Developing a reflective capacity: the role of personal epistemologies within undergraduate education

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The aim of the ISL research seminar

“To discuss new and possibly preliminary findings or analyses of issues, where the interpretation is open or new and would benefit from extensive discussion and also where interpretation may be controversial. This format is especially appropriate for works in progress. No more than 20 minutes should be used for presentation, allowing the majority of time for questions and discussion which should be planned to involve all participants”.

This seminar will present preliminary findings and discuss issues in relation to one part of an on-going research project funded by the Higher Education Academy and the Charitable Trusts of the Institute of Chartered Accountants in England and Wales. The aim of the project is to investigate a particular aspect of the undergraduate student experience – the role of work-based placement learning in supporting the development of a reflective capacity.

The project draws on the work of Baxter Magolda (1992, 1999) to examine the relationship between the development of a reflective capacity and a student’s “way of knowing”. The latter is influenced by cognitive development, as well as interpersonal (how one views oneself in relation to others) and intrapersonal (how one perceives one’s sense of identity) development. Thus placements, where students have to “act” in a range of roles and make a variety of independent decisions is highly relevant to examining development in these areas.

Baxter Magolda’s work represents just one part of a broader research area that focuses on the conceptions that individuals have about knowledge and knowing i.e. personal epistemologies. Thus our initial contribution within the seminar will refer to this broader literature which is best exemplified by the publications within the Special Issue of Educational Psychologist: “Personal Epistemology: Paradigmatic Approaches to Understanding Students’ Beliefs About Knowledge and Knowing” (2004, Vol. 39 (1)). This special issue contains articles by Hofer, King and Kitchener, Schömmer-Aikins, Louca et al and Bendixen and Rule.

This is a comparative study, using a questionnaire and interviews, of the experience of placement and non-placement students within business and accounting degree programmes. The preliminary findings presented at the seminar will comprise an initial analysis of interviews with fifteen students: ten at the beginning and end of their placement year and five at the beginning and end of their final (post-placement) year.

Drawing on both the literature and our experience of data collection and analysis within this project, we shall raise a variety of issues for discussion within the seminar. For example, in relation to both ways of knowing and epistemological beliefs:

- how can they be identified?
- to what extent may they be contextual?
- to what extent do they represent stages of development?
- what are the characteristics of contexts and events that influence or impact upon existing beliefs?
1. Project overview

Background

This project is funded by the Higher Education Academy and the Charitable Trusts of the Institute of Chartered Accountants in England and Wales. Its focus of interest is work-based placement learning. Work-based placement learning forms an important part of degree programmes within a wide range of disciplines. The project seeks to inform our understanding of how this form of learning influences graduate outcomes. It draws on, and seeks to develop, research within two linked areas. The first area of research considers the relationship between the work-based placement and academic performance in the final year of undergraduate study. Currently there is mixed evidence about the way in which work-based placements impact on performance within the final year of the degree (Duignan, 2003). It is difficult to evaluate this evidence as prior studies vary in how they characterize the nature and form of work-based learning. Thus the contribution of this project will be to draw on a second area of relevant, but previously unrelated, area of research: the development of a reflective capacity.

Within undergraduate education there is an increasing emphasis on the need for reflection as an integral part of learning to learn. This applies to both substantive studies and the maintenance of personal development portfolios. Moreover, there is a growing emphasis by professional bodies on the development of a reflective capacity to support professional judgment. Consequently, the need to develop reflective practice, particularly as a part of an evidence-based approach, is an integral part of the work-based learning framework both in higher education and professional training.

There is a substantial body of research into the development of a reflective capacity. The work of Baxter Magolda (1992, 1999, and 2001) and King and Kitchener (1994) have been central in supporting our growing understanding of the way in which students develop a capacity to think critically and reflectively. For example, key distinctions arise between a student who has a dualistic view of knowing, seeing knowledge as certain or absolute and another student who sees knowledge as constructed and requiring judgement based on evidence. Baxter Magolda’s work has shown how a student’s epistemological beliefs or “ways of knowing” are related to academic performance. This is confirmed by the work of Zhang and Watkins (2001) and Lucas and Meyer (2005) who found that students who reported a dualistic way of knowing also reported a surface approach to learning and those students who reported a more relativistic and committed way of knowing also reported a deep approach to learning.

