in order to develop relational epistemology, teacher educators may need to encourage students to explicitly reflect, not only on the referential nature of their beliefs, but also on how a range of beliefs might be related (Brownlee, 2001a). For example, how many different types of beliefs about knowing and knowledge do the students hold and what is the focus of their beliefs? Are there structural relationships between the beliefs? Are there themes that connect these beliefs?

Relational epistemological beliefs can also be influenced by an *implicit* or indirect focus on epistemological beliefs. This involves the use of assessment and teaching strategies that encourage students to engage in approaches to learning that are reflective of sophisticated beliefs. Such indirect approaches rely on how teacher

educators themselves conceive of knowing and knowledge. Schommer-Aikens (2004) suggested that teachers' epistemological beliefs influence the nature of teaching and assessment and subsequently the development of their students' beliefs. For example, if a teacher with evaluativistic beliefs uses assessment and curriculum that require students to integrate and make a critique of knowledge, students may come to understand that knowledge is tentative and uncertain and must be evaluated. Thus, students may take on a particular "epistemological stance" (Kang & Wallace, 2005, p. 143) based on experiences within the learning context in which they are participants.

Brownlee et al. (2001) implemented a teaching programme designed to focus implicitly and explicitly on the development of epistemological beliefs. Twenty-nine graduate pre-service teacher education students completed a year-long unit on educational psychology. Apart from explicit reflection on the nature of beliefs through the use of journals and interviews, an implicit focus was created through the use of integrated curriculum. The educational psychology content was integrated using epistemological belief theory. For example, students discussed the topic of behaviour guidance from a range of different theoretical perspectives but also considered how a teacher's epistemological beliefs might influence how they guided children's behaviour in the classroom. This process took place for all topics covered in the subject. An integrated view of knowledge for the course content was therefore provided by encouraging students to link tutorial content to an epistemological beliefs framework. This was described as a *relational curriculum* (Brownlee, 2004) and was used as a way to indirectly model sophisticated views about knowing and knowledge.

19.5.2 Skills of Critical Inquiry in Relational Pedagogy

Baxter Magolda and Terenzini (2004) suggest that, apart from encouraging students to reflect on their epistemological beliefs, students need to be supported to practise the skills needed to reflect in an epistemologically sophisticated way. These include strategies to search for relevant information and select, analyse, and weigh the evidence from different sources to develop reasoned responses, rather than relying on personal opinions or accepting experts' views uncritically. Effective, relational pedagogy needs to focus on both *beliefs* (referential and structural dimensions) and incorporate *strategies* that are likely to enhance the development of a relational epistemology.

Stacey et al. (2005) developed an intervention that was designed to focus on beliefs and the strategies associated with relational epistemology. Students in their third year of a 4-year Bachelor of Education (Early Childhood) programme undertook a compulsory research methods unit specifically designed to develop epistemological beliefs. The unit covered a range of topics related to research knowledge and skills (e.g., research paradigms, data collection techniques, data analysis strategies, assessment of the validity and trustworthiness of data, and conducting literature

reviews in a knowledge domain). The assessment approach within the unit of study was a formative and summative report on a small scale research study that encouraged students to develop skills for critical analysis of evidence. In the research study, students interviewed a critical friend about their epistemological beliefs at the beginning and end of the semester-long unit. Stage 1 of the report was essentially a research proposal that required the submission of a critical literature review (drawing on theory and research related to epistemological beliefs and teacher education) and a methods section. Stage 2 was the final research report that required a revised literature and method sections (after feedback from lecturers) as well as the analysis of the findings from the student interviews.

All students completed the Epistemological Beliefs Questionnaire (EBQ) (Schommer, 1998) at the beginning and end of the semester. The analysis of belief change from the beginning to the end of the semester indicated that students were more likely at the end of their course to see knowledge as integrated and related to effort rather than dependent on innate ability. They were more likely to believe that a critique can be made of experts' knowledge. The study showed that explicit reflection on epistemological beliefs and a structured approach to developing the skills needed for critique of evidence assisted students to develop more relational epistemological beliefs. More research is needed, to determine how explicit reflection and skill development contributes to changes in epistemological beliefs.

19.6 Towards an Extended Model of Relational Pedagogy in Teacher Education

A common goal for teacher education is to assist teacher education students to be able to enact sophisticated relational epistemology in diverse and often complex teaching and learning environments. To promote belief change, pre-service teacher education students need to be able to explore and articulate their personal beliefs about teaching and learning that may have been developed prior to their entry into their higher education programme. They need to be supported to become critical thinkers by developing the skills to evaluate different sources of evidence stemming from the theory and research (Kuhn & Udell, 2001). We need to change our approach to teacher education so that it reflects relational pedagogy. With an explicit and implicit focus on epistemological beliefs and skills, relational pedagogy holds promise as a conceptual platform on which to base future research on the outcomes of teacher education programmes.

