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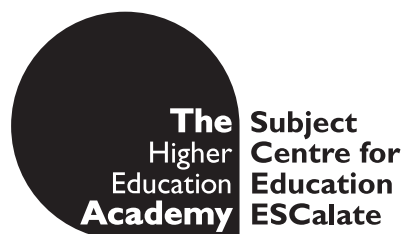
a new perspective on the elusive
activity of critical thinking:
a theoretical and practical approach

Dr Jenny Moon

University of Bournemouth/
Independent Consultant

jenny@cemp.ac.uk

Tel: 01395 276569



Introduction to this publication

This paper is in two parts:

Part One questions what is meant by critical thinking, referring to the literature in some detail to build towards a descriptive statement.

A particularly helpful aspect of Dr Moon's writing is the link made between critical thinking and the development of the conceptions of knowledge (epistemological beliefs) which have not been explored fully elsewhere.

Part Two focuses on the practical side of the issue for staff and students in HE, finishing with some photocopiable activity pages.

ESCalate and Dr Moon are both keen to receive comments and feedback on this publication via heacademy-escalate@bristol.ac.uk

Dr Julie Anderson, ESCalate

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SHORTCUT TO ACTIVITIES

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Part One

What is the elusive activity of critical thinking?

Why the confusion about critical thinking?

'Critical thinking' is like a number of words in higher education that sound 'good' and sit comfortably in, for example, the vocabulary of the Institutional mission statement. In mission statements vagueness may not matter, but when students are told 'through the use of critical thinking' they should analyse something, a more precise definition does matter. How can they develop something if they do not know what it is? (Meyers, 1986; Barnett, 1997) It is important, therefore, that we can form a clear view of critical thinking that provides a fruitful basis for pedagogical purposes(*) that can be understood by both teachers as well as students.

This guide aims to help us create such a view – and translate it to useful activities to develop critical thinking.

**we use the term pedagogy as a generic term for teaching / learning processes - not those specifically associated with childhood learning*

Critical thinking – the beginning of the search

There is not an agreed definition of critical thinking. There are some different views of and approaches to critical thinking. Ultimately we seek a common view. This view will need to accord reasonably with ideas in the literature, be coherent in itself and relate to common conceptions of learning. In particular it will need to have a practical basis that can be translated into use in the classroom.

We start with a few simple ideas. Critical thinking is clearly akin to processes of learning but the emphasis in 'thinking' is on the re-processing of material that has been learnt. The way in which the term 'critical thinking' is used implies that the subject matter being considered is complex and understanding is involved. For this reason, critical thinking would seem to be associated with the taking of a deep approach to learning and not to the taking of a surface approach.

The idea of critical thinking 'about something ...' seems to imply that there is a rationale for the process, and an outcome – or a judgement. There is also an idea that evidence is assessed or evaluated in the process – and that the process itself is subject to evaluation.

The 'critical' element in the idea of critical thinking causes most of the problems in definition because it suggests that critical thinking is more than simply the process of thinking. Many students who come across the word 'critical' would reasonably associate it with the everyday sense of making a negative comment about something. It is usual to tell them that this is not the meaning - but then to stall at telling them clearly what it is!

A first look at the literature of critical thinking

The lack of one clear definition of critical thinking is reflected in the literature.

Some approaches to critical thinking promote the teaching of **logic** (see articles in Mitchell and Andrews (2000), in particular, Sweet and Swanson). This is an approach that takes a technical view of the process of critical thinking as a cognitive ability that can be increased by knowledge of the rules of logic, and practice of them. There may be benefit from the learning of logic as a process, but it seems that, 'logic is a good way of teaching logic' de Bono (1982), and Meyers (1986) cites evidence to suggest that such learning does not relate directly to critical thinking abilities. However, the ideas of an approach like logic are retained in the notion that critical thinking is a sustained and systematic process of examination.

Other approaches to critical thinking are less rule-bound than formal logic. A common approach is to identify the **component processes, skills and abilities** in critical thinking in order to make the idea seem more comprehensible and to relate it more directly to practice. For example, in a study skills book for geography students, Kneale (2003) suggests that critical thinking is 'working through for oneself, afresh, a problem' (p3). She identifies some processes that might be involved as 'critically evaluating', making judgements, awareness of bias, 'commenting in a thoughtful way'. As in much literature that is meant to clarify, it is questionable as to whether student readers would understand these components of critical thinking any more than the concept of critical thinking itself.

Footnote : By a deep approach, we imply that the learner actively relates new material of learning to current knowledge, endeavours to understand it and will query and challenge ideas. (Marton, Hounsell and Entwistle, (1997).

Using a similar approach, Marshall and Rowland (1998) talk of the 'fundamental elements' of critical thinking as ... 'the presentation of arguments to persuade... debate and negotiating positions...reflection...it is a communicative activity...(it) has as its outcome making a decision and acting on what you have come to think and believe' and it 'involves emotion as well as reason and rationality' (p34).

A much more comprehensive example of the component processes approach to critical thinking is described by Paul and Elder (2004) in a booklet for staff and students called 'The Miniature Guide to Critical Thinking'. The definition of critical thinking in this booklet is 'a process by which the thinker improves the quality of his or her thinking by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them' (p1). This seems to be a promising definition - but the booklet expands into a range of other conceptions such as 'universal intellectual standards' (p7), which are - clarity, accuracy, precision, relevance, depth, breadth and logic, and 'structures'. By the end of the booklet it is difficult to see how all of these factors are interrelated. The miniature booklet approach seems attractive as a means of supporting students, but might be too complex for its size. It certainly stresses the use of a systematic approach, with expectation of a judgement as an outcome, with evaluation as an ongoing process, and with the sense that there are standards to meet in making the judgement.

Another approach to critical thinking that might seem to simplify it is the **sequence approach** in which a series of stages are given for the reader / writer to follow in order to arrive at a conclusion of some sort. Cottrell (1999) provides an example. She starts by saying that critical thinking 'means weighing up the

arguments for and against' (p188). She then describes a series of stages of critical thinking in reading, which also may be new vocabulary to the student (see above - eg 'critically evaluate' etc). The stages - or 'steps' - are as follows: 'identify the line of reasoning', 'critically evaluate the line of reasoning', 'question surface appearances', 'identify evidence in the text' 'evaluate the evidence' 'identify the writer's conclusions' and 'evaluate whether the evidence supports the conclusions'. These are good thinking activities, though the stages listed do not seem to lead the reader towards what she might expect to find from the initial definition - a 'weighed up' argument that is either 'for' or 'against'. It does not seem unusual for the processes to add up to a different end point than is initially implied - such as finding the 'correct' solution to a specific problem - which we would not normally call critical thinking.

A group of important writers on critical thinking describe critical thinking **in relation to pedagogical issues** and in so doing, adopt a less structured approach to its identity. Their work is particularly helpful since their concern was not to capture a tight definition but to facilitate the development of critical thinking in the classroom. One could say that their definitions emerge through the ways in which critical thinking is facilitated (usually by teachers). They mainly wrote at a time when critical thinking was widely taught in American College education, though an early proponent of this view was Dewey (1933). Brookfield's (1987) work seems to typify the 'pedagogical approach' to critical thinking. He says that, 'phrases such as critical thinking...are exhortatory, heady and conveniently vague' (p11) and that 'trying to force people to analyze critically the assumptions under which they have been thinking and living is likely to serve no function other than intimidating them to the point where resistance builds up against this process'(p11).

He advocates processes of 'trying to awaken, prompt, nurture and encourage this process' (p11). Meyers (1986) also focuses on how to enable learners to think critically, though his focus was young college students (Brookfield was concerned with adults). Like Brookfield, Meyers suggests that critical thinking should be fostered through engagement of students' interest and motivation in a facilitatory environment.

