Investigating Epistemological Beliefs in Vocational Education for Child Care Workers: New Ways of Thinking about Learning and Training

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Abstract

Epistemological beliefs (beliefs about knowing and knowledge) have provided interesting insights into effective teaching and learning in higher education over the last 30 years. However, to date, little research has taken place in regard to teaching and learning in the technical and further education (TAFE) context in Australia. Seventeen 1st and 2nd year child care students studying for a Diploma in Children's Services were interviewed about the nature of their epistemological beliefs. The findings revealed new ways of thinking about evaluativistic beliefs, described as "practical evaluativism". These beliefs may have implications for the way in which students evaluate theory and practice for implementation in their own child care practice.

Background

Many governments are increasingly aware of the importance of provision of child care services for workforce participation and also the importance of quality child care for positive outcomes for children. Positive short- and long-term developmental outcomes are dependent on the quality of care experienced rather than the type of care (Shonkoff & Phillips, 2000). The quality of child care is an issue of concern in Australia

because it is not always considered to be of a consistently high standard and lower standards of child care quality are more likely to be evident in corporate child care chains than in community and independent private centres (Rush, 2006).

There is also a growing body of evidence indicating that quality child care is associated with the level and specialisation of child care workers' qualifications (Campbell & Milbourne, 2005; Vandell, 2004). Responsive, sensitive, stimulating interactions with children (Kreader, Ferguson & Lawrence, 2005) as well as effective organisation of materials and provision of appropriate activities (Vandell, 2004) are all related to levels of qualifications and training. However, some research linking qualifications to practice is less convincing. Tout, Zaslow and Berry (2006) report on studies in which teachers with bachelors degrees did not necessarily demonstrate high quality care and indicated that there is a need to examine what actually facilitates effective practice from qualifications. Pianta (2006) also reported that links between professional preparation and quality were not always clear. He described the research evidence as mixed and weak and goes on to suggest that this demonstrates that professional preparation is not effectively ensuring quality in child care. There is some evidence that teacher's knowledge and psychological characteristics (e.g., beliefs) are linked to child care quality, although little research has focused on these aspects of quality care (Pianta). Thus, to promote sound outcomes for children we need to investigate the training of child care workers (Karp, 2006), in particular their pre-existing beliefs and cognitions.

Vocational education

In Australia, most child care workers employed in centre-based child care are trained through Technical and Further Education (TAFE) colleges and private providers within the Vocational Training and Education (VTE) system. Since the establishment in 1996 of Australia's National Training Framework, training packages have been used to provide broad training frameworks and tools for the development of training programs to meet the needs of industry (Simons, Meyers & Harris, 2003). According to Simons et al. these packages aim to specify outcomes (competencies) rather than prescribed courses of work to be followed, allowing for more flexibility in training. They use competency standards that include skills, knowledge and dispositions for effective workplace learning outcomes (Hackett, 2001).

In the past, the focus on competencies has been criticised for its narrow, behaviourist skills (Smith, 1999) and modularised, segmented knowledge (Simons et al., 2003). It was argued that such competencies merely encouraged trainers to mark off competencies as having been achieved or not and that this narrow focus on skills ignored other dimensions such as the social, emotional and spiritual aspects of learning (Arnold & Ryan, 2003). With this in mind, Hackett (2001) and Schofield and McDonald (2004) advocated for a broader view of competencies which, in addition to a skills focus,

included critical reflection on knowledge. Schofield and McDonald described this broad view of competency as "effective performance in employment; application of skills and knowledge within and across a number of work contexts and contingencies; ability to transfer skills and knowledge across and within work contexts and within a changing context over time; and (where relevant) a combination of higher order skills" (p. 17).

The child care training package, like other training packages, provides the framework for these broader, critical approaches to learning to take place. Any difficulties experienced in the past with learning as narrow, fragmented, and skills-focused are not related so much to the training package itself, but to the "quality of the *interpretation* of the package, the skills of the trainer and the abilities of the learners" (Simons, et al., 2003, p. 27). This means that apart from the focus on obtaining industry approved qualification, we now need to pay attention to the professional development of trainers for effective interpretation of the training packages.