Baxter Magolda’s also work points to the importance of experiences outside of higher education in supporting the development of a reflective capacity. She argues that the development of a reflective capacity requires more than just cognitive skills. For students to embrace a way of knowing that is relative or contextual requires a development that is also interpersonal (how one views oneself in relation to others) and intrapersonal (how one perceives one’s sense of identity) i.e. a form of self-authorship. Baxter Magolda (2001) found that individuals often progressed quickly to relativistic ways of knowing when required to make significant independent decisions. Similarly Zhang and Watkins (2001) found that students who indicated more work and leadership experiences were more likely to exhibit relativistic ways of knowing. Thus an assumption underlying the design of this project is that interpersonal and intrapersonal development is more likely to be stimulated within a work-based placement than in an academic environment.
Aims and objectives of the project

The aim of the project is to investigate the development of reflective capacity during work-based placement learning and its relationship to student final year academic performance. Its objectives are to identify:

1. The level of reflective capacity brought by business studies and accounting undergraduates to their work-based placement and/or their final year of studies.
2. The elements within the work-based placement that support, encourage or inhibit the development of a reflective capacity.
3. The way in which the level of reflective capacity brought by undergraduates from their work-based placement is related to their academic performance in their final year of undergraduate study.

This is primarily a research study. Thus a central deliverable will be the findings that are designed to contribute to a growing understanding of the student experience.

Research methodology and method

Research on students’ ways of knowing is concerned with how students make meaning of their experience and how this is related to how they approach their learning. It requires a careful listening to what students have to say about their experience and this involves suspending judgement to empathize with, and describe, that experience. This research project therefore falls into the naturalistic area of inquiry and implies certain types of research method.

Two forms of research method are adopted within this project. The first involves the use of extended interviews with students who undertake a placement. This relates to research objective (2) above: the identification of elements within the work-based placement that support, encourage or inhibit the development of a reflective capacity. Semi-structured interviews were conducted with 15 students in the early and latter stages of their work placement. The interviews followed the type of protocol used by Baxter Magolda (1992, p.411-426) but this was adapted to take account of the work-based context and its relationship to degree studies in the UK. The term “protocol” should not be taken to imply an overly structured approach to the interview. The intention is to use all questions but not to follow a rigid order. This allowed each student to follow their own train of thought. Ten students undertaking a work placement in 2005/06 were interviewed twice during the year: usually one or two months after the start of placement (Sept/Oct 2005) and around the end of the placement (June / July 2006). Five further students who had undertaken a work placement in 2004/05 were interviewed two months after the completion of their placements (Sept/Oct 2005).

The second form of research method will not be reported on in this paper. It involves the administration of a questionnaire to quantitatively measure the level of reflective thinking (Kember and Leung, 2000). This relates to research objectives (1) and (3) above: to identify the level of reflective capacity brought by business studies and accounting undergraduates to their work-based placement and/or their final year of studies and to identify the way in which the level of reflective capacity brought by undergraduates from their work-based placement is related to their academic performance in their final year of undergraduate study. The questionnaire comprises a self-report inventory. This is a four-scale instrument measuring four constructs; habitual action, understanding, reflection and critical reflection. The constructs measured are derived from the extensive literature on reflective thinking, particularly the work of Mezirow (1991). This work is compatible with that of Baxter Magolda, focusing as it does on the way in which beliefs and values underpin action. The questionnaire comprises 16 statements about actions and thinking. As is the norm with this type of questionnaire, students are asked to respond quickly rather than deliberate over each
response. This questionnaire was administered to the entire cohort of business studies and accounting undergraduates (n=1,060). They comprised: Year 3 students (those who had chosen to undertake a placement in 2005/06 (n=260) and those who had not (n=520), and Year 4 students who had undertaken a placement in 2004/05 (n=280) and were embarking on their final year of studies. We hope that this will provide us with data to identify whether: there are significant differences in the reflective capacity of those students who choose to undertake a placement and those who do not; the relative changes in reflective capacity of placement and non-placement students during the academic year; and the changes in reflective capacity of placement students during their work placement and their final year of academic study. This represents a substantial student population and permits a reliable and valid quantitative data analysis. Permission was granted for use of the Kember and Leung (2000) instrument.

Initial findings from a pilot exercise are available in Lucas and Tan (2006).