Another approach to critical thinking is evident in Barnett's work (e.g. 1997). Barnett considers critical thinking as an element of the taking of a critical stance – **an acquired disposition towards all knowledge and action.** This is a approach that includes emotional as well as cognitive and whole person functioning. Barnett suggests that learners progress in their process of critical thinking in specific areas to the development of the 'critical being' who has a critical viewpoint on the world, and who is willing to act on that view.

Summary

From the discussion so far:

- There is a sense that we think critically in order to reach an outcome and that outcome is usually a decision, or a judgement.
- Ideas that are the subject matter of critical thinking are complex.
- The process of critical thinking involves relatively systematic consideration of ideas that we might call 'evidence'. This might be called a process of evaluation of the evidence.
- There are associated notions of clarity and precision of the thinking process, and in the manner in which the case is represented. This does not exclude some aspects of broader exploratory thinking as well.

- There is some sense that there are standards for critical thinking - that the thinker makes an evaluation of the quality of her judgement that may take into account the wider context of the critical thinking event.
- Emotional factors may be relevant to the process of making a judgement.
- There is an implication in some of the approaches surveyed above that critical thinking is not just a set of abilities, but a quality of a person's relationship with the world that is nurtured and encouraged rather than taught as a 'one off'.

So far it seems that:

Critical thinking is a capacity to work with complex ideas whereby a person can make effective provision of evidence to justify a reasonable judgement. The evidence, and therefore the judgement, will pay appropriate attention to context.

These ideas suggest that critical thinking is about making a judgement based on appropriate and well considered evidence that takes account of the context in which the judgement is made. There are also a number of associated ideas that arise out of this statement. These are:

- the meaning of 'a judgement'
- the meaning of 'effective'
- clarity and precision playing a part in critical thinking
- the involvement of creativity
- the involvement of emotion
- the metacognitive process of monitoring the making of a judgement.

These ideas are considered more fully in Appendix 1.

Bringing new ideas to critical thinking: epistemological development

We now deviate from this line of reasoning in order to take account of an issue that is neglected in most of the approaches described above. Those approaches apply the same ideas of critical thinking to the higher education student at any stage of her development and do not seem to consider *progression* to be an issue either in a student's ability to think critically or in pedagogy. Barnett (1997) is an exception to this in implying that we should think of critical thinking as a process of development towards 'critical being'. We carry forward this exploration of critical thinking by considering a body of work on developmental epistemology, which describes the developing manner in which students conceive of the nature of knowledge. We will show that epistemology and the work on critical thinking are closely related and that epistemological issues need to be integrated into a definition of critical thinking and its pedagogy. In broadening our approach to critical thinking in this way, we add two elements to our thinking:

- The influence of the student's conception of knowledge in her ability to think critically and
- The implication from this that the capacity for critical thinking should be seen as a developmental process.

The term 'epistemology' is used here to relate to the learner's view of the nature of knowledge – we talk of a learner's 'conception of knowledge' or 'stage of epistemological belief' synonymously.

Epistemological development has been the subject of a number of studies over the last half century that indicate that there is a developmental sequence in

learners' conceptualisation of the nature of knowledge and that this influences the manner in which learners function - particularly affecting their capacity for critical thinking. Four substantial studies broadly concurred about the nature of the continuum that they documented among relevant experimental samples. They differed in the terminology that they used, in the populations that they studied, in their focus on gender and in the number of stages in the continuum that they identified. The studies were those of Perry (1970), Belenky, Clinchy, Goldberger and Tarule (1986), King and Kitchener (1994) and Baxter Magolda (1992, 1994, 1996). With the exception of King and Kitchener, a research method of semi-structured interviewing was used. King and Kitchener asked subjects to work with ill-structured problems and then discussed with them their experience of the process. These projects are explored in more detail in Hettich, 1997; Moon, 2004.

Baxter Magolda

In order to illustrate the concept of epistemological development, we focus here on the work of Baxter Magolda (1992). Baxter Magolda worked with college students of both genders, identifying four 'domains' (stages) in her scheme. 'Absolute knowing' is the least developed stage in her scheme. Here knowledge is seen as certain or absolute and formal learning is a matter of seeking and absorbing the knowledge of those who know – experts, who might be teachers (Baxter Magolda, 2001). This state of thinking is described as a 'dualist' position – with the notion of knowledge being 'right' or 'wrong' (Perry, 1970).

Baxter Magolda describes a second stage as 'transitional knowing', in which there are doubts about the certainty of knowledge – a sense that there is both partial certainty and partial uncertainty as well as absolute knowledge. The third domain is

'independent knowing' - when learners recognise the uncertainty of knowledge, and cope with this by taking the position that everyone has a right to her own opinions or beliefs. This seems to be an embryonic form of the most sophisticated domain, that of 'contextual knowing', in which knowledge is seen as constructed, and is understood in relation to the effective deployment of evidence that best fits a given context. Teachers are, at this stage, seen as facilitators and partners in the process of the development of knowledge. This is a 'relativist' position (Perry, 1970). The stages described by Baxter Magolda are illustrated by quotations from her subjects in Part Two.

It is important to note that very few of Baxter Magolda's subjects were actually in the domain of contextual knowing at the stage of first degree graduation, so our interest in this paper primarily concerns the shift from absolute thinking towards contextual thinking. Baxter Magolda found that two influences seemed to facilitate learners' progression into this latter stage after graduation – either the challenging experience of postgraduate education, or confrontation with the need to make significant independent decisions in work or other situations (1994, 1996). Later (1999 and 2001), she confirmed and expanded the latter findings – and we return to the practical implications of this for critical thinking below.

Baxter Magolda – Key conclusions

Baxter Magolda did not suggest that her subjects progressed steadily from domain to domain. She acknowledged that they shifted somewhat haphazardly between the domains and sometimes worked with different conceptions on different topics at the same time. While there is remarkable similarity in the four studies in the actual continuum from dualistic to relativistic thinking, the identity of the

stages has led to further discussion and some work that could seem to complicate the picture. Briefly we review some of this further work and then pull together the material on epistemological beliefs in order to relate it to critical thinking.

Further Studies

We start with another look at the significance of the stages in the continuum. Kember (2001) studied the learning of 'novice' and 'expert' part-time students in Hong Kong. He simplified the model of development of epistemological beliefs and conceived of two sets of beliefs at two poles of a continuum, which included factors of the student's view of knowledge, the nature of the teacher-learner relationship and responsibility for learning. These descriptions relate closely to the absolute and contextual knowing stages of Baxter Magolda (1992). Kember did not consider it necessary to identify as specific stages the intermediate progression between these two 'orientations', maintaining an open mind as to whether there were distinct intermediate 'stages'. He observed that students could hold a range of beliefs that related to both poles at the same time. His conclusion, however, is significant –

'what comes through strongly from this study is the importance (for students) of making the transition from one broad orientation to the other' during their higher education.

Other studies queried whether there was one quality represented in the continuum of development of epistemological beliefs, or more than one (eg Schommer 1990, 1993, 1994). It is useful that this question has been raised, but the evidence seems uncertain at present (Hofter and Pintrich, 1997).

Other investigations have looked at whether epistemological belief is affected by the nature of disciplines studied. There seems to be evidence to indicate that there are differences in the structures of disciplines that affect the progression and that learners are more and less challenged by different aspects of disciplines and their conceptual structures - Schommer and Walker, (1995); Lonka and Lindblom-Ylänne, (1996); Palmer and Marra, (2004). An alternative interpretation is that it is not the actual structure of the discipline that varies in its challenge, but the manner in which it is traditionally taught. There is a tendency to regard early parts of the study of medicine, for example, as primarily the inculcation of facts.