In addition to assessment using competencies, graded assessment is being trialled in certain states in Australia with an increasing interest at both the national and state level (Department of Employment & Training, 2005; Williams & Bateman, 2003). Graded assessment is characterised as being criterion-referenced, supplementary to competency-based assessment, transparent and optional for students. This form of assessment focuses on reporting the different levels of quality of performance and knowledge within the competencies (Department of Employment & Training). Currently, Queensland is trialling an approach to graded assessment known as PLA (Performance Level Assessment) and the child care training package is part of this trial (Department of Employment & Training).

In the child care training context, a focus on both competencies and graded assessment PLA is expected to encourage broader, reflective learning processes. PLA requires students to explicitly reflect on practices in order to meet the following criteria: "reliability and responsibility", "originality, creativity and innovation", "initiative and autonomy", "resource planning and use", and "depth and breadth of knowledge and skills acquired". Graded assessment has the potential to reward excellence by providing more information to students about their learning outcomes which can have a motivating effect (Watson, 2006; Williams & Bateman, 2003). However, there does not seem to be any debate taking place about the nature of learning and the broader learning outcomes as advocated by Hackett (2001) and Schofield and McDonald (2004).

Karp (2006) suggested that the training of child care workers is crucial in promoting quality in child care. In particular, pre-existing beliefs and cognitions are important to consider in the professional preparation of child care workers (Pianta, 2006). A significant and yet under researched set of cognitions in child care training are those

beliefs about the nature of knowledge and knowing, or epistemological beliefs. Over the last 30 years, research into epistemological beliefs has offered insights on how best to promote effective teaching and learning, particularly in academic contexts across a range of disciplines. However, little research has taken place in training contexts and none in the area of early childhood training.

Epistemological beliefs

Epistemological beliefs are those beliefs held by individuals about the nature of knowing and knowledge (Hofer & Pintrich, 1997). A wide variety of epistemological belief research has consistently similar developmental trajectories in these beliefs. For example, Perry (1970), Belenky, Clinchy, Goldberger and Tarule, (1986), Baxter Magolda (1994), and Kuhn and Weinstock (2002) all noticed a similar pattern of change in epistemological beliefs over time in their samples. In this trajectory, to begin with, individuals hold *absolutist* epistemological beliefs about knowing. This means that they are more likely to have a predominantly "black and white" view of knowledge where knowledge is conceived of as absolute, unchanging and not needing to be examined because the source of knowledge simply transmits the "right" information to the individual. Next, individuals with *multiplist* views see knowledge as based on personal opinions because they no longer believe that knowledge can be black and white and transferable to a learner. Even though multiplism implies that knowledge is personally constructed, there is no requirement to validate such opinions. Knowledge remains personal, intuitive and unexamined. Finally, individuals with *evaluativistic* beliefs about knowledge, like those who hold multiplist views, acknowledge that knowledge is personally constructed but an evaluativist must weigh up evidence to construct this understanding. From this perspective knowledge is evolving, tentative and evidenced-based. According to Penn (1999), such flexible, evidenced-based approaches to learning and knowing, are necessary for promoting quality child care practices. From such an epistemological framework, child care workers would be more inclined to reflect on different perspectives to develop informed practice rather than relying on unexamined personal experiences (multiplism) or experts' knowledge (objectivism). Hence epistemological beliefs may impact on teaching practices (see for example Arredondo & Rucinski, 1996).

Apart from the relationship between epistemological beliefs and teaching practice, clear links also have been established between epistemological beliefs and individuals' conceptions of learning. For example, Brownlee's (2001) study indicated that preservice teacher education students with evaluativistic epistemological beliefs were more likely than students with objectivist beliefs to describe learning as a process of making meaning. These views of learning are known as qualitative conceptions of learning because learning is not merely an internal representation of an external phenomenon, but rather new information is transformed by the connections made to

the learner's pre-existing knowledge. Such transformative learning involved linking new theory with prior knowledge and experiences to construct personal meaning. Marton, Dall'Alba and Beatty (1993) referred to these qualitative or transformative conceptions of learning as *Understanding, Seeing something in a different way,* and *Changing as a person.*

