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The emerging importance of epistemological beliefs as a learning outcome of higher education (0245)

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There has been a flurry of research on epistemological beliefs (beliefs about the nature of knowledge and knowing) and their relationship to a variety of learning-related factors. For example, epistemological beliefs are reported to be significantly related to students' approaches to learning, goals and academic achievement, comprehension, reasoning and persistence in difficult tasks. It is well established that students with sophisticated beliefs are likely to perform better at school and university than students with naïve epistemological beliefs. But why might it be important for there to be a specific focus on the development of these beliefs in higher education? To address this question and illustrate the vital role of these beliefs in university curricula, we discuss research we are conducting on the role of epistemological beliefs in critical thinking and the development of lifelong learning propensity; two key student outcomes espoused by most institutions and programs of study.

The emerging importance of epistemological beliefs as a learning outcome of higher education.

Outline

People encounter information through various sources on a daily basis; from the media, to the opinions of authority figures, and conversation with friends and colleagues. The ways in which they interpret and evaluate this information is influenced by a range of factors, including their beliefs about information, or knowledge, itself. These beliefs are termed epistemological beliefs and are generally conceptualised as beliefs about knowing that reflect an individual's views on what knowledge is, how it can be gained, its degree of certainty, and the limits and criteria for determining knowledge (Brownlee et al, 2001). The study of epistemological beliefs has included examination of not only how we come to know and the beliefs we hold regarding knowledge, but also the influence these beliefs have on other processes such as thinking and reasoning.

Research on students' epistemological beliefs has been a burgeoning area since the early 1990's and the development of the first self-report instrument (Schommer, 1990). Epistemological beliefs have consistently been reported to be significantly related to learning outcomes (Cano, 2005) and other associated variables such as learning goals (Cavallo et al, 2003), study tactics and comprehension monitoring (Almahasneh, 2006), conceptual change (Qian & Alvermann, 1995) and reasoning (Bendixen et al., 1994), where students with naïve beliefs tend to be less successful than students with sophisticated epistemological beliefs. For example, students who believe that knowledge is organised in isolated pieces (naïve beliefs) are more likely to poorly comprehend textbooks (Schommer-Aikins & Hutter, 2002), poorly understand mathematics, scientific concepts and foreign language (Schommer, 1998).

Moreover, epistemological beliefs have been linked to critical thinking, which is not surprising given that critical thinking 'reflects the skills necessary to analyse arguments, judge credibility of sources and ask challenging questions' (Kuhn, 1999). Kuhn theorised that epistemological belief sophistication may form the most fundamental underpinning of critical thinking. For example, for an individual with naïve beliefs, critical thinking is unnecessary as the individual believes that knowledge is held by experts and is unchanging, that there is a 'truth'. However, for an individual with more sophisticated beliefs, a recognition has developed that information is based on judgements that can be evaluated, and critical thinking is a valuable tool in considering such information (weighing up evidence, context, source etc). Some studies support this view (Bath & Alford, 2008; Robey, 2002). For example, Bath and Alford measured students' beliefs about knowledge, beliefs about learning, their approaches to learning and critical thinking in a sample of first-year undergraduate students. Students' epistemological beliefs predicted critical thinking scores over and above approaches to learning and learning beliefs. This is an important finding given that critical thinking is included as a key graduate attribute in most institutions.

Furthermore, epistemological beliefs have been recently linked to the propensity for lifelong learning; another key graduate outcome of most universities but also advocated by industry and employer groups, who recognize the value of, and need for, this capacity in the workforce (Cervero, 2000; Kember, Leung & Ma, 2007). Lifelong learning has been characterised as the "capacity to respond flexibly to changing circumstances, to learn throughout a career, and to integrate theory and practice...to deal capably with previously unmet situations" (Bligh, 1982). It is considered important not only for national competitiveness, but also social cohesion; as Berman (1984, 105) states, lifelong learning is "necessary if one is to be a useful and productive citizen both of the immediate and the broader community". However, whilst it is agreed that individuals need to engage in lifelong learning, particularly in professional contexts, it has also been argued that many may not have actually gained the required skills and abilities needed for lifelong learning (Livneh & Livneh, 1999).

Research into the characteristics of lifelong learners has tended to focus on demographic and socioeconomic variables as predictors of engagement in lifelong learning activities (Desimone et al. 2002; Smylie, 1988). Whilst being able to explain existing professionals' engagement in lifelong learning is important, a more pertinent question for higher education institutions is whether students are developing a belief in, and commitment to, lifelong learning, and how this outcome can be facilitated through curricula. Recent research we conducted with students from a range of programs (Bath & Smith, 2009) demonstrated how epistemological beliefs predicted students' propensity for lifelong learning over and above a range of related factors such as openness to experience, approaches to learning and self-efficacy, indicating that these beliefs may also be a key foundation of lifelong learning.

Preliminary findings of our most recent research (Bath & Smith, in preparation), goes one step further and examines the kinds of teaching and learning activities that may be important in developing both epistemological beliefs and a propensity for lifelong learning. In a sample of final year undergraduate science students, we found that more sophisticated epistemological beliefs were related, in particular, to the experience of a learning community (peer mentoring; felt part of group

committed to learning; met others on campus for study etc), and to communication with others (with peers from different backgrounds or beliefs, discussed ideas with others in and outside class; worked with others in groups etc). Both of these environment factors were also significantly related to lifelong learning beliefs and skills. This is commensurate with previous findings (Smith & Bath, 2006) which indicate that the experience of being in a 'learning community' is related to the development of graduate attributes (e.g., communication, problem-solving, ethical and social sensitivity). In addition, we have found that lifelong learning beliefs were strongly related to an environment where the teachers encouraged or invited students to share their ideas, opinions, knowledge with staff and peers, and students were encouraged to learn from each other. Lifelong learning skills, on the other hand, were particularly related to an environment where students were given opportunities on- and off-campus to experience real-world application of their knowledge and the discipline. The implications of these, and the above, findings will be discussed in relation to future directions for the design higher education curricula, and for focussing the purpose of higher education more generally.

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