An extended model of relational pedagogy for teacher education is presented in Fig. 19.2. It provides a description of how relational pedagogy can promote relational epistemology using a social constructivist theory. From this perspective, epistemological beliefs are constructed in a social context, rather than as an individual process of construction of meaning. This model evolved by first adapting the 3 P Model of Learning (Biggs, 1993) to apply to teaching, which resulted in the *Relational Model of Teaching* (Brownlee, 2004). The Model was then further

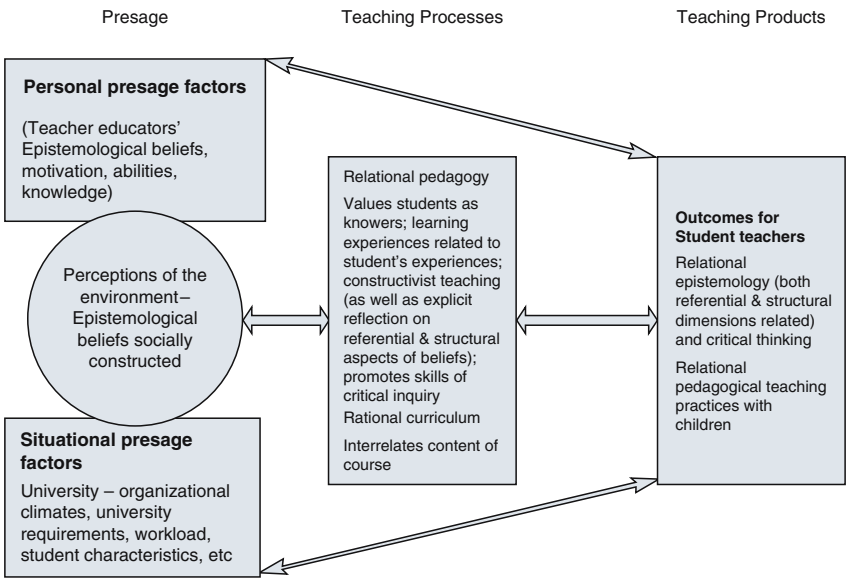

Fig. 19.2 Model of relational pedagogy in teacher education (Adapted from Brownlee, 2004 and Biggs, 1993)

extended by incorporating skills for critical inquiry as an important aspect of relational pedagogy (the Process component of the model).

In this extended model, Relational pedagogy (Process component of model) draws on the constructivist teaching approaches originally described by Baxter Magolda (1996) in which students' beliefs are respected in the learning context and learning experiences are connected to prior experiences in a social context. However, we have also argued that relational pedagogy should include explicit reflection on referential and structural aspects of beliefs as well as the use of an implicit focus on epistemological beliefs through relational curriculum (Brownlee, 2004).

Relational pedagogy is influenced by personal and situational presage factors, as indicated in the Model. Teacher educators' own beliefs are acknowledged as an important presage factor, in addition to other factors such as knowledge, abilities, motivations, etc. Their work context can facilitate or impede the implementation of relational pedagogical approaches in higher education programmes. Situational presage factors, such as expectations of their students and characteristics of the students, as well as the organisational and cultural climate of their work setting impact on their own epistemological development (Personal presage factor) and subsequently how their beliefs are enacted in practice (Process: Teaching approach). For example, a teacher educator with more sophisticated epistemological beliefs and a knowledge of constructivist teaching strategies (Personal presage factor) who interacts in a university culture of support and innovation (Situational presage

factors) is more likely to enact evaluativistic epistemological beliefs and be able to engage in relational pedagogy and curriculum (Process: teaching approach). Relational pedagogy and curriculum are likely to result in stronger learning outcomes for student teachers (Products: professional practice outcomes) that include the development of a relational epistemology to inform their professional practice in the future (becomes a Personal presage factors for future learning).

19.7 Conclusion

This paper has argued for personal epistemological beliefs to be considered as relational epistemology and for the development of such beliefs through the implementation of relational pedagogy in teacher education. The argument is made that quality teacher education courses should support teaching and learning processes in higher education through explicitly and implicitly addressing epistemological belief and strategy change. The conceptualisation presented proposes a theoretical shift from the individualistic view of personal epistemology to a social constructivist view of epistemological beliefs which links internal and external relations. The paper presented a view of learning in relation to change in epistemological beliefs drawing on the 3P Model of Learning proposed by Biggs (1993), as well as drawing on this model to develop a model for relational pedagogy that is socially and contextually situated.

A process of change in teachers' thinking about their practice is required by the increasing recognition that teaching is a complex and multifaceted process. Teacher education courses need to stimulate reflective and critical thinking about practice as necessary preconditions for effective learning outcomes. Better learning outcomes for students in teacher education courses ultimately lead to better learning outcomes for children in classrooms. Greater importance needs to be attached to the need for pre-service teacher education students to articulate and develop their theories and beliefs about teaching and learning through their course of study and become critical and reflective thinkers in their professional practices.

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