2. The development of a reflective capacity and personal epistemologies

The project is concerned with “the development of a reflective capacity” and this section will explain the use of the term. Often the term “reflection” is associated with cognitive thinking skills. However, this project is based on a particular view of reflection, “critical reflection”1 defined as follows:

“the process of making a new or revised interpretation of the meaning of an experience, which guides subsequent understanding, appreciation and action” (Mezirow and Associates, 1990, p.1)

Such experience may be educational, work-based or personal. However, common to all is the reflection on presuppositions (Mezirow, 1991, p.6). These assumptions may be wide-ranging embracing the psychological, epistemic and sociolinguistic. Such assumptions are likely to be implicit or tacit. Consequently Mezirow stresses that:

“What we perceive and fail to perceive and what we think and fail to think are powerfully influenced by habits of expectation that constitute our frame of reference, that is, a set of assumptions that structure the way we interpret our experiences. It is not possible to understand the nature of adult learning or education without taking into account the cardinal role played by these habits in making meaning.” (Mezirow and Associates, 1990, p.1)."

Critical reflection is thus distinct from other kinds of “learning” (Mezirow, 1991, p.23). Other kinds of learning may be achieved by adding knowledge to existing meaning schemes or by learning new meaning schemes with which to make interpretations about experience. However, critical reflection involves a transformation of beliefs, attitudes, opinion, and emotional reactions that comprise meaning schemes or transforming meaning perspectives (sets of related meaning schemes).

It is this emphasis on such habits and frames of reference that distinguishes critical reflection from the cognitively-based notion of critical thinking skills. The former embraces the affective (emotion and identity), as well as the cognitive. Brookfield (1987) points out that the

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1 Moon (2004, p.96) characterises this view of reflection as “deep reflection” which is transformatory in the sense that it involves the transformation of meaning structures that are the basis of judgments. Sometimes this is termed “reflectivity” (Taylor and White, 2000) or reflexivity.
development of a reflective scepticism - a key attribute for a professional - is a major affective outcome of critical reflection. It involves:

“a readiness to test the validity of claims made by others for any presumed givens, final solutions, and ultimate truths against one’s own experience of the world.” (ibid, p.22, emphasis added).

Reflective scepticism means that, even when a commitment is made to a particular way of viewing the world, or set of values, it is an informed commitment and the student remains critically aware. In so doing, the student has to take a stand, to question authority and to develop his or her own voice. Critical reflection thus places great expectations on the student’s capacity not only to think critically but to move towards critical being, which will ultimately involve action (Barnett, 1997, p.1).

Critical reflection thus involves issues of identity or view of self, and change is not likely to be straightforward. Brookfield observes that “making the attitudinal shift to reinterpret as culturally induced what were initially held to be personally devised value systems, beliefs, and moral codes can be highly intimidating.” (1987, p.17). Thus there may be denial, or defensive responses, before other belief or value systems are considered (if at all). Perry (1981) talks about the process of grief and sense of loss that is involved. It may be that conflicting feelings and ideas have to be integrated or reconciled and the student has to become comfortable with the new situation. Savin-Baden (2000, p.87) characterises this as involving “disjunction”, involving a fragmentation of part of, or all of the self. The belief systems involved may be so fundamental that the student sees himself or herself as a different person. This is supported by the sixth conception of learning identified by Marton et al (1993); learning as changing as a person. Once the issue of identity enters into consideration, this then leads to issues of identity in different roles or contexts. If one assumes that identity is context or role-related, then critical reflection might be a norm in one context, but not in another. This issue is linked to our use of the term “capacity”.

We have used the term “capacity” to indicate that we consider there may be a potential for critical reflection but that it may not be exercised in all contexts or on all occasions. We particularly wanted to avoid the terms “skill” and “competence” with their overtones of generic, transferable abilities and of stage-like cognitive development. Rather, we wanted to focus on the development of a sense of self, which increasingly supported a broadening and deepening capacity to reflect on multifarious aspects of experience. We did not seek initially to define what we meant by the term “capacity” but intended to explore the idea further through a reading of the literature and within the interview data collected in the project. We are in the process of so doing. We have found the following sources of interest. French (undated) points out that: “the notion of capacity may offer an alternative to what appears to be an inevitable drift into hierarchical thinking about development. [ ] The metaphor of expansion and containment in the notion of capacities may offer an important alternative to these dominant images” (p.8). Carr and Claxton (2002) and Claxton and Carr (2004) talk of the “capacity and the confidence to engage in lifelong learning. Central to this enterprise is the development of positive learning dispositions, such as resilience, playfulness and reciprocity” (2002, p.9). Claxton and Carr (2002) identify two interrelated aspects of learning: capabilities and dispositions. Capabilities are necessary but not sufficient for learning. Disposition to learn is also required. Casement (1985), in talking of capacity in relation to therapists, refers to the “capacity to tolerate feeling ignorant or incompetent, and a willingness to wait (and to carry on waiting) until something genuinely relevant and meaningful begins to emerge” (p.2). This form of capacity appears to be related to inaction although a capacity is exercised. This is linked to French’s (undated) observation that a capacity relates to the ability to hold or contain more and more dimensions of experience (p.6). Certainly, the continual revision of one’s position implied by contextual ways of knowing will require a capacity to live with uncertainty.