Ryan's work (1984) also contributes to the understanding of epistemological beliefs. Ryan (1984), based his work on Perry's findings and demonstrated that the epistemological beliefs of students at a number of stages of their college education related to different standards in their comprehension of a text and to different levels of academic performance. He suggests that '.....one's epistemological beliefsform the psychological context within which (the learner) develops standards' for evaluating the knowledge that has been extracted from a text. In other words, the reader's satisfaction with the quality of knowledge gained from reading a text is related to the stage of her epistemological beliefs. In the context of this paper, we might assume that the same 'standard' relates also to the reader's thinking and then reading of her own writing. It is interesting to note that Ryan also found that the individual's quality of epistemological belief predicted course grades 'even after the effects of academic aptitude or the amount of college experience (had) been eliminated' (Ryan, 1984).

Ryan's statement about the relationship between epistemological belief and course grade is echoed by, and directly related to critical thinking by Meyers (1986). He says that 'the real value of Perry's work (on epistemological beliefs) is the insight it offers into the reasons why most students do not think critically' (p97). Kember (2001) went one step further than Meyers, saying that 'critical and creative thinking is only possible if relativism is recognised'. We return later to this important point that **students need to be able to recognise relativism in order fully to engage with critical thinking.**

The development of epistemological beliefs – a conclusion for the purposes of pedagogy and critical thinking

There seems to be evidence to indicate that higher education is a process during which a student's conception of knowledge is expected to undergo a considerable shift along a continuum that we can broadly describe. If we work solely as researchers, we can afford to wait for the detail of this continuum to be elicited. However, if there is a concern for pedagogy - for example, for a means of understanding critical thinking, - we need to conceive of a framework that can enable us to understand better the manner in which students see knowledge.

From the review of the literature here and for the pedagogical purposes of this paper, this writer tentatively puts forward a simple model rather like that of Kember or like the two extremes of the Baxter Magolda scheme.

In this model students generally progress from absolutist to contextual conceptions, but they do this by shifting forwards and sometimes backwards in different areas of this progression as they encounter different challenges to their learning.

There seems to be some suggestion that when learners first encounter complex ideas, they may regress and treat the ideas in a more factual - absolutist manner at first (Baxter Magolda, 1999).

Furthermore, it seems most helpful for pedagogy to consider that there is a central line of progression in developing epistemological beliefs and further implications of that progression. By 'implications', we mean that, for example, as view of knowledge changes there will be a need for the learner to reinterpret her view of the world and her relationship to the world. There are implications also for the manner in which she sees her role as a learner who becomes more autonomous and therefore more in charge of her own development of knowledge and her role in relation to her teachers. As a consequence of this **there will be a shift of her view of teachers from expert holders of knowledge, to partners in the construction of knowledge.**

Baxter Magolda subsequently explored the later development of part of the sample of students that she followed through college and has been able to indicate some of the factors that contribute to further development. She found that the nature of postgraduate education drew students towards contextual conceptions of knowledge (Baxter

Magolda, 1996), as did situations in professional life that confronted these young adults. The particular kinds of situation were those that... 'held participants responsible for making their own decisions, required direct experience in making decisions and involved interactions with peers or co-workers to explore and evaluate opinions' (Baxter Magolda, 1994).

Baxter Magolda suggested that the involvement of college work with 'real-life' situations such as work in student affairs (student unions, etc.) and placements could furnish these kinds of experience very helpfully (see below), thereby enabling students to progress in the development of their epistemological beliefs. We might take from this the implication that we ignore the potential for epistemological development of activities that are outside formal education at a cost.

Another aspect of the later work of Baxter Magolda, still of relevance to critical thinking, broadened the picture. She looked at how epistemological development interacted with interpersonal and intra personal development (self in relation to others and the development of personal identity). She used the conception of development towards 'self-authorship' (1999, 2001). This links back to Barnett's notion of the critical being (1997), and usefully it acknowledges the social nature of knowing and knowledge, and the issues of risk-taking that are involved in critical thinking. Again we return to these ideas in due course.

A final position on critical thinking

The following statements will be used to guide the description of practical and pedagogical issues in the second section of this booklet.

Critical thinking is a capacity to work with complex ideas whereby a person can make effective provision of evidence to justify a reasonable judgement. The evidence, and therefore the judgement, will pay appropriate attention to the context of the judgement.

The fully developed capacity to think critically relies on an understanding of knowledge as constructed and related to its context (relativistic) and it is not possible if knowledge is viewed only in an absolute manner (ie knowledge as a series of facts).

The meaning of a 'judgement' may relate to a judgement of one thing against another/others (like a decision) or the judgement of the merit of one thing (sometimes in relation to a purpose or set of criteria). The idea of effective judgement implies effectiveness in the thinking and in the quality of the representation of the thinking in writing, speech, etc.

Correspondingly, both the thinking and its representation need to display clarity and precision.

Emotion is recognised to play a part in critical thinking as it does in all cognitive processing. The thinker should monitor the various influences of emotion, articulating this where possible and appropriate.

The critical thinker will be able to take a critical stance towards her actual process of critical thinking (metacognition).

Widening the view: critical thinking and its place

Opportunities for critical thinking occur all the time. We go back to Barnett's idea that higher education should be about the development of the critical being – the person who thinks critically as part of her way of life, and who is willing to act on her understandings. In their educational context, students make judgements all the time – in the process of revision of a piece of writing; in a decision how to tackle an experiment; in the organisation of time in relation to tasks to be done; in decisions as to what to revise; in the judgement as to what are the important points in a text and so on. They take evidence into account in making those judgements. Critical thinking in higher education is not only to be engaged when the essay title asks for it – but needs to become a matter of course alongside the development of students' conceptions of knowledge. It is this writer's view that the frequent allusion to critical thinking in higher education is actually a reference to epistemological development and not just to the cognitive process. It is a means of representing the need to shift learners from absolute conceptions of knowledge towards contextual knowing.

For a discussion of critical thinking and other academic activities – see Appendix 2.

Critical thinking and writing

The most obvious link between critical thinking and writing is in the use of writing to represent the process of thinking. Some people can better express what is in their minds than others because, for example, they have better capacity with language. The capacity to write clearly and precisely is particularly associated with critical thinking, both in the sequencing and layout of evidence, but also in the broader summing up of the case.

The links between critical thinking and writing go beyond the process of getting the content of the critical mind onto paper. The production of a paper 'version' of our thoughts provides a chance for review. It is a chance to engage in metacognition about our own critical thinking as we judge whether the material on paper says what we need it to say – and we duly revise it – or not. Once thinking is represented on paper, it can also be seen by others, who can also comment and make judgements about it – as in the process of peer review of academic papers or the assessment of student work.