Hammer (2003) described similar connections between epistemological beliefs and learning in physics students. He noted that students with objectivist epistemological beliefs saw physics as discrete items of information which did not bear any relation to everyday thinking and saw learning as reproductive. This means that learning was conceived as a process of reproducing disconnected bits of information without making any personal links to previous knowledge. These are referred to as quantitative conceptions because the focus is on aggregating pieces of information without making connections for personal meaning. Marton, Dall'Alba and Beatty (1993) described quantitative conceptions as *Increasing one's knowledge, Memorising and reproducing* and *Applying.*

These studies indicated links between epistemological beliefs and beliefs about personal learning or conceptions of learning. However, Doverborg and Pramling (1996) also indicate that links between epistemological beliefs and beliefs about children's learning are critical for practice. Brownlee and Berthelsen (2004) demonstrated links between child care workers' epistemological beliefs and beliefs about children's learning. They noticed that child care workers who described evaluativistic beliefs also held beliefs that children learnt through active construction of knowledge. Conversely, child care workers who were described as holding subjectivist beliefs were more likely to think that children learnt through modelling and physical activity of some sort. Children in constructivist child-centred environments are more likely to have increased motivation, decreased stress and increased problem solving and language skills compared with children in teacher-centred teaching environments (Daniels & Shumow, 2003).

In this paper, we examine an extended framework for investigating child care workers' epistemological beliefs. This framework draws on research about general epistemological beliefs and considers the relationship between beliefs about knowing and personal learning, as well as the relationship that connects epistemological beliefs to children's learning as identified by Brownlee and Berthelsen (2004). Schommer-Aitkens (2004) proposed that epistemological beliefs are "core" beliefs that act as filters for other beliefs. The analysis examines this proposition and considers the congruency between the nature of participants' beliefs about personal learning, children's learning and beliefs about knowing.

The Study

The aim of this research was to investigate the nature of epistemological beliefs in a sample of pre-service child care students. All 1ˢᵗ and 2ⁿᵈ year students completing a Diploma of Children's Services at a TAFE Institute in a large metropolitan area in Australia were invited to participate in this interview study. The students were selected because of pre-existing professional connections with the Institute and, thus, constituted a convenience sample.

Context

These students were studying to become group leaders in child care centres. Group leaders are responsible for the direction of a group program in a child care centre and would normally be expected to hold a Diploma of Children's Services which is a 2 year full-time, post-secondary qualification. Students who complete the first year of the course are awarded Certificate 111 in Children's Services which qualifies them to become assistants in child care programs. The Diploma is awarded on completion of the second year of their studies. As part of the course students are required to participate in field placements for one day per week (except for the first 5 weeks of semester) in addition to a 2 week block per semester.

The course content includes prerequisite study (e.g., Identify and respond to children and young people at risk of harm; health and safety); compulsory modules (e.g., Supporting the rights and safety of children within duty of care requirements); and electives (e.g., Provide experiences which facilitate children's expressive development) all of which have a strong practical focus. Many units of competency demands both "on the job" and "off the job" evidence of learning. Practical evidence of competency on the job might include planning appropriate experiences while evidence of off the job learning might consist of theory-based assessment such as assignments, research papers, practical exercises, and group presentations.

PLA (performance level assessment) is also used in this particular Institute of TAFE. PLA provides students with opportunities to provide evidence at the proficient, credit or distinction level in the five criteria of "reliability and responsibility", "originality, creativity and innovation", "initiative and autonomy", "resource planning and use", and "depth and breadth of knowledge and skills acquired". In order to receive a graded PLA, students must first be rated as competent according to the CBT requirements. At the conclusion of the unit of study, students receive both a CBT and PLA result.

The interviews

During a regular lecture time slot, 29 students were invited to participate in the study and were provided information packages and consent forms. Those who signed the

consent form were invited to allocate themselves to an interview time in the following week. Nineteen students participated in the interview process, of which two interviews could not be used due to technical problems.

Of the seventeen interviews available for analysis, seven participants were in the 1st year of their course, while ten were completing the 2nd year of their vocational training. Four 1st year and six 2nd year students were between the ages of 15-19. Three 1st and four 2nd year students were aged between 20-29 years of age. None has children of their own, only one student held a previous qualification and four students had previous experience working with children.

