



Soden, Rebecca and MacLellan, Euphemia (2004) Experienced tutors' deployment of thinking skills and what might be entailed in enhancing such skills. *International Journal of Lifelong Education*, 23 (4). pp. 335-349. ISSN 0260-1370

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Experienced tutors' deployment of thinking skills and what might be entailed in enhancing such skills.

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ABSTRACT

In the context of research that reports weaknesses in adults' critical thinking skills, the primary aim was to examine adults' use of critical thinking skills that are described in taxonomies and to identify areas for development. Position papers written by an opportunity sample of thirty-two experienced adult educators formed the data for a descriptive sample survey design intended to reveal participants' use of critical thinking skills. Each 6,000 word paper was written during a development programme that supported such skills. A content analysis of the papers revealed that, when participants drew on personal and published ideas about learning to derive their proposals for change, they accepted the ideas uncritically, thereby implying that they might find it difficult to help learners to examine ideas critically. The evidence supports research that implies that critical thinking skills are unlikely to develop unless overall course design privileges the development of epistemological understanding (Kuhn, 1999, King and Kitchener, 1994). A proposition that merits attention in future research is that the development of such understanding is largely neglected in current curricula in formal post-16 education.

The issue

Although thinking is a problematic construct, the case has been well made that learning to think critically about whatever is being studied is an important but not well realized purpose of post-school education (Kuhn, 1991, Harvey, Moon, Geall and Bower, 1997, Bennett, Dunne, and Carre, 2000, King, 2000). This concern has been pursued in at least two extensive bodies of research literature, commonly known as critical theory and critical thinking, both of which have made significant contributions (Tennant, 1997). The present, small-scale descriptive study is located in what is known as the critical thinking literature. Its primary aim was to examine adults' use of critical thinking skills that are described in taxonomies and to identify areas for development. An important assumption is that underdevelopment of such skills impairs educators' ability to help learners to use critical thinking skills (King, 2000).

However, there have been few rigorous studies that provide detailed description of how well educators exercise thinking skills in writing about pedagogical issues that mattered to them (Livingston, Soden and Kirkwood, 2004). Without such description, it is difficult to know which aspects of thinking need to be the focus of interventions. It is possible that lack of knowledge of strengths and weaknesses in adults' thinking is one of the complex reasons for disappointing results from interventions (Lawson, Clark, Cramer-Meldrum, Falconer, Sequist and Kwon, 2000). The use of trivial tasks in many studies that aim to establish causation between pedagogy and thinking outcomes has impeded knowledge of adults' thinking (Bereiter, 2002, Livingston et al 2004). Against

this background, the present study describes the participants' thinking in a programme that encouraged thinking but the paper makes no claims about causation.

Introduction

It is not our purpose to debate the value of the particular content of the professional development programme that was the focus of the study, or to enquire into relationships between theory and practice, (e.g. see Thomas, 1997, Rowlands, 1999), but rather to examine the extent to which the adult participants in the study used critical thinking skills. Research on teaching critical thinking often characterizes thinking as sets of abilities that are described in the many taxonomies of thinking that were evaluated by Moseley, Baumfield, Elliott, Gregson, Higgins, Lin, Miller, Newton, and Robson, (2004 in press). These abilities, commonly represented as skills, include identifying claims, questioning assumptions, querying conceptualisations of phenomena, considering the reliability, validity and generalisability of evidence, considering different interpretations of evidence, and looking for bias and agendas that might be served. This extensive literature on critical thinking provides descriptions of the extent to which adults deploy critical thinking skills and reports findings from interventions designed to enhance such skills. Sound examples of descriptive research can be found in reports by Kuhn (1991) and by King and Kitchener (1994). A review of the more rigorously evaluated interventions can be found in Livingston, Soden and Kirkwood (2004). Stevenson (2001) argues that benefits of descriptive research in this area include 'allowing us to talk about knowledge, to inspect it, to assist in sharing it with others, to assist others in acquiring it ... and to give credit ...' (p.648). Plainly, a limitation of describing critical thinking in

terms of skills included in taxonomies is whether any list of indicators can capture a particular quality of thinking.