An aspect of peer review is the consideration of the reference list. Initially we can see referencing as an acknowledgement of sources, but it has also much to do with the breadth of consideration and the quality of the evidence consulted – in other words, the critical thinking processes. Referencing also supplies information that helps a reader further to evaluate sources if she so wishes. In the assessment tasks that are set in order to evaluate student knowledge and ability to think critically, the listing of references has other purposes. Firstly it demonstrates to the assessor the breadth and quality of sources of evidence to which the student has referred in making judgements and secondly the discipline of writing references is a form of training for the student in the proper communication of academic knowledge. Critical thinking in its written form also relates to writing in a further way that is not often overtly considered. This is when writing most clearly interacts

with thinking and learning – when ideas are explored, 'toyed-with', tried out as notes in a note-book. The scribble of the idea on the back of the envelope, concept maps and other graphic depictions, layouts of ideas, lists and plans all come into this group. This is an under-exploited form of writing that has much to do with critical thinking in the processes of higher education. See Appendix 3 for some further details on this topic

Critical thinking and progression of student learning

The discussion so far indicates that the ability to think critically needs to be considered in relation to the progression of learning and thinking of learners. We have said that it is logically not possible to get an absolutely absolute thinker to engage in proper critical thinking and that learners' capacity to think critically will grow in relation to their epistemological development. A consequence of this is that we cannot expect first year students properly to understand what to do if we ask for critical thinking, though there are activities that can help them to shift towards this ability. As they progress, so the fostering activities can progress, always just moving beyond what is 'easy' for the majority, and recognising that some will need more support. On this basis, the activity that supports critical thinking will differ as the student progresses. The progression needs to be considered carefully and may be aided by the use of a questionnaire (eg Baxter Magolda, 2001) as a means of obtaining a picture of how the students conceive of knowledge. The information can then be used as a guide for the development of curriculum activities. In appendix 4 we make some suggestions as to what we can expect from students at different stages of their undergraduate studies and correspondingly for the ways of working with the students on the development of critical thinking. The writer invites comment and suggestions for amendment.

Part Two

The practical side of critical thinking

Critical thinking, writing and pedagogy – the development of a strategy

We now have a descriptive statement about critical thinking that can guide us in planning educational experiences for students in higher education.

We consider the practical implementation:

- As a set of principles to govern the pedagogy of critical thinking and epistemological development;
- As practical exercises and activities;
- Through the manner in which we view writing in higher education – we propose a new form of writing that can particularly support the development of critical thinking.

General principles for support of development in epistemological beliefs and the improvement of critical thinking

One person cannot make another think critically:

The nature of thinking of an individual is totally under the control of that individual. As Meyers (1986) clearly indicates, we facilitate or foster critical thinking through the tasks set, the habits formed by learners, the careful provision of feedback and explanation and the understanding of the teacher and the classroom atmosphere.

It is worth recognising that **there are several major strategies for encouraging critical thinking in programmes.** Lipman (1991) advocates facilitation of critical thinking through the teaching of philosophy to all students. Brookfield (1987) suggests that critical thinking can be introduced as a topic apart from the disciplines studied by the learners, and Meyers (1986) suggests that critical thinking needs to be integrated into disciplinary teaching.

Lipman's view is exemplified in the pattern of the International Baccalaureate (IB) in which there is study of 'Theory of Knowledge' alongside other disciplines. Theory of knowledge seems to be an important support to the learning of IB students, and appears to be very helpful in confronting higher education learning. We would therefore argue that there should be provision of this kind for all students in higher education.

Along the lines of Brookfield's ideas, non-discipline related work with critical thinking is probably justified in another way. Carey and Smith (1999) talking about younger students, suggest that there may often be a discrepancy between the stage of 'common-sense' epistemology and the stage that drives thinking on scientific work at school or college. If this is the case, then it may be possible to work at more sophisticated levels of thinking when the topic is related to every-day life.

Clearly, however, Meyers must be right in suggesting that discipline staff need to work with overt and well-understood concepts of critical thinking in their subject classes.

Our view is that none of the three approaches is wrong. The support of critical thinking development in a student needs to be the responsibility of all staff who work with students because all need to have the same expectations of the student. A general principle that emerges from the epistemological literature is that the **functioning of learners is drawn towards contextual knowing by just challenging them beyond their 'comfort zone of knowing'** throughout their studies, (King and Kitchener, 1994). This accords with Vygotsky's conception of teaching in the zone of proximal development (1978). The draft descriptors in Appendix 6 that attempt to describe pedagogical elements in the progression can help to guide this process.

Staff knowledge and development has a crucial role in fostering critical thinking. If critical thinking is closely associated with the student's progression along the continuum of development of conceptions of knowledge, then staff, who facilitate the learning of students, should be well aware of the continuum and use it to guide their teaching of and interactions with students, including assessment.

Meyers demonstrates in his book (1986) that a fruitful manner in which to enhance critical thinking, is to work with teachers, helping them to clarify the idea in their own disciplines and contexts. Through a dialogue method in a series of seminars, Meyers suggests how such developments can be initiated. In one of the sessions, teachers are asked to visualise their disciplinary framework for critical thinking (1986 – p19). It is the view of this writer that working with staff and developing their own conceptions of critical thinking in relation to their disciplines is the one of the most effective strategies for the development of critical thinking among students.

It is useful here to note the results of some Australian research. Brownlee (2001) looked at the epistemological stages of student teachers and found, not surprisingly, that they were not always fully developed in their understanding of knowledge, ie to contextual knowing. We have to recognise that it is common for UK students to be taught by postgraduate students who are at much the same stage. We do need to ensure that teachers have a sufficiently developed conception of knowledge before they are in contact with students.

Another important factor in the fostering of critical thinking is the need to recognise the **significance of the atmosphere of a class**. Learning to think critically and express that thinking is often risky for a student. Students can feel daunted by academia and the cult of the expert and challenged by the notion that absolutist conceptions are no longer appropriate. Kember puts this graphically in relation to the students in his study: students who commence higher education with (absolutist) beliefs can find the process difficult and even 'traumatic' – and that change does not take place over-night (Kember, 2001).

Recognition of the potentially difficult situation, Meyers says, is key to much of the success of facilitating critical thinking. He says that:

'Students must be led gently into the active roles of discussing, dialoguing and problem solving. They will watch carefully to see how respectfully teachers field comments and will quickly pick up non-verbal cues that show how open teachers really are to student questions and contributions' (p67)

Where Brookfield (1991) talks about the nurturing of student interest and curiosity, about the use of metaphor and analogy, Meyers talks of the presentation of paradoxes to 'set students' minds to pondering... (so that) ...disequilibrium... will challenge their old ways of thinking and prepare...' them for change (Meyers p44).

So we are suggesting that the classroom should feel as if it is a place where risk-taking is tolerated. It is a place for the exploration of ideas, rather than the simple transmission of knowledge, it is a place in which there is time in which to tease out problems rather than jump to a solution in an absolutist manner. It is worth noting that there are often difficulties in implementing this philosophy in higher education at the current time. Higher student numbers, the priorities of research, the tick-boxing of modern administration and quality assurance, and sometimes the naïve introduction of some technologies, can work against the provision of an atmosphere in the classroom in which good critical thinking is fostered.

Crucial to the generation of a nurturing atmosphere in a classroom is to ensure that teachers **model critical thinking** in the manner in which they teach (Meyers, 1986), (Topping, Crowell and Kobayashi, 1989). There is interactive teaching and there is presentation. Most lectures are 'presentation'. Even the vocabulary gives it away - the material is 'delivered' to the students. The tendency to use pre-prepared material – overhead projector slides and PowerPoint encourages the presentation of fully-formed ideas and takes us further from the chalk and talk methods in which teaching was seen clearly as a thinking process instead of the 'thought out product' (Moon, 2001).

The teacher needs to recognise and to work with the different capacities of students to think critically – which may well be related to their current conceptions of knowledge. At any one time, some able students will require to be challenged to enable them to maintain their interest and some will need help because they cannot cope and both of these activities have to be ongoing in a teaching situation. It is difficult!

Another aspect of classroom work that can help the development of critical thinking is the **deliberate encouragement of interaction between students**. Critical thinking is a social activity because the agreement that knowledge is acceptable is a social process. An 'agreement' 'holds' within a social and cultural context or community of practice at that particular time. A more practical reason why interaction is important in the process of critical thinking relates to the need to understand that there can be different perspectives, different views of the same idea. The exposure to the different perspectives that occur even within a class of students can facilitate the shift from absolutist thinking. Some of the techniques in the next section are based on this principle.

