

What is the Role of Epistemological and Ontological Beliefs in Adopting ‘Knowledges’ for Teaching?

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This paper will generate conversations around the nature and role of epistemological and ontological beliefs in teachers' pedagogical decision-making. Perry's early empirical and theoretical work on the nature and role of epistemological beliefs in student learning in higher education has captured the attention of teacher education researchers. How these beliefs impact on teachers' (and pre-service teachers') pedagogical decision-making is examined, along with how we can support teachers to develop the sophisticated beliefs necessary for informed and critical 'knowledges' on which to base their pedagogical decisions.

Over recent decades epistemological beliefs and how these and ontological beliefs interrelate and are developed in an individual have been examined through a psychological rather than philosophical lens. Based on the seminal work undertaken with college students by Perry (1970), the study of personal epistemology has been a growing area of interest in education (Brownlee, Schraw & Berthelsen, 2011). Personal epistemology is defined as an individual's theories and beliefs about the nature of knowledge and knowing (Hofer, 2002, 2010). Brownlee et al. (2011) argue that rather than focusing on the philosophical nature of those beliefs, personal epistemology focuses on the individual who holds those beliefs. According to these authors research associated with personal epistemology can be clustered into paradigms related to epistemological development (uni-dimensional, stage-like changes influenced by contexts), epistemological beliefs (independent, multidimensional beliefs that influence learning), epistemological theories (both general and domain-specific), epistemic metacognition (contextual, cultural beliefs organised into theories operating at a metacognitive level, and situated in practice) and epistemological resources (multiple context-specific resources rather than stages, beliefs or theories). Although each of these research paradigms has introduced key understandings for application in education contexts the focus of this paper is on selected theoretical constructs and research outcomes associated with teachers' epistemological beliefs and epistemological development. Schraw and Olafson (2008) introduced the necessity to examine teachers' ontological beliefs (OB's) alongside his or her epistemological beliefs (EBs), in an attempt to integrate understandings concerned with their beliefs about knowledge, learning and teaching. OBs in this instance refers to an individual's beliefs about what he or she considers is the 'reality' of teaching and learning, that is, his or her embodied knowing (Titchen & Ajjawi, 2010) about pedagogy. Schraw and Olafson (2008) argued that EBs and OBs are often holistic and can be differentiated in terms of their levels of sophistication, and both EBs and OBs can be fostered (see also Schraw, Olafson & Vanderveldt, 2011).

Concepts related to EBs and epistemological development

Four interrelated identifiable dimensions based on Hofer and Pintrich's (1997) original descriptors have often been used to identify EBs held by an individual (Bendixen & Feucht, 2010; Brownlee et al., 2011). The first two dimensions were linked to the *nature of*

knowledge and included an individual's perception of the certainty of knowledge (its stability and strength of supporting evidence), and the simplicity of knowledge (the relative connectedness of knowledge). The remaining two dimensions were linked to the *process of knowing* and included the justification of knowledge (how individuals evaluate knowledge claims) and the source of knowledge (as residing internal or external to oneself). Hofer (2004) described the beliefs located in these dimensions as independently influencing learning. Schommer-Aikins (2002) similarly highlighted the independent nature of EBs. Self-report inventories such as the Epistemological Belief Questionnaire (EBQ) created by Schommer (1990) has been widely adopted to ascertain an individual's beliefs about the simplicity and certainty of knowledge and one's innate ability to learn and speed at which they learn. Tillema (2011) adapted the EBQ while also noting criticisms of the EBQ around its de-contextualised questions and highly structured interpretations of pre-defined response categories.