The students were interviewed about their beliefs using the extended framework for epistemological beliefs which included beliefs about children's learning, personal learning and knowing. The questions included:

Beliefs about children's learning How do you think children develop knowledge/ learn? Can you think of an experience you have had with a child where you really noticed that he or she had learnt something? How do you know when children have learnt something?

Beliefs about their personal learning How would you go about learning something that you needed to know that would help you to be a group leader? How do you know when you have learnt something? So can you tell me now what you think learning is for you?

Beliefs about knowing (epistemological beliefs) What are the most important sources of knowledge that influence your practice as a teacher in early childhood? What sources have you used? How do you use these sources of knowledge? What sources of knowledge do you most trust? Do you agree with the idea that there are no right answers in early childhood practice and that anybody's opinion is as good as another's? Can an opinion be better than another in early childhood? These questions were adapted from the work of Belenky et al. (1986).

The audio-taped interviews took between 30 to 60 minutes, took place on location at the TAFE Institute, and were transcribed verbatim.

Analysing interviews

Content analysis was used to carefully examine and interpret the interviews for "patterns, themes, biases and meanings" (Berg, 2007, p. 304). Both deductive and inductive approaches to data analysis were used which is a common approach in content analysis (Berg). A deductive or theory-driven approach was used to categorise responses

regarding beliefs about knowing and beliefs about personal learning, while an inductive or data-driven analytic approach was used to examine beliefs about children's learning.

Both beliefs about knowing and beliefs about personal learning have long and robust research traditions spanning the last 30 years, with clear categorisations of beliefs emerging over many studies. With regard to the developmental epistemological beliefs research, the categories of *absolutism, multiplism* and *evaluativism* (Kuhn & Weinstock, 2002) have emerged over time in many studies in one form or another. In this study we used this same set of categorisations to analyse our data, but changed the terminology to *objectivism, subjectivism* and *evaluativism* respectively for what we considered to be clearer meaning. A deductive approach to analysis was also used to examine beliefs about personal learning. This is another area which has a long research tradition. The categories described by Marton, Dall'Alba and Beatty (1993) as *acquisition, recall, application, understanding,* and *seeing different perspectives* have emerged in many studies over time (e.g., Marton, Dall'Alba & Beatty, 1993; Säljö , 1979; Watkins & Akande, 1994) and were used as a rubric for analysis in this study. However, while a deductive approach was used, the researchers remained open to any variations that might emerge in the application of these categories. These categories of beliefs about knowing and personal learning, and the variations, are discussed in detail in the Findings.

Inductive analysis was used to describe beliefs about children's learning. Very little research has investigated what teachers think about children's learning and so in the absence of any robust pre-existing categories, an inductive approach to analysis was used. The categories that emerged from the interview analysis included *observing and recall*; *observing and meaning making*; and *meaning making*. These will be discussed in detail in the next section.

In order to promote credible findings, the categories that either emerged from or were applied to the data were subjected to dialogic reliability checking (Akerlind, 2005). In this form of peer debriefing, the goal is to reach consensus by discussing and critiquing both the data and how each researcher has arrived at the categorisation decision. A second researcher had expertise in the analysis of epistemological beliefs interviews. She was provided with the categories that were used in analysis (both the rubrics and the emergent categories) and asked to use them to re-analyse all of the interviews, blind to the previous researcher's categorisation. Agreement was reached on 94% of the beliefs about children's learning categories, 88% of the beliefs about personal learning categories and 88 % of the beliefs about knowing categories. Where disagreement occurred there was discussion until agreement was reached between the researchers to arrive at a final categorisation.

After the interviews were analysed for beliefs about children's learning, personal learning and knowing, the next step was to consider how each of these categories of beliefs related to each other for each participant. This provided a holistic account of each student's beliefs that was considered to constitute a profile of beliefs across the three areas. For example, Alice described her personal learning as understanding. She thought that children learnt by observing and then using that information to create personal meaning. Her beliefs about knowing were described as evaluativistic. So in each of the categories of learning and knowing she described an overall profile of beliefs that related to constructing meaning. The profiles were described by using the category label that related to beliefs about knowing because there is evidence to suggest that epistemological beliefs are "core" and act as filters for other beliefs and knowledge (Schommer-Aitkens, 2004).