3. Personal epistemologies and undergraduate education
The previous section discussed the meaning and nature of the term “developing a reflective capacity”. Such a capacity would depend on the ability and/or willingness of students to become aware of their meaning-making structures. However, such a capacity will, in itself, be affected by the nature of those meaning-making structures themselves. One important aspect of those structures arises from the personal epistemology of the student and involves their epistemological beliefs.

A wide range of research has been conducted into the personal epistemologies of students (and teachers) within education. This project draws on the work of Baxter Magolda (1992) but is also informed by an understanding of the broader framework of research into personal epistemologies. Hofer (2004a, p.1) points out that the foundations of most models of epistemological understanding can be traced to Perry’s (1970) scheme of intellectual development during college years (within the US). However, work since then varies in terms of the assumptions that underpin the respective models, their associated research methods and their focus of educational interest. These are briefly described in Appendix 1. This section of the paper will review research into ways of knowing. The next section of the paper will refer to the findings of research into other models as we discuss issues arising from our review of the literature and from our initial interview findings.

**Stages in intellectual development/ways of knowing**

Over several decades interview research has shown that students vary in their beliefs about knowledge (epistemology) and that this affects the way in which they learn and make judgments (Perry, 1970; Belenky, Clinchy, Goldberger and Tarule, 1986; Baxter Magolda, 1992). Sometimes these are referred to as “stages of intellectual development” (Perry, 1970) or more recently, “ways of knowing” (Belenky et al., 1986; Baxter Magolda, 1992). This research has been complemented by the work of King and Kitchener (2004) on the development of reflective judgment. This paper will not describe the findings of this prior work in detail. Our project draws on the work of Baxter Magolda since, to a large extent, she has synthesised findings from earlier research through her large-scale empirical studies and she also develops issues relating to identity.

Baxter Magolda asserts that understanding college students’ intellectual development should be:

“at the heart of effective educational practice. Students interpret, or make meaning of, their educational experience as a result of their assumptions about the nature, limits, and certainty of knowledge. Such assumptions, referred to by researchers as epistemic assumptions (Kitchener, 1983), collectively form “ways of knowing”” (Baxter Magolda, 1992, p.3)

Baxter Magolda identifies four qualitatively different ways of knowing. Firstly, an absolute way of knowing assumes that knowledge exists in an absolute form: it is either right or wrong. Students, in this case, will interpret differences in opinion between authorities as differences, not about the facts, but about detail arising from inappropriate application, misinformation or misunderstanding. This way of knowing assumes that all problems are well-structured and thus evidence is not needed to reach a conclusion. Secondly, a transitional way of knowing accepts that knowledge is certain in some areas but uncertain in others. Disagreements between authorities in areas of uncertainty are considered to arise because the facts are not yet known. It is assumed that in due course better evidence, techniques or theories will produce accepted facts. Thirdly, an independent way of knowing represents a shift to an assumption that knowledge is mostly uncertain. This is accompanied by a recognition that authorities are not necessarily the sole source of knowledge. Thus a student’s opinion may be regarded as valid as that of an authority and there tends to be an “anything goes” attitude. In this context the role of evidence is diminished. Fourthly, a contextual way of knowing also assumes that knowledge is uncertain. However, the “anything goes” attitude is replaced by a belief that knowledge is contextual and one judges knowledge on the basis of evidence in
context. Thus knowledge claims can only be understood in relation to the context in which they arise. 