In a separate but related area of enquiry, critical theorists of adult education (e.g. Brookfield, 1993b, Mezirow, 1994) have pursued their interest in critical thinking through pedagogies that help learners to reassert the political dimensions of self-direction by bringing into the learner's critical consciousness those assumptions, beliefs and values which have been uncritically assimilated and internalised during childhood and adolescence. Critical theorists have been particularly concerned with what Tennant (1997) describes as ideological critique, in which the sociological, historical and political origins, nature and consequences of ideas are analysed and evaluated. While empirical studies reported in the critical thinking literature reflect some of the pedagogical concerns of critical theorists, such as encouraging adults to judge the quality of evidence that supports ideas they encounter, typically the concerns are with practising targeted thinking skills on any kind of content. While there is consensus that emancipatory goals are a central purpose of adult education, arguably, progress towards such goals might be promoted through systematic practice of intellectual skills described in the critical thinking literature (Tennant, 1997, Cornford, 2002).

Although thinking probably depends on the execution of many cognitive processes that appear in taxonomies, such as extracting and organising relevant information (Halpern, 1997), some writers argue that thinking is not critical unless it invokes criteria for evaluating knowledge (Lipman, 1991, Kuhn, 1999). The central idea in Lipman's (1991) definition of critical thinking is that it is thinking 'that can be assessed by appeal to

criteria' (p.116). Kuhn (1991) described broad aspects of critical thinking that are similar to those identified by Lipman and other writers (e.g. King and Kitchener, 1994, Salomon and Perkins, 1998). These aspects include the ability to (a) separate beliefs from evidence; (b) propose beliefs alternative to one's own and to know what evidence would support these; (c) provide evidence which supports one's own beliefs while rebutting the alternatives; (d) to take an epistemological stance which involves weighing the pros and cons of what is known. Abilities such as working with multiple criteria that may conflict with each other, tolerating uncertainty and meta-cognitive competence are also prominent in the critical thinking literature (Resnick, 1987, Halpern, 1997, McGuinness, 1999, Kuhn, 1999). Kuhn's five broad components involve sub-components described by Moseley et al (2004) such as identifying relevant evidence, evaluating limitations in evidence, discriminating between more and less compelling evidence for and against a view, and planning an argument. It is that believed that adults who can utilize these abilities are better equipped to justify why they prefer some ideas to others, to challenge particular views and to propose alternative views (Bensley, 1998).

In view of posited connections between critical thinking, employability and citizenship (King, 2000, Kuhn, 1999), we were particularly concerned, as tutors on professional development programmes that focus on learning, that available evidence implies that neither school teachers nor adult educators learn to think critically through participation in professional courses (Kuhn, 1991, Dye, 1999, Maclellan, 1999, McMahon, 2001). Coffield (1999), in arguing that all those involved in lifelong learning initiatives need to understand learning deeply if they are to be effective in promoting such initiatives,

implies that such people will be relatively ineffective if they do not understand why they prefer to draw on some ideas about learning rather than others. This view is supported by findings that tutors provided few opportunities to practise anything that resembled critical thinking in courses in the further education sector (Bloomer, 1998, Soden and Halliday, 2000, Anderson, Howe, Soden, Halliday and Lowe, 2001). Our own experience in teaching professional development courses resonated with the findings above that course participants do not deploy what are described as critical thinking skills when they write about the extensive prescribed reading that is common in such programmes. This raised questions about the value of such reading, since many studies suggest that the ideas in readings were being regurgitated rather than used to transform professional understandings (Dye, 1999, McMahon, 2001). We were persuaded by Kember's (1997) meta-analysis of research that changes in educators' practice might depend on changes in their conceptions of learning and teaching. Vygotskian ideas about intellectual change imply that such an outcome is related to the appropriation and effective use of significant cultural tools (Vygotsky, 1978). This idea informs much of the empirical research on critical thinking that guides the present study.

The programme in which the data were generated

While we were not seeking to establish causation between a programme pedagogy and thinking outcomes, we focused on a programme that observed pedagogical principles described in the extensive research literature on teaching critical thinking (e.g. see Brophy, 2002). Evidence of thinking might be expected to be more prevalent in such a programme than in those post-16 formal education courses that work with pedagogies

that are fundamentally behaviourist in intent and pedagogy (Halliday and Soden, 1998).