Kitchener (2002) noted that there appeared to be a sequential progression (trajectory) of epistemological positions (stands) held by an individual based on their views of the nature of knowledge and the process of knowing. The first, uncritical *objectivism* (*often labeled absolutist*), are those that involved directly ascribed copies of what is presented by "the world" (p. 90). The second position, Kitchener described as *subjectivism* where knowledge is based on personal opinions. These two extremes, according to Kitchener, are then synthesised into a more comprehensive, rational reflective stance in which knowledge is evaluated upon reasonable criteria. This, third position, is described by Kitchener as an *evaluativistic* stance. Others, such as Kuhn and Weinstock (2002) found that individuals who hold an absolutist (right or wrong) stance tended not to evaluate or reflect on knowledge, and those with subjectivist views although demonstrating more tentative ideas about knowledge and knowing were not likely to examine ideas in any depth. They argued that the shift to an evaluativistic stance occurred when individuals regarded knowledge as being constructed from a range of perspectives yet required evaluating to come to an evidence-based conclusion. A comprehensive comparison of models and methods for examining personal epistemology (including EBs and their development) can be found in Urban and Roth's (2010) summary. The strength of considering developmental descriptions alongside multifaceted EB descriptors is that doing so offers potential to illustrate more in-depth, nuanced qualitative changes over time.

A focus on teachers' beliefs: EBs/OBs and pedagogical beliefs

A long tradition of EB studies with pre-service teachers has identified the range and complexity of beliefs held by individuals (Many, Howard & Hoge, 2006). They also described changes in EBs that have related to their involvement in specifically designed interventions (see for example, Brownlee, 2003; Brownlee, Petrwiskyj, Thorpe, Stacey, & Gibson, 2011). Similar developmental trajectories have been shown in studies exploring teachers' epistemological positions and their pedagogical knowledge and/or beliefs and practices. For example, Bendixen and Corkill (2011) showed that teachers with more experience viewed knowledge as more complex and uncertain than those with less experience. Recent decades of research has highlighted considerable interest in the connection between teachers' EBs and their pedagogical beliefs. Hofer and Pintrich (1997) conjectured that beliefs about learning and teaching, and beliefs about how knowledge is acquired, are intertwined. Investigations have since shown that the two constructs, EBs and pedagogical beliefs usually relate to each other (Bendixen & Feucht, 2010; Weinstock &

Roth, 2011; Bendixen & Corkhill, 2011). In addition, several researchers have illustrated the relationship between EBs and teaching practices (Olafson & Schraw, 2010). Muis and Foy (2010) coined the term constructivist epistemic beliefs, describing them as those that reflect an individual's beliefs in the tentative nature of knowledge, its complexity and active construction. They suggested that teachers' who held these beliefs were more likely to hold constructivist beliefs about how students acquire knowledge and held a wider repertoire of instructional strategies that were more likely to foster students' conceptual change. The connections that have been made between EBs and practice has led to growing interest in researching teacher OB's in an attempt to provide insights into teachers' beliefs about their lived reality of the classroom and their lives as teachers and pedagogical decision-makers.

Schraw and Olafson (2008) highlighted the complex relationships between beliefs and their enactment which led them to focus on collective rather than independent EBs and OBs. They focused instead on EB and OB world views, indicating that like EBs, OBs can be tacit or explicit in part or whole and changed with specifically designed interventions (Schraw, Olafson & Vanderveldt, 2011). Others such as Kuhn and Weinstock (2002) suggested the possibility of individuals holding multiple OBs about the origin, permanence and changeability of reality and being which may impact on their self-authorship (Brownlee, Edwards, Berthelsen & Boulton-Lewis, 2011) and pedagogical decision-making. There is much to explore if we want to increase our understanding of EB/OB interconnections, their development and teacher change in response to educational reform agendas.

Conclusion: Provocations for consideration and discussion

- How can EB/OB research support the development of teachers' clinical acumen?
- What is the contribution of EB/OB self-authorship in the context of changing policies in education?
- Where do strategies such as relational pedagogy, community of practice (CoP) based action research and reflection fit in EB/OB development?
- What is the role of teachers' critical ontology in the development of pedagogical beliefs and practice?

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