Whilst there is a broad convergence in prior research about the nature of variation in epistemological positions, there is less agreement on what these represent. Perry describes a passage, or journey, though a sequence of epistemological perspectives that he refers to as positions. Belenky et al and Baxter Magolda are much more explicit about their constructivist position and use the term “ways of knowing” to describe the different perspectives from which individuals view the world and draw conclusions about truth, knowledge and authority. They are also much more explicit about the extent to which ways of knowing are bound up with self-concept. Thus Baxter Magolda, in describing the goal of learning, refers to the work of Kegan (1994) and uses his term of “self-authorship”. The latter is the ability to reflect on one’s beliefs, organise one’s thoughts and feelings in the context of, but separate from, the thoughts and feelings of others, and literally to make up one’s own mind.

“self-authorship extends beyond critical thinking or making informed judgements because it is not a skill; it is, rather, a way of making meaning of the world and oneself. This concept is inextricably linked to — students’ epistemological development”.

(Baxter Magolda, 1992, p.6).

Baxter Magolda thus argues that self-authorship simultaneously comprises three aspects: cognitive (how one makes meaning of knowledge), interpersonal (how one views oneself in relation to others) and intrapersonal (how one perceives one’s sense of identity). Development in all these three areas does not necessarily go hand in hand. Thus students can “learn” cognitive enquiry skills, yet not be able to use them to decide what to believe because they have no internal sense of identity or belief system (ibid.p.10). Both cognitive and affective domains are implicated throughout all of these stages. This makes great demands on students who may be immersed in absolutist or transitional ways of knowing.

\[ \text{How do these “ways of knowing” relate to everyday teaching and learning activities?} \]

A student’s way of knowing will act as a lens through which he or she views the world. Thus it will affect how a student sees key aspects of their learning environment and the way in which learning is approached. These key aspects are:

- the role of the learner
- the role of peers
- the role of instructor
- evaluation (of learning)
- the nature of knowledge

The table in the Appendix 2 shows how students’ perceptions of these key aspects and their approaches to learning vary according to their way of knowing.

Each way of knowing provides a lens through which the learning environment is viewed. Thus the task of the educator is not straightforward. A student with an absolutist or transitional way of knowing will not necessarily react positively to a dialogical approach to education. The teacher will be deemed to have all the answers and the role of that instructor will be considered to be that of conveying those answers to the student. Thus, for example, Gwen likes “teachers who will give you as much as you need and not just leave you with a little small idea and try and have you talk it out.” (Baxter Magolda, 1992, p.31). Where the teacher attempts to encourage discussion about different ideas or theories, the student may become impatient and wait for the “right” idea to be conveyed. A student might refer to “discussion” as being useful, but it might, in fact, transpire that the purpose of discussion is to help the student remember the “facts” rather than to evaluate different theories. This student is unlikely to be receptive to a dialogical approach to education and is likely to provide poor feedback on the teacher in a course evaluation questionnaire (Clouder, 1998).
The development of critical reflection may thus be an aim of higher education but, dependent on a student’s way of knowing within business and accounting, receptivity to this aspiration is likely to vary. If a student possesses an absolute way of knowing, then he or she is unlikely to either cope well with problem-solving in conditions of uncertainty nor react positively to challenges to deeply-held assumptions. By way of contrast, a student who possesses an independent or contextual way of knowing is likely to feel more confident, and be more effective, in such a situation.

For example, it is understandable that for absolute knowers it makes logical sense for their role to be that of obtaining knowledge from the instructor. Thus the role of the instructor is regarded as being to communicate knowledge effectively and to make sure that the student understands it. This contrasts with independent knowers. Here the role of the learner is to think for him/herself and the role of the instructor is to promote independent thinking and to promote the exchange of opinions. One can see, therefore, that an absolute knower will not necessarily take kindly to an instructor who encourages debate and questions. Such activities would only slow down the effective communication of the knowledge that the student needs!

Ways of knowing: an educator’s normative stance (health warning!)

The focus of most research into ways of knowing has been educational. Thus despite the naturalistic or phenomenological nature of the research on ways of knowing, students’ ways of making meaning are, to a greater or lesser extent, analysed by reference to the expectations of the higher education system. Thus it can be argued that findings from this form of research tell us as much about the values of institutions of higher education as they do about the students. Students, and their “ways of knowing” are compared against our expectations. As Claxton (2002, p.22) points out: “educators are in the business of making value judgements about what kinds of mind people need, and are therefore to be cultivated.” Similarly Hofer and Pintrich (1997, p.121) acknowledge: “The common developmental endpoint of most of the models of epistemological development may be a socially constructed artefact of Western schooling and culture (Moore, 1994).”