The programme observed the following main principles: it encouraged learners to use critical thinking skills outlined in the first section of this paper to:

- build from their previous constructions
- integrate formal and informal knowledge
- evaluate their own ideas and those introduced in the programme
- engage in self-regulation and meta-cognition (thinking about their thinking)
- understand the role of meanings negotiated and shared with peers
- challenge participants' views by asking them to compare their own ideas with those in literature
- monitor the effects of discussion and collaboration on their conceptions

Conflicts were provoked through asking participants to read and discuss ideas about learning that emanates from three perspectives (Behaviourist, Humanist and Constructivist) with fundamentally different underlying assumptions about the nature of learning and learners, and to compare them with their own ideas. Following arguments of Vygotsky (1978), Lave (1996) and others, that the construction of knowing is not a matter of individual, solitary construction of understanding, but a dialectical process firmly grounded in a system of social relations, most of the class time was occupied by debating interpretations of prescribed and chosen pre-reading about learning, their implications for day-to-day practice and identification of issues which merited further critical analysis.

Participants were given the following task brief:

Write a position paper that might form the basis of a presentation at a conference or seminar that focuses on adult learning, or that might be sent for review for publication in a journal concerned with informed practice. Write a theoretically informed analysis of an issue connected with your own practice and, from your analysis, generate proposals for addressing the issue. Make it clear why you prefer to draw on some theories rather than others in analysing the issue and generating proposals.

Method

Design

The design is a descriptive sample survey design that was employed on an opportunity sample. Unlike most designs of this nature, the survey data consisted of extended prose generated by programme participants in response to a fairly open question, and it was generated to earn accreditation. Participants were asked to release, for content analysis, papers that were written to meet the assessment task brief that is described at the end of the previous section. Permission to content analyze these papers was sought only after the papers were submitted and grades recorded, in order to minimize effects of participation on the submitted papers and to eliminate any perception that withholding permission for content analysis might influence grades. All participants agreed to content analysis of their papers, provided that confidentiality was assured, and provided that they had access to the subsequent content analysis of their papers. Thus, the ways in which

the participants exercised critical thinking skills on the programme readings and on their own experientially derived knowledge was inferred from their papers.

While the participants' discussions might have yielded insights into their thinking, this type of data was discounted for two tightly related reasons. First, since this study sought responses that the participants had time to consider at length, it was decided that a task requiring a prepared written response would better enable such responses. A second reason for using a written task to elicit data was an acknowledgement of the evidence (Bereiter and Scardamalia, 1987; Langer and Applebee, 1987; Wells, 2002) that engagement in the writing process can enable the writer to transform extant and earlier understanding(s) into something more sophisticated. While the brief and criteria undoubtedly influenced the papers, they might also have served as intellectual scaffolding in that they described higher order thinking. Hence the writing task was likely to reflect the most advanced level of thought the participants were able to express. A further reason for relying on data from the written task was that it avoided any stress for participants that might arise from recording their discussions.

Participants

Following Tennant (1997), we describe the participants in our study, who facilitated learning towards National Vocational Qualifications (NVQs) in Social Care, as adult educators. The participants were thirty-two tutors who had, on average, five years' experience in supporting learners who were pursuing a General National Vocational Qualification in Social Care through programmes that alternated work placements with

more formal instruction in Further Education Colleges (FECs) All the participants, who had a degree level qualification (e.g. in social work), were enrolled in the second year of a two-year part-time post-graduate accredited development programme designed to enhance practice in adult education.

Data/Data analysis

While the incidence of critical thinking, as defined by Lipman (1991), was of particular interest because of posited connections between such thinking and employability and citizenship (King, 2000, Kuhn, 1999), the data analysis also allowed other forms of thinking to emerge that might contain seeds for development of more critical thinking.

The participants' 6000 word position papers were used as data. Following Tesch (1990), the unit of analysis was a segment of text that is comprehensible by itself and contains one idea, episode or piece of information. Every unit was coded, the total number of units was recorded as well as the percentage of statements allocated to each code.

The development of the categories was guided by both literature on critical thinking (outlined earlier in this paper) and the data. The procedure began with random selection of papers. The two researchers and a research assistant each analysed these data independently and devised an initial set of codes. They then met to compare codes and to devise a second set of codes. The researchers and research assistant then coded a new set of papers, using this second set of codes. The category system was revised and developed through this process of iteration between data and research literature until agreement was reached on a set of codes.