Findings

The categories of beliefs about children's learning, personal learning and knowing that emerged in this study are first presented to provide detailed descriptions of each of these beliefs. The overall belief profiles of 14 students are then discussed to enable consideration of the links between epistemological beliefs and learning (both personal and children's learning).

Beliefs about children's learning, personal learning and knowing

A range of beliefs about children's learning, personal learning and knowing were described by the students in this study and are presented in summary form in Table 1. Each category will then be described in detail using exemplars from the interview responses.

Beliefs about children's learning Children's learning is . . .	Beliefs about personal learning Personal learning is . . .	Beliefs about knowing Knowing & knowledge are . . .
Observing & recall Observing & making meaning Making meaning	Acquisition Recall Application Understanding Seeing different perspectives	Objectivism Subjectivism Practical Evaluativism Complex Evaluativism

Table 1: Categories of beliefs about children's learning, personal learning and knowing

Beliefs about children's learning Students were asked about how they thought children learnt and how they knew when a child had learnt something. Nearly all students believed that children learnt through observation. However this category of beliefs was further differentiated to include a reproductive and transformative view of observation. For example some students described observation in the context of children making meaning (transformative):

> Through observation and their own interactions with their environment. . . . by observation I mean watching what other people do and seeing how they react to certain situations, then the children form their own opinions based on what they see other people doing. (Stella)

This is clearly a transformative perspective in contrast to those beliefs about observation learning which involve children merely reproducing information or skills (doing):

> (Children learn) by example, by watching other children and watching grown ups as well. Even something as simple as getting dressed, like watching mum and dad in the morning getting dressed can help them develop their self-help skills. (Elsa)

Some students thought that children's learning was a process of making meaning, without discussing observation.

> In my first prac there was a child who was trying to build something but he had the smaller blocks on the bottom, kept getting knocked down and he just couldn't understand. And there was another child sitting next to him and he said you need to use the bigger ones because the building isn't staying up because they're too skinny. And he kind of handed him the bigger ones and he put them down on the table and he started to build on top of them. The blocks stayed up and I think he said something like, that's why it stays up because they're bigger than the other blocks. So he understood that the smaller blocks couldn't hold the weight of the bigger ones . . . a light turned on inside him. He couldn't do it by himself, he couldn't see that it was too skinny. But when somebody else came in and tried to, not do it for him, but suggested something, kind of helped him understand a little bit more. (Allan)

Beliefs about personal learning Apart from their beliefs about children's learning, students were also asked about what they thought about their own learning. Specifically they were asked how they would go about learning something in child care; how they knew when they had learnt something; and what they thought learning was. The beliefs were categorised as *acquisition, recall, application, understanding,* and *seeing different perspectives* which are similar to the categorisations of conceptions of learning described by Marton, Dall'Alba and Beatty (1993).

The beliefs that learning is about *acquisition* was often described in terms of learning being automatic or instinctive, gaining knowledge generally and the notion of learning everyday of your life. Quite often, students discussed such beliefs in conjunction with learning as recall or repetition. For example Naomi said

> Learning is – I don't really think you can describe learning. Having a knowledge of something, I guess … I think people learn every single day and they don't know that they learn. Like you learn something new every day, like at the end of the day you've learnt a million things but you can't always recall them all. So I just don't think you can really describe learning. (I know I have learnt something when …) when I can put it into theory and know it off the top of my head. (Naomi)

Some students believed that learning was about *application* without necessarily understanding what they were applying. These students did not refer to the process of constructing understanding and then applying this knowledge. Rather, they believed learning involved the application of particular skills or practices that were required in the field of child care. Jackie gave the following example about how she used sources of knowledge:

> Well, with children's services I try … to make sure that the children are safe and having a good time. And just really try to be like apply all the hygiene practices everything that I have learnt to the children at the child care centre. (Jackie)

The final two categories of beliefs were *Understanding* and *Seeing things from different perspectives.* These beliefs about learning were inherently different from the preceding beliefs because they were clearly transformative or constructivist in nature. These are described as transformative conceptions of learning because they focus on students creating their own meaning as an outcome of learning and are exemplified respectively in the following excerpts.