Such value judgements then become enculturated and taken for granted. As Bruner (1986, p. ) points out:

“theories of human development, once accepted into the prevailing culture, no longer operate simply as descriptions of human nature and its growth. By their nature, as accepted cultural representations, they, rather, give a social reality to the processes they seek to explicate, and to a degree, to the ‘facts’ they adduce in their support.”

This acknowledgement is a necessary recognition of our own assumptions and habits of making meaning. It does not negate research into personal epistemologies but acts as a necessary reminder (if one takes a cultural-historical activity perspective) that the discourse of “individual-development” psychology may be of value “but always with the awareness that we are dealing with more-or-less useful fictions and idealizations” (Claxton, 2002, p.26).

3. Issues for discussion

The following represent a range of issues that we are currently considering. They arise out of our literature review and our initial analysis of interviews.

How can epistemological beliefs be identified?

The ‘ways of knowing’ research has tended to use extended, semi-structured interviews to identify ways of knowing. Our initial findings indicate that such interviews are effective in providing an individual student profile and overview of relevance structures, but less effective (but not unsuccessful) in identifying epistemological beliefs. We have initially emphasised the role of narrative and relevance structures as we analyse the interview transcripts. Whilst we have the aim of identifying ways of knowing, we are also aware that our prime concern must be to engage with the lifeworld of the student. We have thus attempted to counter tendencies
to make assumptions about that lifeworld through the development of an empathetic understanding of the individual's experience (Ashworth and Lucas, 2000). This involves attuning ourselves to possible "restorying" processes that might be occurring (Rossiter, 1999).

As we found that ways of knowing were not emerging in quite the way we expected, we introduced an additional exercise within the second interview with placement students. We used two Kitchener and King "problems" (1994, p.260/1) and these are included in Appendix 3. It is of interest that we found these raised issues of relevance and meaning as well as of epistemological beliefs.

Interviews access professed beliefs but don’t necessarily access enacted beliefs. This raises the issue of context (see below). To access enacted beliefs requires a focus on a task at hand and the use of "hot" review (Louca et al, 2004) or think aloud protocols (Hofer, 2004b).

To what extent are epistemological beliefs contextual?

Most researchers also acknowledge, to a greater or lesser extent, that whilst an individual is likely to fall broadly into one way of knowing at any one time, context has to be taken into account. What is meant by context might include:

- **Subject/discipline**
  - Recent work by Palmer and Marra (2004) was conducted with students across sciences and the humanities. They tentatively conclude that students’ epistemologies may not be consistent across knowledge domains at any given point in time.

- **New field/role**
  - Hofer (2004b, p.52) speculates whether students are likely to transfer their epistemological sophistication in disciplines where they were developing expertise to areas where they were likely to be novices.

- **Enactment**
  - Context is the place of enactment (Louca et al, 2004, p.59; Hofer, 2004b)
  - This could also be linked to relevance: the extent to which an issue or situation has meaning for a student (e.g. what is a theoretical issue to some students are real issues to others).

- **Domains: home, work, education etc.**
  - In our interviews we have focused on the identification of ways of knowing within different domains, dependent on the profile of the student. This may relate to identity and role variation between domains.

- **Degree of support available**
  - King and Kitchener (2004, p. 11) consider the degree of contextual support that might be available. They refer to the work of Fischer and colleagues (Fisher and Pipp, 1984; Lamborn and Fischer, 1988) who propose that variability in individuals' response arise from differences in contextual support. No support gives rise to a "functional" capacity whereas contextual support gives rise to "optimal" capacity. Contextual support would offer prompting questions, examples, role models, the opportunity to rehearse and so on.

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2 However, for Louca et al (2004) it is epistemological resources, rather than beliefs, that are activated by context.
To what extent may ways of knowing represent stages of development?

Hofer and Pintrich (1997, p.120) point out that most researchers in this area have concluded that there is some developmental progression, particularly for those who have undergone some form of higher education. Moreover, most agree as to the nature of the general trend — from a view of knowledge as being either right or wrong to a view where individuals actively construct meaning and come to judgements within a relativistic context. However, no researcher claims that there is a strict developmental sequence. For example, Kitchener and King (2004, p. 9) use the term "stage-like properties" to describe "waves across a mixture of stages, where the peak of a wave is the most commonly used set of assumptions." (p.10). They also recognise issues of context and contextual support. Baxter Magolda (2004, p.36) talks about fluid reasoning “patterns” rather than stages. Thus it is not surprising to find the following comments about reversion, as well as the previous observations about context.