The research assistant used the final category system to code all papers. Cronbach's alpha was used to calculate the reliability of the coding scheme. The results indicated that the coding could be carried out reliably over a two-week period. (Cronbach's alpha = 0.70).

The final set of codes were as follows and are explained and exemplified in Table I

Personal claims/evidence

Ideas in programme literature

Critical discussion of ideas/evidence

Informed proposals

Signposts

Background information unrelated to other categories

Insert Table I about here please

Findings

The most notable of the findings, which are presented in Table II below, are that only 2.7 per cent of total statements were categorized as 'critical discussion of ideas/evidence', and that over a quarter of statements consisted of unsupported assertions.

Insert Table II about here

Discussion of findings

Evidence of critical thinking in participants' position papers

The primary aim of this descriptive study was to examine adults' use of critical thinking skills that are described in taxonomies and to identify areas for development. The aspects of thinking described by the coding system in Table II were outlined in the Introduction section of this paper. In order to provide scope for the exercise of these aspects of thinking, participants compared their own ideas with those from three perspectives (Behaviourist, Humanist and Constructivist) with fundamentally different underlying assumptions about the nature of learning and learners. There are problematic assumptions in the categorization system, which is derived from a definition of critical thinking that insists on 'appeal to criteria' (Lipman, 1991, p. 116), which in turn means that a particular interpretation of appropriateness of criteria is inherent in the system. Nevertheless, it provided some useful insights into the research questions. All that the authors are claiming is that the system they devised for categorizing their data separates statements that contain significant elements of critical thinking from those in which knowledge reproduction, unsupported assertions or content extraneous to the analysis is predominant.

The category labelled 'informed proposals' (24.0 per cent of total statements) describes the extent to which participants generated informed proposals for addressing their chosen issue about learning in their workplaces, while the category labelled 'ideas in the programme literature' (24.1 per cent) describes participants' efforts to relate ideas in the literature to their chosen issue, and integrate these ideas with their own. The 'critical discussion of ideas/evidence category (2.7 per cent) represents participants' attempts to

judge their own ideas, and those from research, against appropriate criteria. Examples from the data of statements in these categories appear below and in Table 1. The proportion of statements in the ‘informed proposals’ category implies that, in deriving proposals for changes in practice from their knowledge, participants have combined a range of thinking skills to achieve what Moseley et al (2004) describe as productive thinking. The proportion of statements in the ‘ideas in programme literature’ category reflects the extent to which participants used information processing skills that appear in most taxonomies of thinking (Moseley et al) to summarize and present knowledge they had acquired from reading or experience. Examples from the data of this category appear in Table 1. Although Cornford (2002) argues that not enough attention is being given to such skills in the discourse on lifelong learning, the findings imply that educators themselves deploy these skills. Therefore, it is possible that they would be able to help learners to do likewise if this goal were to be emphasized.

The 24 per cent of statements coded as informed proposals seem to have elements of Sternberg’s descriptions of creative and practical thinking. Of this 24 per cent of statements, about a quarter propose (and address) a task which is similar to one that Sternberg (1999) offers as an example of a test of creative thinking: ‘Suppose you were to teach ... the five factor theory of personality to a classroom of 10 year olds. How would you explain the theory in a way that would be comprehensible and interesting to them?’ The other statements in this category propose and address tasks that are similar to Sternberg’s examples of tests of practical thinking. Sternberg’s examples ask students to apply concepts from theoretical frameworks to practical tasks such as designing a

learning or therapeutic intervention. An example in the present data of such thinking appears in the following statements:

The constructive accounts of learning I described above led me to a proposal that involves me in changing my role as a tutor. I would do much less input and questioning of learners about it, and less discussion leading on questions I choose. I would change my role to being more of one in which I am a resource person for the learners. This means that they would be given time to make up questions that they want to ask me.

Thus, in almost a quarter of their total statements, the participants demonstrate reasonable levels of two of the three types of thinking in Sternberg's triarchic model, which is derived from a separate but related body of literature on thinking: practical and creative thinking. This evidence of thinking goes beyond that found in essays written by similar participants (Dye, 1999, Maclellan, 1999, McMahon, 2001). Thus, the participants in the present study had considerable strengths in an aspect of thinking that could be used as a starting point for developing more critical thinking about practice.