A further principle is that **we should overtly encourage students to engage in thinking**. The increasing use and acceptance of reflective learning, of learning journals and self-appraisal in the form of personal development planning (PDP) could seem to be leading in this direction. However, sometimes in these tasks we seem really to be valuing a box that has been filled, a task that has been done without paying attention to any real depth of the thinking.

Although critical thinking is very much in the language of education, it remains a word that has multiple and unclear meanings. Once definitions have been agreed, thinking activity words such as 'think critically on...' 'reflect', 'ponder on', 'judge', needs to be given space and time, talked about, brought into the lecture and the tutorial in practical ways. This idea is expanded in the section of activities below.

We could see the recommendation for **provision of examples of critical thinking** as a technique – but it is upgraded to a principle because it seems so important across so much teaching in higher education. Many students, in particular those from non-traditional backgrounds, do not know what is expected of them in their studies (Moon, 2005). They ask for examples but it is common for higher education teachers to resist the use of examples because students might copy them or think that there is only one way of doing a task. Providing students with examples of the quality or standard of work that they should be doing in the present, and of work that they will be doing at the next level, provides them with a picture of what is expected. The process of using examples is aided more if students are shown poor work as well, in which critical thinking has failed to occur. The examples need to be accompanied by a commentary or annotated with respect, in this case, to the critical thinking (and not the content).

Assessment and critical thinking: we have said that in many current situations in higher education it can be difficult to facilitate critical thinking through supportive classrooms. Student numbers are too great and teachers tend to be anonymous – or at a distance. We have to consider ways of encouraging critical thinking that do not rely on the immediate presence of a helpful teacher. An important or the most important ‘driver’ to learning is assessment. We need to show students the importance of critical thinking overtly in the manner in which we assess their work - because what we assess is seen by students as a marker of what it is that is important for them to achieve. We can show the role of critical thinking in assessment by talking about it and by making it very evident in the criteria for assessment tasks.

The fostering of epistemological development of a group of students requires careful management. If we are to take the epistemological development of students into greater account, there are implications for the management of student learning and their autonomy. One of Perry’s books beautifully illustrates this point in its title (1970). It is called ‘Different Worlds in the Same Classroom’: some students shift rapidly towards

contextual knowing, while others are stalled at the absolute stage of knowing in the same group. There is rightly opposition to the notion that students should be ‘spoonfed’ and not challenged (Furedi, 2005). We have said that to challenge students’ learning is the manner in which to help them to progress, on the other hand, we need to recognise that some students will still be needing greater support in order to shift from their absolute position (Moon, 2005). Both support or ‘spoonfeeding’ and challenge may be correct strategies for a mixed group of students – and methods of managing this situation will need to be found – preferably without sending the non-progressing absolutists to anything remotely like a remedial service.

In order to facilitate critical thinking we need to take writing more seriously: as we have already said, writing is central to the development and use of critical thinking in higher education.

Techniques for encouraging the progression in epistemological beliefs and the improvement of critical thinking

We consider some techniques under the following headings:

- Teaching of philosophy or theory of knowledge
- Talking about epistemology and the process of critical thinking
- Critical thinking about 'real life' issues
- Placements and out-of-class activities
- Use of reflection to enhance critical thinking
- The deliberate provision of 'thinking time'
- Encouraging critical thinking through the processes of assessment
- Oral critical thinking
- Writing and critical thinking

We have stressed that the teaching of critical thinking is not 'one off', but a matter of constant revisiting, all the time taking note of the students' developing conceptions of knowledge.

N.B. Many of the exercises shown can be used at any stage with appropriate adaptation of the material, but some are more suitable for the initial stages of development of critical thinking, and some are designed for later use. Notes are made to this effect on the exercises.

Teaching of philosophy or theory of knowledge

■ Philosophy used to be a usual first year subject in higher education. It has been edged out, but it is surprising how many academics would still wish it to be in place. International Baccalaureate (equivalent to 'A' level) students study 'Theory of Knowledge' (TOK) in order to help them to understand the structure of disciplines, and the differences between them. Although they may find it hard to start with, they are better equipped for any further study and appreciate that. It seems reasonable to assume that well taught TOK helps them along the continuum from absolutist conceptions of knowledge towards contextual conceptions. Such study would seem particularly to support students who are covering several disciplines, where no one teacher has the experience to help them across their range of study. It also provides an excellent basis for the development of the lifelong learner. TOK may be best used twice in the course of an undergraduate programme – once early on and then later in a more reflective and metacognitive mode – as a review of the nature of learning.

Talking about epistemology and the process of critical thinking

■ We need to talk with students about what critical thinking involves and what we mean by evidence and judgement. It has been noted above that sometimes critical thinking relates to the evaluative judgement of a single concept and sometimes it relates to a judgement that compares several concepts.

The process of describing critical thinking needs to be well illustrated by considered examples. The subject matter may be from the students' discipline or it may be an every-day example – probably preferably both.

The teaching and explanation need very much to relate to the stage of conception of knowledge of the students – and because of this, the subject matter needs to be revisited several times during a student's progress through higher education and considered in an appropriate manner.

■ It would be useful to show learners at entry to university how their conceptions of knowledge are likely to change in the period of their education. There could be a logical contradiction in this in the sense that if they can understand the kind of thinking that they will be doing, they could be argued to be able to do it now. However, as we have said, there is evidence that learners are not totally based at one stage, but, for different areas of knowledge, may be at different stages. On this basis, it is worth doing some work with them on the conceptions of knowledge. An exercise that the writer has used extensively with teaching staff has been adapted for use with learners. The process involves the preparation of some quotations from subjects (students) who were interviewed in Baxter Magolda's (1992) study. There are quotations from students at each of the four stages. Participants in the exercise are given a description of the stages that were identified by Baxter Magolda, and asked to group the quotations appropriately. They are asked to think about what their own students say to them. The 'student' version consists of fictitious 'quotations' that are more clearly and overtly related to the four stages (Moon, 2005a). This exercise is a way of opening up a discussion about critical thinking. Although presented here for students, it is important that their teachers have the same understanding – maybe also having done the exercise.

Critical thinking about 'real life' issues

■ There are several justifications for talking about critical thinking in terms of real life. Firstly, it is important for students to realise that critical thinking is an every-day activity, not confined to the academy. Secondly, however, students' conceptions of knowledge may be more advanced in relation to 'real life' issues than in academic issues. 'Real life' issues arise out of the everyday situations of students' lives, personal experiences in which judgement has been made / has to be made and 'real life' issues in the discipline as in research dilemmas or ethical issues. From the arguments in the first section of this paper, it would seem useful to ensure that critical thinking in the everyday life is brought into the academic situation early on as a means of support for critical thinking.

Placements and out-of-class activities

■ Baxter Magolda identified the qualities of experience that supported development towards self-authorship, and identified situations in which these might occur for students at college or in their early post-college years. These ideas have been linked with the observation that students who go out on work placements within a higher education programme tend to achieve higher classes of degree (Lucas, 2005). Clearly this cannot be generalised for all work placements – some are dreary, routine and the student has little responsibility. However, it is possible in a placement to enable the student to have more opportunities to make real judgements and decisions, to meet conflicting views, and to lead others, and these situations seem to enhance these aspects of development.

■ It would seem useful to employ some of the ideas in the section above as criteria for the design of good quality work placements or out-of-class activities. However, there are ways of providing these experiences within the higher education curriculum. Many institutions provide students with the opportunity to gain credit for work experience – sometimes basing this on the work that students are doing to support themselves financially (Watton, Collings and Moon, 2002). There are other examples in which, for example, local employers provide students with real projects that are incorporated in their programmes of study – and which demand the making of professional judgements. This is probably an activity suitable for more advanced students.