Reversion

- Although most year one college students appear to be absolute knowers, Boyes and Chandler (1992) found all epistemic levels represented amongst high school students within their study. They speculate that students may make a second pass through the developmental levels as they go on to higher education.
- Hofer and Pintrich (1997, p.122) also speculate that “individuals may retreat to safer, more established positions when in new environments and that there may be affective issues involved, such as the effects of anxiety and negative feelings associated with challenges to strongly held ideas.”
- Baxter Magolda (2004, p.38) observes that, post graduation, many interviewees used external formulas to guide their lives “regardless of their way of knowing”. She observes that “on leaving college, longitudinal participants did what they had been taught to do best – follow authorities’ leads to manage uncertainty”.

What are the characteristics of contexts and events that “impact” upon existing epistemological beliefs?

The taking of responsibility and development of self-confidence

- Baxter Magolda identifies several changes that may be likely to support moves into independent ways of knowing. She suggests that being at work, or studying as a postgraduate, can reinforce self-confidence. Self-esteem is essential if independent knowers are to protect and develop their newly-found voices. Self-esteem may also be supported by working in an environment where individuals have to invent, organise and evaluate their own work, evaluate multiple perspectives and choose plans of action accordingly.
- Certainly, within our interviews, taking responsibility for organising oneself appears to be a key issue for the students. But we are not sure that this is necessarily related to a change in epistemological beliefs. The students who had undertaken a work placement also tended to indicate an increase in self-confidence.

Epistemic doubt, epistemic volition and a resolution strategy

- These three elements form a part of an integrated model proposed by Bendixen and Rule (2004). All three feature in aspects of the epistemological beliefs literature. They are also considered in the conceptual change literature. Cognitive dissonance, a confrontation with a situation where old rules can no longer apply, features heavily in the latter and there is scope for linking these two (rather separate) literatures.
- Change in context (discussed above) may well provide a dissonant environment
What is the role of motivation/relation?

The role of motivation/relation is not much discussed in the epistemological beliefs literature. However, it arises as an issue for Bendixen and Rule (2004) as they seek to develop a more integrated model. In particular, they consider the role of relevance in conditions for the change of beliefs. Personal relevance includes having a stake in the outcome, an interest in the topic, emotional involvement and/or high self-efficacy related to epistemological belief change. Within our interviews, relevance or the way in which the student related (or failed to relate) to context, is a significant issue. Hence our emphasis on the analysis of the student profile and relevance structures.
**APPENDIX 1**

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<thead>
<tr>
<th>View of epistemological beliefs/personal epistemology</th>
<th>Research method</th>
<th>Focus of educational interest</th>
</tr>
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<tbody>
<tr>
<td>Epistemological beliefs (EB) as part of a cognitive-developmental process. A patterned, developmental sequence. (Perry, 1970; Belenky et al, 1986; Baxter Magolda, 1992; King &amp; Kitchener, 1994)</td>
<td>Phenomenological/naturalistic. Students are perceived as active, meaning makers who are transformed through their interaction with the environment. Ways of knowing are socially constructed and context-bound. Open-ended interviews (production tasks).</td>
<td>How educational experiences enhance progress towards advanced outcomes (epistemological reflection or reflective judgment).</td>
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<tr>
<td>Personal epistemology as an embedded systemic of more-or-less independent beliefs (with some trait-like individual differences relating to cognition and affect). Development may be asynchronous. (Schommer-Aikins, 2004)</td>
<td>Survey questionnaires (recognition tasks): use of factor structures and structural equation modeling.</td>
<td>How epistemological beliefs influence learning within a systemic model. Beliefs are seen as predictors of outcome variables (e.g. exam success, understanding or conceptual change).</td>
</tr>
<tr>
<td>Epistemological understanding is a metacognitive process that activates epistemic theories, a multidimensional set of interrelated beliefs about knowledge and knowing (active and situated - an organized way of knowing that is domain-general and domain-specific). (Hofer, 2004b)</td>
<td>Metacognitive approaches: strategy questionnaires, interviews, self-report measures, think aloud protocols.</td>
<td>How theories act as a metacognitive monitoring in practice, within a sociocultural setting (malleable, situated and influenced by teacher, task and environment).</td>
</tr>
<tr>
<td>Epistemological resources (ER): context activation of resources (developmental but non-stage like). ER are more fine grained and context specific than EB, less stable or trait-like and situated in educational contexts. Recognises development of more permanent metacognitive beliefs (but always with some difference between professed and enacted beliefs). (Louca et al, 2004)</td>
<td>Classroom observations and clinical interviews.</td>
<td>How teaching (or particular kinds of conversation) can activate (and develop) epistemological resources</td>
</tr>
<tr>
<td>A dynamic model of personal epistemology giving attention of nature, conditions and mechanisms of change. Elements include: a mechanism for change (epistemic doubt, epistemic volition and resolution strategies), dimensions of beliefs, advanced beliefs, metacognition, conditions for change (dissonance and personal relevance), affect, cognitive abilities and environment and reciprocal causation. (Bendixen and Rule, 2004)</td>
<td>Provides a coherent model for the comparison and integration of research findings. Thus it would involve the use of all of the above research methods.</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX 2