> (I know I have learnt something …) when I can I read it through, regurgitate it, when I can sort of understand myself and tell it to someone else. So with a friend if they need help on a particular topic I can sort of explain it to them in a way I think that they know, what I'm trying to get them to understand. So I suppose and also when I can understand it, is when I'm in the field and I actually I now know where the knowledge, where the theory has come from, where the theory has come into the practical side, so I can adjust my theory into practical, and its like "Oh okay now I know why they taught me this". (Alice)

> I find I work a lot better in group situations where we are able to talk things through and I am able to get other people's perspectives on what we are learning, get their ideas and put them with my own, and go "Yeah, that's a good point". Sort out the junk that I don't agree with. (Anita)

Beliefs about knowing Students were asked a range of questions that required them to consider their core beliefs about the nature of knowing (see interview questions previously described). Students usually described more than one category of epistemological beliefs in their responses. However, it was possible to determine their focus on a particular type of belief. The categories included *objectivism*, *subjectivism*, *practical evaluativism* and *complex evaluativism*, with the distinction being made between complex and practical evaluativism which constitutes a new dimension of evaluativism than has been evident in the research literature. Each of these will be discussed in turn.

Objectivist beliefs about knowing are characterised by beliefs that knowledge is absolute and able to be transferred from teacher to learner. There was no discussion of analysis of theory because such knowledge was simply conceived of as right or wrong. Students with such beliefs described experts as being able to be trusted to give them the information they required.

> Truth is that it is the right thing like … It is just, truth is hard to define as some people may think something is true while others don't. There would have to be truth at some point, as what I see truth is as not a lie, so it is the right thing. (Ann)

> I trust the teachers here at TAFE but they have obviously been in all the situations regarding child care before, they are knowledgeable about it. (Raye)

The next category of beliefs was described as *Subjectivism*. Students referred to the construction of personal opinions without the need to analyse or critique either knowledge or experience. Once again such beliefs demonstrate a lack of analysis of theory, because one's personal beliefs and intuitions were paramount. These responses typically referred to everyone being entitled to their own opinions with none being considered better than others.

> "Oh well everyone has different beliefs", so there are going to be people who think differently about different practices. So I thought well it is just better to build my own beliefs and listen to others and say what, you know, just try and find the right belief. I mean there is no right or wrong 'cause everyone has got their own so . . . yeah just try and build up my own beliefs. (Jackie)

A category of belief that emerged from the data was *Practical evaluativism*. In these responses analysis was evidenced-based but the evidence was based on child care experience, rather than theory. There was also no discussion of gaining an informed opinion or understanding as a result of this analysis. Rather, students described what

might be considered *informed practice*. These students seem to be analysing or weighing up various strategies from experts (with experience) rather than theories per se.

> So you try and listen to everybody's and then make your own opinions on it. You just kind of continue to kind of analyse things and you think what you've been taught, what you've been trying to practice in the workplace. And you try and practice it there and make your own opinions on what they think and you try and involve other people as well. (Allan)

Some students described practical evaluativism as evaluation of experience or strategies in terms of what felt more comfortable. Another way in which an analysis of strategies or experience took place was on the basis of a "majority rules" approach. This means that they would analyse which strategy to implement on the basis of how many experts agreed with the same approach.

The final category of beliefs was described as *complex evaluativism* to distinguish it from *practical evaluativism*. Students who espoused beliefs about knowing as complex evaluativism indicated that knowledge was analysed on the basis of theoretical evidence. Sometimes they acknowledged that both theoretical and practical evidence needed to be analysed together. Their personal construction based on such evidence formed the basis of an informed opinion, understanding or belief.