That almost another quarter of the statements, which were coded as 'ideas in programme literature' (24.1 per cent), imply that participants were making some attempt to organize their knowledge base by trying to synthesize ideas and relate them to their practice (see examples in Table 1). Sternberg and Spear-Swerling (1996) make the point strongly, as do many other writers (e.g. McPeck, 1981, Glaser, 1996), that thinking well requires a well-organized knowledge base. Sternberg (1999) points out that critical thinking may

well involve some creative and practical thinking and will almost certainly involve some degree of factual recall. Since the findings suggest that the participants were reasonably competent in this aspect of thinking, it does not seem to require particular attention in curricula for educators. Rather, it is the third category that requires attention: this category represents participants' attempts to judge their own ideas, and ideas from the research they chose, against appropriate criteria. The fact that they produced only 2.7 per cent of statements which fit Sternberg's description of 'analytical' thinking, which includes features which appear in many definitions of critical thinking, might be interpreted as an indication that, although participants made sense of what they read, ideas in readings were not evaluated but treated as incontrovertible evidence that supported their proposals, as were their own ideas. The first example below from the data shows an uncritical acceptance of ideas whereas the next example represents attempts to judge ideas against criteria, such as the perceived adequacy of assumptions:

I will illustrate for my own learners how useful Behaviour Modification is in working with people with learning difficulties. I will do this by ...

I intend to persuade my colleagues to make more time available to discuss with the learners the assumptions that underlie procedures they use at work. We could talk with learners about how ethical it is for carers to decide how other people should behave, and then to use reinforcement schedules to get that behaviour. We could talk about whether we connect with the assumptions about humans that underlie these procedures.

Taken together, these two findings suggest that grasping and summarizing ideas was much less of a problem for the participants than evaluating the ideas against conventional academic criteria. In the pedagogy for the programme that generated the data for the present study, although there was no transmission of content by tutors, there are no indications that participants failed to assimilate the content through texts and peer discussion. What the participants failed to master were academic skills described in the critical thinking literature. Thus, development programme designers might reserve class time for critical evaluation of ideas and expect participants to exercise their information processing skills on readings prior to class meetings to inform themselves about ideas.

Two data driven categories were used to account for statements that were judged to be either 'signposts' or 'background information'. Statements allocated to the 'signposts' category (3.9 per cent) seemed to arise from participants' attempts to let the reader, and perhaps themselves, see how they were processing large amounts of complex information, both theoretically and experientially derived, to produce a proposal. For example:

I will talk about the theories first, and then see what they have to say about my work ...

This finding provides additional evidence that participants were practising an information processing ability that Cornford (2002) implicates in lifelong learning competency. The second data driven category accounted for the 17 per cent of statements that were judged to be background information because they were not related to claims or evidence, nor did they contribute to a reader's understanding of proposals. For example:

The learners in my group hated school, they don't get up in time for their placements and they're not interested in much beyond TV soaps.

It is possible that this category was capturing inability to use criteria for judging what information was more and (much) less significant, and therefore was reflecting a weakness that is similar to that described by the 'critical discussion of ideas/evidence' category. The 17 percent of statements allocated to this 'background information' category, together with the 28.2 per cent of statements that were allocated to the category 'personal claims/evidence' implies that it would be worth re-designing programmes in ways that enable participants to practise systematically the selection and evidencing of ideas that support or cast doubt on a chosen position. Of the 28.2 per cent of statements categorized as 'personal claims/evidence' only 1.8 per cent cited evidence of any kind, including evidence that invoked work experience. Whether participants believed that there was no need to test their personal claims against evidence or whether this data simply reflects an oversight is not clear. Examples of 'personal claims/evidence' appear in the following statements:

Some learners will never need to be able to write anything, and so there's no point in trying to get them to improve.

Some learners are just not reflective, there's nothing much we can do about this.

We have a lot of low intelligence learners and they would not respond to approaches that come from the constructivist theories.

Overall, the main weakness in participants' papers was that they did not judge much of what they had read against appropriate criteria. Thus, in the data, statements such as the following were common:

There are inventories (e.g. ...) for measuring learning styles. This means you can use this measurement to match up the learning activities you use to the style of each learner.