<table>
<thead>
<tr>
<th>Domains</th>
<th>Absolute Knowing</th>
<th>Transitional Knowing</th>
<th>Independent Knowing</th>
<th>Contextual Knowing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of learner</td>
<td>• Obtains knowledge from instructor</td>
<td>• Understands knowledge</td>
<td>• Thinks for self</td>
<td>• Exchanges and compares perspectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Shares views with others</td>
<td>• Thinks through problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Creates own perspective</td>
<td>• Integrates and applies knowledge</td>
</tr>
<tr>
<td>Role of peers</td>
<td>• Share materials</td>
<td>• Provide active exchanges</td>
<td>• Share views</td>
<td>• Enhance learning via quality contributions</td>
</tr>
<tr>
<td></td>
<td>• Explain what they have learned to each other</td>
<td></td>
<td>• Serve as a source of knowledge</td>
<td></td>
</tr>
<tr>
<td>Role of instructor</td>
<td>• Communicates knowledge appropriately</td>
<td>• Uses methods aimed at understanding</td>
<td>• Promotes independent thinking</td>
<td>• Promotes application of knowledge in context</td>
</tr>
<tr>
<td></td>
<td>• Ensures that students understand knowledge</td>
<td>• Employs methods that help apply knowledge</td>
<td>• Promotes exchange of opinions</td>
<td>• Promotes evaluative discussion of perspectives</td>
</tr>
<tr>
<td>Evaluation (Assessment)</td>
<td>• Provides vehicle to show instructor what was learned</td>
<td>• Measures students' understanding of the material</td>
<td>• Rewards independent thinking</td>
<td>• Student and teacher critique each other</td>
</tr>
<tr>
<td>Nature of knowledge</td>
<td>• Is certain or absolute</td>
<td>• Is partially certain and partially uncertain</td>
<td>• Is uncertain - everyone has own beliefs</td>
<td>• Accurately measures competence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Student and teacher work toward goal and measure progress</td>
</tr>
</tbody>
</table>

Figure 1 - Baxter Magolda's Epistemological Reflection Model (Baxter Magolda, 1992, p.30, amended)
APPENDIX 3

There have been frequent reports about the relationship between chemicals that are added to foods and the safety of these foods. Some studies indicate that such chemicals can cause cancer, making these foods unsafe to eat. Other studies, however, show that chemical additives are not harmful, and actually make the foods containing them more safe to eat. (Kitchener and King, 1994, p.260)

Selecting and hiring the best employee is a difficult decision for employers. Some people believe that the most important criterion is how highly qualified the applicant is in relation to the written job description. Others believe it is more important that a new employee fit in with the personalities of the other members of the work team, assuming the applicant's qualifications are adequate. (Kitchener and King, 1994, p.261)

Can you state and justify your own point of view about this issue?

And then follow-up questions:

What do you think about these statements?

How did you come to hold that point of view?

On what do you base that point of view?

Can you ever know for sure that your position on this issue is correct? How or why not?

When two people differ about matters such as this, is it the case that one opinion is right and one is wrong? If yes, what do you mean by “right”? If no, can you say that one opinion is in some way better than the other? What do you mean by “better”?

How is it possible that people have such different points of view about this subject?

How is it possible that experts in the field disagree about the subject?
References