> (Can an opinion be better than another?) It depends on whether they've had the experience to back it up or whether they have the theory to back it up and whether or not I agree. I mean most definitely, an opinion can not be better, but to maybe me more reasonable or more, make more sense. It's like learning about theories, in the end you have to decide what you agree with most, what you believe. It all comes down to how you want to perceive something. So when I have really no idea, then I suppose I would keep researching until I've learnt enough to reach my own conclusion about whatever the subject is. (Merrin)

The first two categories, namely objectivism and subjectivism, do not involve the analysis of evidence, which reduces the need to be reflective about the learning process. Individuals who describe objectivist beliefs accept another's "truths" which means there is no need to engage in the analysis of theory or reflection. Those with subjectivist beliefs, on the other hand, accept their own personal "truths" and so do not feel the need to analyse or reflect on other perspectives. However, individuals with practical evaluativistic or complex evaluativistic beliefs engage in analysis and critique of practice and theory respectively. This requires a capacity to be reflective in order to evaluate evidence and construct personal knowledge.

Individuals' profiles of beliefs about children's learning, personal learning and knowing

In this section, the relationships between beliefs about children's learning, personal learning and knowing are described. For 14 of the 17 students, there was a level of congruency evident in their beliefs across the domains investigated. By examining students' beliefs holistically, it was possible to describe the nature of their overall belief systems. These profiles (Table 2) demonstrate how the three domains of beliefs are congruent across the belief systems, even though that congruency takes different forms. The nature of the beliefs systems of the remaining three students in the study, for whom there was not a congruency across beliefs systems, is then discussed.

	Beliefs about children's learning	Beliefs about personal learning
Profile 1 Alice , Merrin, Shelley, Anita	Observation & making meaning	Understanding
Profile 2 Allan, Ann Ros, Nell	Observation & making meaning	Acquire, recall, apply
Profile 3 Raye, Elsa, Jackie, Kelly, Naomi	Observation & recall	Acquire, recall, apply
Profile 4 Allina	Observation & recall	Acquire, recall

Note: Pseudonyms are used to maintain confidentiality

Table 2. Profiles of beliefs about children's learning, personal learning and knowing for 14 students who had congruent beliefs structures

There were 4 main profiles evident and described here as: complex evaluativism, practical evaluativism, practical evaluativism and objectivism, and subjectivism and objectivism. The first profile, complex evaluativism, indicates that the construction of informed, evidenced based opinions are related to transformative beliefs for both children's learning and personal learning. The next profile is called practical evaluativism (construction of informed evidenced based practice). This profile includes transformative beliefs in children's learning but beliefs about personal learning are reproductive in nature. The third profile is called practical evaluativism and objectivism. In addition to practical evaluativism, these students described other strong beliefs in the objectivist nature of knowledge, often indicating that the nature of truth, use of experts and sources of knowledge were related to knowledge as absolute. This profile also includes beliefs in both children's learning and personal learning as reproductive. The final profile is Subjectivism and Objectivism where the student represented held beliefs that opinions do not need to be analysed or critiqued and knowledge is absolute and categorical. In

this profile, beliefs about personal and children's learning are also reproductive as was the case for Profile 3. While this profile is only represented by one student, it is included because it does indicate a congruency across the belief domains investigated. It is not discounted in this small exploratory study but is maintained to test it veracity in further investigation by the researchers in studies which have a larger sample size.

There were three students whose beliefs did not show congruency across the domains investigated. Noni described complex evaluativistic beliefs about knowing and transformative beliefs about children's learning, which was similar to Profile 1, but unexpectedly viewed her own learning in quite a reproductive way. Shona's beliefs seemed to be similar to Profile 3 with practical evaluativism and strong objectivist beliefs about knowing and reproductive beliefs about personal learning. However, she described children's learning in terms of constructivism. Stella's belief systems were also similar to Profile 3 with reproductive beliefs about personal learning but also described children's learning as constructive. It is unclear why these profiles do not demonstrate consistency across the domains of beliefs. It may be useful in future research to examine such profiles in more detail, paying particular attention to students' experiences of the learning context in which they study.

Discussion

A framework for investigating child care workers' epistemological beliefs was examined in this study to explore the nature of beliefs about knowing (epistemological beliefs), personal learning, and beliefs about children's learning, in the context of child care training. The nature and relationships between those belief domains were also examined to explore the proposition made by Schommer-Aitkens (2004) that epistemological beliefs constitute a core set of beliefs which influence the level of belief complexity that would be evident in other belief domains. Thus, implying that congruency in the complexity of beliefs would be found across different belief domains. In the nature of their beliefs about knowing, most students (n = 13) described either complex or practical evaluativistic beliefs. Through an examination of the congruency of these beliefs about knowing with their beliefs about personal learning and children's learning, congruency in the level of complexity of the belief systems was found for 12 students whose beliefs were described by three profiles. One other student had congruency in the nature of her beliefs across domains but the nature of her epistemological beliefs was not evaluativistic. This profile is maintained in the analyses as a distinct profile for further investigation.