■ The value of work placements and of the experiences that we have mentioned above, are enhanced when students are asked to engage in reflection, sometimes in a learning journal for example (see below).

The use of reflection to enhance critical thinking

■ We said above that deep reflection is similar to critical thinking but tends to be more often associated with thinking about the self and personal activities and critical thinking tends to be more associated with the need to arrive at a conclusion or judgement. More superficial reflection is probably less closely related to critical thinking. The introduction of reflective activities into the curriculum will usually support the development of critical thinking so long as the reflection is sufficiently deep (Moon, 2004).

■ In relation to the link between deep reflection and critical thinking, there is a series of activities designed to deepen reflection in Moon (2004 - eg The Park). These are based on a generic framework for reflective writing (Moon, *ibid*). These exercises can be used to deepen critical thinking – possibly at more advanced stages in undergraduate work.

■ Learning journals are containers for reflective work (Moon, 1999). They take many different forms and may be designed directly to underpin critical thinking activities. They may, for example, be the 'thinking place' for research projects, or the place in which there is critical thinking about (appraisal of) the quality of personal (perhaps also professional) activities. There is an issue of risk for the student working on a learning journal where the journal is to be seen by another or marked. A useful strategy to avoid this situation can be to ask students who have kept a journal to write an account of their learning, with quotations from the journal – a form of secondary reflection. It is this that is marked.

■ Personal Development Planning (PDP) is a reflective process in which most UK students are now engaged. PDP mainly involves self appraisal – a critical thinking process about personal experiences, progress, decisions etc within a higher education programme. There can be a danger of the appraisal being a strategic tutor-pleasing account, or a box-filling exercise – neither of which have much to do with real critical thinking. If there are questions, they should be challenging to the student either in the range or novelty of information to be taken into account, or in the depth of consideration required. It is worth explaining to students the link between critical thinking and PDP, recognising that critical thinking is a broader concept.

■ Metacognition is a form of reflection in which a process of cognitive work, itself, is reviewed. The focus is not on the content of the work, but on the cognitive processes – and as such, this is an activity that is a part of good quality critical thinking. Metacognition is encouraged when students are asked to discuss the manner in which they have tackled a task. They might be asked to discuss their processes of writing essays or conducting a project. While the term does not imply evaluation or a notion of 'what I would have done better or differently', it is

useful to incorporate this idea. It is probably an area of activity that should be brought further to the fore in later undergraduate education.

■ The process of secondary reflection involves a critical review of initial reflection in order to deepen and perhaps broaden the outcome. Secondary reflection may be used with any of the other reflective activities that are described above. It tends to improve the learning achieved in the initial reflection.

The deliberate provision of thinking time

■ It often seems that while higher education is meant to be about the promotion of thinking, the manner in which pedagogy is conducted provides little time for thought. Lecturers start speaking and continue to speak until the end of the lecture and students need to move on to the next class. If we believe in the encouragement of critical thinking, we should build time for it into academic work. (The use of reflective activities can be construed as one means of providing thinking time).

■ A helpful means of acknowledging thinking time is to develop a terminology for it – ‘stop and think’, ‘thinktime’. These terms might imply the stopping of a seminar or lecture in order that students can think about a particular point, or write notes down on it or make critical comments (see ‘quickthink’ below).

■ The idea of providing thinking time relates back to the teacher also. She should take time to listen reflectively to students. This means that she does not just give a direct answer to a student’s question (as an expert) but, where appropriate, engages in dialogue with the student.

■ ‘Wait time’ is a concept developed by Tobin (1987). Tobin found that where lecturers used a speech style that involves brief pauses (eg asking rhetorical questions, building in reflective pauses, making pauses between topics etc) students learned

better. It seemed that their brains had time to process information and to think. This seems to be one of the most meaningful findings in educational research – and yet we so rarely deliberately take note of it.

Encouraging critical thinking through the processes of assessment

■ There are many activities in higher education that represent forms of critical thinking and judgement in practice. The quality assurance processes, and peer review of academic work are two, and so is the process of assessment of student work. A general principle is that we need to encourage students to become more used to looking at each other’s work and we need to ensure that they understand the difference between being critical in a negative manner, and constructive.

■ Attitudes towards assessment in higher education often reflect somewhat absolutist values – assessment is a mysterious judgement that is made by an expert who somehow ‘knows’ the mark to attribute. If the assessment criteria are introduced, and, even better presented as contestable, then assessment can be better viewed as a judgement that is subject to critical thinking. This is doubly true if students are themselves involved in the development of assessment criteria.

■ If students are to be engaged in the development of assessment criteria, a decision needs to be made as to which kind of criteria are to be developed – threshold criteria, or those associated with marking - grading criteria (Moon, 2002). Students are asked to produce a sample of the material that will be assessed, or are given a sample to read (if it is written). In groups, they generate some assessment criteria that they consider to be appropriate. One method is take one criterion from each group in turn until all of the criteria are ‘used up’. The list of criteria is then reconsidered, and a suitable number are

selected for use (Moon, 2002 after Brown and Dove, 1991). In this activity, the element of critical thinking is the selection of appropriate evidence for making the judgement.

■ Peer assessment, which may or may not involve the learner-generated assessment criteria – is related to critical thinking because it provides practice in making the judgement on the basis of evidence. It involves students in marking the work of their peers on the basis of the given criteria. Students learn much about standards of work expected, ways of writing (and otherwise representing their work) through this process.

■ In the process of self-assessment, students assess their own work against a set of criteria. They thereby learn metacognitive skills (see above), they learn to make judgements, and usually they learn how to do their work better the next time.

Oral critical thinking

■ We have said that critical thinking has social dimensions. It is valuable to encourage the oral expression of ideas for several reasons. Firstly, self expression is an important self development skill, Baxter Magolda (2001) associates it with self-authoring (see earlier). Secondly, from the point of view of critical thinking, the exposure to the views of others helps learners to recognise the need to take multiple perspectives into account in the process of thinking. Any form of group discussion can be helpful in the process of critical thinking, but there can easily be 'drift' in the discussion of a group. The requirement for a decision, or judgement to be made or conclusion reached in a limited time, and the identification of someone as a 'chair' can keep the process moving. Several groups set up in competition to reach a well evidenced judgement in a certain time can raise the tempo and maintain focus effectively as well.

■ Debate is designed to enact critical thinking – with evidence given, evaluated and judged. Tutorial groups can be good situations for debate. One problem is that in traditional debate situations, not everyone is involved. One way of ensuring some involvement of everyone is to give learners the subject matter of the debate and ask everyone to prepare a case either for or against. The choice of who is to be the actual proposer and seconder is only made at the beginning of the session itself. In that way, everyone is prepared, and can therefore contribute.

■ The writer uses the term 'quickthink' for short exercises wherein learners are asked to think about a particular issue in groups of three, for three or four minutes. The subject matter is likely to be the definition of a contentious term or a difficult idea. One of the learners in each group writes notes. Responses from some or all of the groups may be requested, though the outcome may be less important than the process of discussion and sharing of perspectives.

■ Meyers (1986) suggests that a pattern is adopted in which each class is introduced by the posing of a controversial or difficult question. At the end of the class there could be a five-minute discussion of the issue.

■ A system that involves the pairing of 'critical friends' can generate critical thinking and associated metacognition. A critical friend is a person who considers and is constructively critical of the work of another. The roles would usually be reciprocal. A critical friend system can be associated with a single task or the work of a whole year or module. There may be some learning associated with the role so that the critique follows specific lines. It might be linked, for example to work described in 'Talk about epistemology...'