Only 2.7 per cent of statements (coded as 'critical discussion of ideas/evidence') could be described as representing enquiries into the soundness of the ideas that the writers chose to inform their proposals. Seldom did they question assumptions implicit in these ideas, nor did they consider any other limitations. Querying interpretations of views cited, identifying rash generalizations or considering evidence that caused difficulties for the positions adopted were also rare in the papers. These are activities that are regarded as part of the ability to think critically (e.g. see Ennis, 1987, 1993, Bensley, 1998,). All these activities are involved in generating new knowledge through disciplined enquiry, which is a feature of authentic assessment tasks (Newmann and Archibald, 1992) and which was required of the participants in this study. When the participants generated new knowledge in the form of proposals for practice they seemed to do so without recourse to critical scrutiny of evidence. The following scripts were among the rare exceptions who did try to scrutinize what they had read:

The papers on concept mapping suggest that we could help our learners to read more effectively, and retain ideas, if we spent a lot more time on teaching them to make concept maps. Although my unit brought in a consultant who pushes this

method. I found a review by ... that indicated that only a minority of research studies show gains from this method. Moreover, most of the learners in these studies were university students who have prospered in school, whereas our learners have not. Concept mapping rests on a model that comes from information processing research and therefore also rests on assumptions in that approach, which are ...

Even supposing that each learner has a different learning style, and we can measure the style, which is questionable, it might not be suitable for learning about social justice concepts in caring, and we might better help them by moving them towards another style.

That participants had identified the need for such scrutiny in completing the assessment task during class discussions supports Perkins (1999) view that many, very substantial time slots are required to practise critical discussion of ideas before participants are able to do this independently.

One interpretation of the results, overall, is that they imply that participants were working to a very limited extent with what Perkins (1989) described as a 'critical epistemology'. Perkins contrasted a 'makes sense' epistemology' with a 'critical epistemology'. People working with a 'makes sense' epistemology' tend to use the criterion of whether a given proposition makes intuitive sense whereas people working with a 'critical epistemology' try to test their arguments against possible objections and modify them until they become more robust. Unless educators reconstruct their knowledge in this rigorous way, their views and proposals for change may not stand up to scrutiny by colleagues and learners.

Consequently, co-operation required to implement proposals is unlikely to be forthcoming. The increasing use of pedagogy consultants from the private sector is another reason for educators to be able to take a critical stance on ideas about learning.

The literature suggests that many people find it difficult to use a ‘critical epistemology’ when they are trying to re-construct their knowledge. Kuhn (1991) concluded that adults, including those who have degree level qualifications, are not very competent at working with a ‘critical epistemology’. Thus, they used their own beliefs and ideas they had encountered in ways similar to the educators in the present study who rarely evaluated the ideas that informed their proposals. The findings from the study support Thomas’ (1997) warning that ideas in publicly available sources can simply constrain thinking if students do not have the intellectual skills required to go beyond regarding these ideas as sets of safe conceptualizations. Keefer (1996) criticized Kuhn’s (1991) claim that adults are not very good at thinking critically. He argues that Kuhn was applying to practical arguments the standards of theory and evidence, which are applied to theoretical arguments. Keefer argues that practical arguments are grounded in participants’ actions, values and goals, and that justification for this type of argument is in terms of experiences, values, morals and commitments rather than evidence. Such considerations rarely appeared in the participants’ papers, and when they did appear they were presented as unsupported assertions rather than being embedded in arguments.

Both Keefer’s views and the idea that students should learn to think critically can be accommodated to some extent by Sternberg’s ‘triarchic model’ which advocates that

students should practise analytical and practical thinking, as well as ‘creative’ thinking (Sternberg, 1999). While not denying the value placed by Sternberg and by Keefer (1996), on certain aspects of thinking, it seems reasonable to be concerned that only 2.7 per cent of participants’ statements represented attempts to enquire into assumptions about learning on which their proposals rested. It seems to be worth considering why the participants in this study were unconcerned about meeting such standards and to be looking at ways in which the programme could be developed to enhance adult educators’ ability and disposition to engage with such matters.

What might be entailed in enhancing educators’ ability to think critically?