The first profile, *complex evaluativism*, included beliefs about knowing as the construction of informed opinions as well as transformative beliefs about children's learning and personal learning. It is not surprising that students who think knowledge

is constructed using evidence would consider learning for themselves and children also to be constructed. These links between evaluativistic epistemological beliefs and constructivist views of learning were also evident in Brownlee's (2001) and Hammer's (2003) research.

In the second profile, *practical evaluativism,* students described beliefs in analytic processes similar to that of complex evaluativism but the analysis was based on skills rather than theory. Students with a focus on practical evaluativism conceived of their own learning as reproductive and children's learning as transformative. In both profiles 1 and 2, students who described complex and practical evaluativism respectively conceived of children as competent constructors of their own knowledge. However, only in the first profile, complex evaluativism, did students also conceive of their own learning as transformative or constructivist.

In the third profile students described *practical evaluativism* however there were also strong beliefs in *objectivism* evident. These objectivist beliefs related predominantly to how they viewed the nature of truth (absolute) and how experts were used in the process of learning (transmitted information). In this profile, the mixed beliefs about evaluating practice and receiving absolute knowledge was related to reproductive, rather than constructivist, beliefs about their own learning and children's learning.

The final profile comprising *subjectivism* and *objectivism*, was described by only one student. Knowledge for this student was gained through the construction of personal opinions and receiving absolute knowledge from experts, both of which do not require analysis and reflection. Not surprisingly, this student also believed that learning for themself and children was not constructivist but reproductive in nature.

The presence of practical evaluativistic and evaluativistic beliefs in this group of students is of interest. This means that many of them have been able to analyse and reflect rather than merely accept experts' experiences. Such analytic thinking is a crucial pre-requisite for quality practice because increasingly child care workers need to be able to manage ill-defined problems in complex settings (Baxter Magolda & Terenzini, 2004; Penn, 1999).

Although evaluativism has been reported in one form or another in many studies of epistemological beliefs over the past 30 years, there has been no research that describes such beliefs in terms of a practical or strategy-based analysis. This may be the case because most epistemological beliefs research has taken place in education rather than training domains. While there has been some reference to epistemologies of practice in the literature (Fenstermacher, 1994) in which knowledge is created from practice rather than theory, this relates to the nature of teachers' professional knowledge rather than beliefs about knowing. Practical evaluativism as a set of beliefs

is significant because it means that evaluativistic epistemological beliefs may be characterised differently depending on the nature of the higher education context and this has implications for teaching and learning in such contexts.

It is of interest that beliefs in practical evaluativism were not related to transformative beliefs about personal learning. In fact all students who described practical evaluativism (profiles 2 & 3) conceived of their own learning as "application" without understanding. This is of concern because such beliefs mean that students do not see their own learning in terms of construction of knowledge. In this study, only the students who espoused complex evaluativistic epistemological beliefs viewed learning as transformative for themselves and children. It is important that students are able to analyse theory as well as practice. Such complex evaluativistic beliefs would enable students to conceive of knowing as a process of accessing multiple perspectives, both theoretical and practical.

This study is clearly limited by its relatively small sample size but has provided some interesting, initial insights into how personal epistemology and beliefs about learning might be related in child care vocational education. It would be useful to investigate such beliefs using a larger sample. It would also be of interest in future research to explore what has influenced these beliefs and how these might be enacted in practice. We also need to know more about how graded and competency based assessment impact such beliefs. If child care trainers are required to interpret child care training packages in order to meet the needs of the industry, then attention needs to be paid to how trainers can teach for active reflection on theory and practice to promote complex evaluativistic beliefs about knowing and learning. Helping students to reflect on both experience (including skills and practices) and personal beliefs in the light of evidence and theory moves epistemological beliefs beyond *practical evaluativism* to ensure that both practice and theory are connected and evidenced based.

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