Writing tasks and critical thinking

Because writing plays a particularly important part in critical thinking, we have structured this section slightly differently. The exercises address:

- the skills of writing that are associated with critical thinking;
- critical thinking as represented in writing;
- epistemological development.

The subject matter for writing exercises of the types described below could either be within or outside of the discipline studied. It could be drawn from politics or current affairs, a common philosophical debate or it could be in an everyday application of the discipline studied. Most of the subject matter for these exercises will involve issues that might be called 'ill-structured' – where there is no obvious right or wrong response.

The first five exercises are particularly useful for students in the early stages of critical thinking

■ **Summarising and the ability to write a conclusion:** a learner is presented with a piece of writing that represents critical thinking about a particular (given) topic. The purpose and or audience may also be specified. The learner is asked briefly to evaluate the evidence and write a conclusion. This exercise is for the purpose of enhancing the understanding of critical thinking, and student's ability to conclude a piece of writing.

■ **Summarising the evidence:** a learner is presented with a piece of writing that represents critical thinking as before. Here the emphasis is put on production of a good summary of the evidence.

■ **Taking different disciplinary perspectives:** a topic is given. Learners have to make notes of the different views of the topic from different perspectives. The topic may or may not be fictitious. For example, it is proposed that a new road should

be built to by-pass a village – some details about the situation are given. Notes are made on the viewpoints that might be associated with the various parties affected.

■ **Making a judgement:** learners are asked to make a judgement about something unfamiliar – for example, a piece of art work, a piece of aesthetic writing, sculpture, a film. When they have made the judgement, they are asked to identify the criteria on which they made the judgement, and to compare them with those used by other students. The focus is not on the content of what they have written, but on the criteria used and how they contribute to making a judgement.

■ **Making a judgement, starting from another perspective:** perhaps as a follow-on from the previous exercise, learners are asked to make a judgement about something (work of art, poem etc) for a given purpose and the judgement is made from the viewpoint of another / others – eg much older, much younger in age or with a different cultural background, or educational background. The focus of this exercise is on the ways in which other perspectives need to be taken into account in a judgement.

The next set of exercises can be useful for students in the middle or towards the end of their undergraduate studies.

■ **Share thought processes on a particular (contentious) issue or matter for judgement in the form of concept maps,** and write about the different views indicated, trying to resolve them.

■ **A fictitious debate:** a group of students construct notes towards a debate or write a piece that has the structure of a debate on a given topic. They will need to consider the nature of the characters who propose and oppose the motion and note the points that they make with evidence that they give. This exercise could be done by an e-mail group.

■ **Practice of peer review skills:** a simplified or fictitious version of a research paper is given to students to read in a 'mock' peer review situation. Learners are asked to make a judgement of the paper (eg as suitable for publication). They are asked to consider assumptions made, to consider the quality of the evidence for the findings, to identify gaps in the research evidence, etc. and to provide justifications for their decisions.

■ **Mark an essay based on critical thinking:** learners are given a prepared essay (made up, or by agreement with the writer) that has required critical thinking. They are asked to mark it for the quality of the critical thinking. They compare their marks and identify the criteria on which they based their marking. It is useful to use good and poor essays so that there can be direct learning from the good ones and the recognition of problems in reasoning in poor essays.

The next set of exercises can be helpful at any stage in undergraduate education, though the complexity of the subject matter will vary.

■ **Short answer tasks:** learners are asked to respond to critical thinking tasks – eg to respond to statements in 300 / 400 words, forcing them to be precise and succinct in their writing and reasoning.

■ **An exercise to demonstrate that people understand things differently:** a lecture / talk is given on a topic that is reasonably complex and probably on a topic within the discipline. Learners take notes at the time and afterwards are asked to compare their notes.

■ **An exercise in which there is emphasis on the identification of the main points and important evidence:** as above, learners are asked to listen to a lecture / talk in which evidence is given for a particular stand. Learners are asked to

summarise the subject matter of the talk / lecture, focusing on the main points made in support of the argument, and the nature of the supporting evidence. This could be used in the first stages of undergraduate education.

■ **Looking critically at one's own work - drafting and redrafting:** this is an exercise on clear writing. It is also a means of showing learners that their perspectives change over time and as they learn more. A set of learners' writing (eg essays) is kept - or copies are made. A while (eg 3 months or longer) after this first writing, the material is given back and learners are asked to edit the material, clarifying the points made and identifying what they would change.

■ **Practice in metacognition:** learners are asked to go back over a piece of work that has involved judgement and to write a reflective commentary on their process of going about the task – the research and the writing. They are asked to consider areas of the process that they would change another time.

■ **'Compare and contrast' tasks:** these could be done in columns, notes or text depending on the exact emphasis of the exercise. Learners can be subject to a restriction on numbers of words.

■ **Learners write a discussion between two theorists (could be fictitious or real) about a topic in their discipline.** They are asked to think about the position that each would take, and the kind of evidence that they would bring into the discussion. The aim of this exercise might be to demonstrate how two experts can apparently disagree about the same subject matter.

Finally, the following exercise is on the stages of understanding of knowledge based on Baxter Magolda (1992).

Exercise on the stages of understanding of knowledge – based on Baxter Magolda (1992)

This is based on Baxter Magolda, M (1992) *Knowing and Reasoning in College*, San Francisco, Jossey-Bass. The exercise that I use with staff utilises actual quotations from the subjects involved in Baxter Magolda's study. For work with staff or students (eg in the final year of undergraduate provision), I have written fictitious statements that illustrate more clearly the stages of thinking that Baxter Magolda described. Most undergraduate students will not have fully reached the stage of contextual thinking, but it is probably still useful to give them the exercise and then to describe the stages of thinking. It is best if participants work in groups of around 6. The material required for the exercise is as follows:

- A – description of all of the stages of understanding of knowledge (one for each participant)
- B and C – Materials (B) and (C) are both based on the same text.
- B – To make (B) material, photocopy the material below, enlarging it - and cut up the quotations so each quotation is on a single strip of paper (or better – on card). Discard the headings and introduction. You need one set of cards for each group.
- C – the handout for (C) is as it is printed below (B and C) – and one for each participant is required. This is, in effect, the 'solution' to be given after the cards have been ordered.

Each participant is given the information (A) first. Each group is then given the material in (B) in card form and the group is asked to classify it under the four stages. They will need at least 10 or 15 minutes for this. When they have finished (or time is up), the handout (C) is given, which shows the 'correct' solution. They will need around 10 or 15 minutes to compare their work with the 'solution', then to relate the actual quotations to the stages in handout (A).

Material A

The stages of thinking described by Baxter Magolda (1992)

Stage of Absolute Knowing

In this stage knowledge is seen as certain or absolute. It is the least developed stage in Baxter Magolda's scheme. Learners believe that absolute answers exist in all areas of knowledge. When there is uncertainty it is because there is not access to the 'right' answers. Such learners may recognise that opinions can differ between experts but this is differences of detail, opinion or misinformation. Formal learning is seen as a matter of absorption of the knowledge of the experts (eg teachers). Learning methods are seen as concerning, absorbing and remembering. Assessment is simply checking what the learner has 'acquired'.

Transitional stage

There is partial certainty and partial uncertainty. Baxter Magolda describes the transitional knowing stage as one in which there are doubts about the certainty of knowledge – learners accept that there is some uncertainty. Authorities may differ in view because there is uncertainty. Learners see themselves as needing to understand rather than just acquire knowledge so that they may make judgements as to how best to apply it. Teachers are seen as facilitating the understanding and the application of knowledge and assessment concerns these qualities, and not just acquisition.