According to Kuhn (1999) and others (e.g. King and Kitchener, 1994, Palma and Marra, (2004, in press), provision for enhancing critical thinking needs to go beyond the types of activities (e.g. see Nickerson, Perkins and Smith, 1985, McGuinness, 1999, Butler, 1998) associated with developing the cognitive skills and strategies that Cornford (2002) advocates in adult learning programmes. Kuhn (1999) argues that epistemological meta-knowing has a pivotal role in critical thinking. According to Kuhn, epistemological meta-knowing includes not only an understanding that knowledge is constructed and evaluated according to criteria of argument and evidence, but also sufficient awareness of one’s own knowledge of such matters to co-ordinate it while performing judgement tasks. Thus, according to this view, attempts to promote cognitive strategies will have limited effects unless they are accompanied by provision to enhance epistemological awareness. Thus, the high proportion of unsupported assertions in the data for the present study can be understood as insufficient awareness that assertions are judgements that can be

evaluated according to rules of enquiry and/or weakness in orchestrating this knowledge. According to Kuhn, (1991), if students believe that knowledge is entirely objective and certain, as her 'absolutist' believes, or if they believe, as her 'multiplist' believes that knowledge is entirely a matter of opinion, they will not understand why assertions need to be evaluated and compared according to criteria of argument and evidence. This implies that development programmes for adult educators should accord high priority to the development of epistemological knowledge and meta-knowledge, in order that participants can be enabled to share such knowledge with their learners. Without such knowledge both learners and educators are unlikely to become able to judge effectively why some practices are to be preferred over others: practices are viewed as either idiosyncratic or immutable. Neither of these views of practice is likely to develop employability or citizenship.

Kuhn argues that generalizing knowledge to new situations might be far more dependent on epistemological meta-knowing than has hitherto been acknowledged. The fact that only 2.7 per cent of all statements in the present study invoked epistemological knowledge, implies that, if meta-knowing is a condition for generalizing acquired modes of enquiry to other areas (Kuhn, 1999), course design should privilege activities that help students to extend their epistemological knowledge and their awareness of the need to bring it to bear on judgement tasks. Although there is a huge body of research on meta-cognition (e.g. McGuinness, 1999), Kuhn (1999) claims that meta-epistemological knowing has not thus far been assigned the central role in critical thinking that she proposes for it. Yet very few interventions in the post-school sector have targeted epistemological awareness (Livingston, Soden and Kirkwood, 2004). Future programme

activities might include modelling the use of epistemological knowledge, and peer dialogue about the extent to which participants had been epistemologically competent in their discussions. (King and Kitchener, 1994; Salomon and Perkins, 1998).

Similar arguments have been advanced by King and Kitchener (1994), who describe seven stages, or patterns, of thinking in their Reflective Judgement Model, and discuss research which points to the validity and reliability of the instrument they devised to assess people's stage of development. This model has much in common with Kuhn's (1991) model that describes four levels of epistemological understanding. Both Kuhn (1999) and King (2000) urge educators to draw on models that can help educators to assess developmental needs of students and to provide educational activities to enable them to progress to thinking that can properly be described as critical.

Those working within perspectives which assume that thinking and learning are situated within the contexts of personal and social epistemologies, beliefs and understandings (e.g. Brown, Collins and Duguid, 1989, Cole and Engestrom, 1993, Lave, 1996) would argue that, while descriptions of how adults think are useful, such descriptions need to be supplemented by studies of knowledge and thinking that is valued in the range of post-16 learning contexts. The participants in the present study facilitated learning in further education colleges and workplaces, within competence-based system approaches that have neglected the advancement of epistemological understandings (Halliday and Soden, 1998). While the purpose of this paper is not to enter the extensive educational debate about competence-based approaches to education, it is relevant to point out that the assumptions underlying the forms of Behaviourism that underpin National Vocational

Qualifications are incompatible with those underlying efforts to promote epistemological understandings. Since researchers within the perspective known as situated learning believe that work cultures influence strongly what is learned, it might be supposed that the forms of thinking described in this study arose from the participants' experience of working with competence-based approaches, and were being maintained by this work culture. A recurring perception in participants' discussions was that the assessment system within which they worked offered learners very little credit for attempts to enquire into the veracity of ideas. What earned credit was evidence of a narrower technician understanding of how ideas could be applied.

The research on teaching cognitive skills and strategies that has been reasonably well received in the formal post-16 sector does not go far enough and, according to the research reviewed above, some of it is fundamentally flawed in its eschewal of epistemological meta-knowing. In the context of a resurgence of interest in the United Kingdom in improving the quality of post-school education, the time might be right for emphasizing epistemological awareness in professional development programmes. Further research might focus on illuminating how an understanding that knowledge is not absolute but open to scrutiny by means of rules of enquiry enables the exercise of critical thinking skills.

Coffield (1999) implies that serious shortcomings in the participants' ability to think critically about available accounts of learning impair their ability to contribute to his vision of a learning society. Barnett (1997) discusses the role of criticality in producing

more enlightened or more effective forms of action and implies that characteristics of critical thinking described in the literature will be involved in effective critiquing of action. Both these writers imply that, unless educators understand why they prefer one account of learning to another, they are little more than technicians. A major challenge for post-school education is to re-design curricula in ways that enable educators to develop epistemological knowledge and harness it to the demands of a learning society.

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Table I: Explanation of codes and coding system

The unit of analysis is a segment of text that is comprehensible by itself and contains one idea, episode or piece of information.

Codes

Personal claim/personal evidence

Any claim, assertion, or point of view given by the author, e.g. ‘Everybody likes to learn in their own way’.

Any evidence from sources that are not publicly available, such as anecdotes and personal life experiences,

e.g. ‘When speaking to the student’s line manager about his results, I was interested to note that ...’.

‘Here are the sorts of things that go on in my college’

Ideas in programme literature

Any claim, point of view or empirical finding which is available for public scrutiny, e.g. in a journal article, or contained within a named theoretical framework; often it is presented as answering the question ‘How do I know this?’

e.g. ‘Greeno et al. (1999) describe the situative perspective as sustained participation in the practice of a community’;

‘The research highlights (Tennant, 1998);

‘Greeno et al suggest that there are five aspects of achievement. The first is a grasp of ... concepts. The second is The third is having the knowledge to monitor and regulate one's own behaviour. The fourth is one's beliefs. And the fifth is that achievement is context dependent’.

Critical discussion of ideas/evidence

Includes weighing up explanatory value, veracity, practical possibility of interpretation of ideas into practice. Examples of indicators:

- mentioning difficulties for and challenges to ideas
- drawing inferences from evidence
- presenting different possible interpretations of the evidence
- discussing how ‘complete’ the evidence is (i.e. has significant evidence been omitted to allow a biased conclusion? e.g. has conflicting evidence been omitted?)
- asking what assumptions are being made
- commenting on logic and coherence of position
- considering what agenda might be served by the evidence/the extent to which the evidence is from a reliable, disinterested source
- considering the nature of the evidence, i.e. reliability, validity, generalisability
- discussing what conclusions can be drawn from the evidence and how these conclusions are justified; noting limitations – e.g. presence of scalar insufficiency (where mention is made of the inadequacy of conditions to bring about the suggested effect e.g. ‘Group work may bring about cohesion within the classroom, but only if it is carried out everyday - once a week makes no difference’) noting neglected influential factor (participant points out another factor which has not been considered, but which may have an effect e.g. it’s hard to teach students to think if they’re in routine jobs that don’t require much thinking.’)

Informed proposals

- deducing implications of the evidence for practice
- generation of positions or courses of action,
- ideas for evaluating such courses of action

e.g. (Using a constructivist approach) An intervention could be set up to test the ideas in Rogoff's article: learners would be taught how to engage in dialogues which'

The infusion of thinking skills could be evaluated by examining whether students taught with this method gain better grades than those not taught this way';

Signposts

Statements directing the argument, referring to paper structure, rhetorical questions: for example, telling at various points in the paper what the writer is concerned about, trying to explain/illustrate/provide evidence of.

Background information unrelated to other categories

Any statements which are not tied to claims, evidence, discussion or proposals, and do not illuminate these matters, often providing a background that does not advance the writer's case e.g. detailed descriptions of the content of modules/units;

Table II: Mean number of statements per paper and percentage of statements per paper (expressed as means) in each coding category

Category	Total	Mean per paper	Percentage of paper
Personal claims/evidence	4318	134.9	28.2
Ideas in programme literature	3684	115.1	24.1
Critical discussion of ideas/evidence	407	12.7	2.7
Informed proposals	3668	114.6	24.0
Signposts	593	18.5	3.9
Background information unrelated to other categories	2620	81.9	17.1
Overall	15290	477.8	100