Independent knowing

Learning is uncertain – everyone has her own beliefs. Independent knowers recognise the uncertainty of knowledge, and feel that everyone has her own opinion or beliefs. This would seem to be an embryonic form of the more sophisticated stage of contextual knowing. The learning processes are changed by this new view because now learners can expect to have an opinion and can begin to think through issues and to express themselves in a valid manner. They also regard their peers as having useful contributions to make. They will expect teachers to support the development of independent views, providing a context for exploration. However 'in the excitement over independent thinking, the idea of judging some perspectives as better or worse is overlooked' (Baxter Magolda, 1992 - p55).

Contextual knowing

Knowledge is constructed and any judgement must be made on the basis of the evidence in that context. This stage is one in which knowledge is understood to be constructed, but the way in which knowledge is constructed is understood in relation to the consideration of the quality of knowledge claims in the given context. Opinions must now be supported by evidence. The view of the teacher is of a partner in the development of appropriate knowledge.

Material B and C

Fictitious quotations from 'students' at different stages of understanding of knowledge

Absolute

■ **Julia:** I like clear lectures where the lecturer does not mess around giving us lots of different theories for everything – but just tells us what we need to know and we can get on and learn it.

■ **Emma:** I am not sure why we have such a long reading list for this subject. I mean why does someone not just write a textbook on the subject and then we could learn from the textbook. Lectures sometimes confuse me, the way they wander around the subject.

■ **Samuel:** In our tutorial, it came out that there are differences of opinion about how much different mammals plan their actions ahead. I suppose it is just that people have not done the research yet. There does not seem much point in disagreeing about it when the work has not yet been done.

■ **Mohammed:** I do not understand why we have to do this referencing game. It all seems such a chore. I mean it disturbs my writing and I can't flow. Knowledge is knowledge isn't it. Facts are facts. Why does anyone have to own a fact and have their name put beside it?

Transitional

■ **Janine:** I have been a bit confused by the way that the two lecturers I have had in this subject have dealt with the battle of Samargo. They seem to have different attitudes to it. One said that it came about because of political reasons and the other said that it resulted from an uprising of the poor. I don't know how to handle these different attitudes when I have an examination coming up and I feel I'd better know the right answer. Or is it that I have to understand it and that is what matters?

■ **Charlie:** Learning in sociology seems hard. I had got good at writing clear lecture notes either from the lecture or from the web. This teacher won't give us notes. She won't even give us straight lectures. We all thought it was a game at first but now we have had a semester of it, I guess I have come to quite enjoy the thinking that I am forced to do and I can discuss the ideas better because I have had to think.

■ **Isaac:** I thought I came to college to stuff my head with what is known. Now I feel confused because there are lots of things that are not certain. I have to think about what I do with those ideas.

■ **Christina:** I like subjects where I know where I am like Physics. In English there are different ways of thinking about things. Physics theory is Physics theory and that is what you learn. In English it is OK to have different views. You have to understand how the views work.

Material B and C

Fictitious quotations from 'students' at different stages of understanding of knowledge

Independent

■ **Ella:** I used to think that everything was so certain – like there was a right answer for everything and what was not right was wrong. Now I have become more aware of people arguing over issues, debating. I suppose it is a matter of coming to your own conclusions and sticking to those.

■ **Kay:** I do statistics. It seems at first that statistics is statistics – a kind of truth - but now I see that you can make statistics back up any argument. I suppose it is a matter of deciding what line you are taking and then making the statistics work for you.

■ **Dale:** It is good in seminars now. I see that my mates sometimes have made different senses of the lectures on politics than me. It's not that one of us is right and the rest not right – but that we have to get good at justifying the way we see it.

■ **Michael:** I was asked to critically analyse some theories about delinquency last semester. I wasn't sure exactly what was meant by that. I thought it was probably about discussing each of them and arguing my case for the one I thought to be right.

Contextual

■ **Elke:** I like having to work in groups now in social work. It is amazing that we have all developed such different perspectives since we have come back from placement. We are much better at listening to each other now. I know that I am all the time trying to understand how each of us justifies our views and listening to others helps me to put together my own thoughts.

■ **Krishna:** The tutor I have got now would have driven me mad last year. He just sits there and says 'OK, what do you think about this theory of coastal erosion?'. He goes quiet and we talk. Then he will make the odd remark that usually sets us off again. I jot down some notes so that I take everything into consideration when I have to write it all up.

■ **Francesca:** I understand better why we have to put down references. The quality of the reference and the way I have used it provides the evidence for the viewpoint that I take and enables others to check the evidence I have used. I used to think referencing was just about showing that I was not plagiarising.

■ **Darren:** When I was reading this chapter, I was thinking 'how does this fit' and ' why does the author seem so sure about this?' and I was relating it all to my views and I think my views might have changed now.

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Appendix I

Towards a final statement on the nature of critical thinking

We can now leave behind epistemological development and return to a few loose ends in the descriptive statement about critical thinking. These were:

- the meaning of 'a judgement'
- the meaning of 'effective'
- clarity and precision
- the involvement of creativity
- the involvement of emotion
- the metacognitive process of monitoring the making of a judgement.

We now look at these issues in greater detail and begin to lay the basis for the practical pedagogical section of this paper. We start by taking a closer look at the notion of **'a judgement'** in the context of critical thinking. There are at least two meanings of 'judgement'. Firstly a judgement can be like a decision to be made. In this case it is of one thing against another or several others in order to identify one for a particular reason. Alternatively the judgement may be about the quality of something for a purpose or for its merit (eg an idea or a work of art etc). In this case the critical thinking involves clarification, exploration of ideas and evaluation. Judgement against external criteria is likely to be involved in both of the meanings of 'judgement'. Different disciplines are likely to use the notion of judgement in critical thinking in different ways.

The **'effective provision of evidence'** has two linked meanings. In the first place, it means the gathering of evidence that is appropriate to the context of the subject matter, the situation and audience for the critical thinking, ie the effectiveness of the evidence. The second meaning of 'effective provision of evidence' concerns the manner in which the evidence is represented (eg in writing). It goes back to the ideas of thinking and the representation of thinking. Evidence can be described in more and less effective ways in relation to the making of a judgement – in written representation there are choices to be made about sequencing, weighting of the argument and so on. In this case we talk of the effectiveness of the provision of the evidence.

Clarity and precision are similarly qualities of critical thinking that apply both to the quality of thinking itself and separately, to the manner in which the critical thinking is represented. Critical thinking is often a process first of recognising jargon, woolly reasoning and vagueness, and then of reconsidering it to the point where issues are clearer and more precise. In terms of the written representation of critical thinking, clarity and precision are qualities of the writing – it needs to present ideas to the reader as clearly as possible in order that the reader may best comprehend the thinking of the writer.

Creativity is involved in critical thinking in the gathering of appropriate evidence. The abilities to gather unusual lines of evidence from 'far corners' of knowledge, and to see unusual links between ideas can be extremely helpful in producing effective evidence on which to base a judgement. Critical thinking is therefore a creative process.

The involvement of **emotion** in critical thinking is not subject matter to be dealt with in one paragraph. Damasio (2000) argues that emotion is involved in all aspects of every cognitive function and is central to consciousness. Taking this line, Moon (2004) analysed the role of emotion in reflection and learning and suggested that there are a number of different relationships involved. Emotion can be the subject matter of learning, can inhibit or facilitate learning, can change the nature of a learning process and can arise as a result of learning. It would seem that we could replace the term 'learning' by 'critical thinking' or any word for cognitive processing. In the quality of the

thinking process and in the process of its representation, what is important is an awareness of the subject of the role of emotion and how it contributes to or affects the thinking or writing processes. One of the difficulties of dealing with emotion is that its function is not always easy to express in language (Damasio, 2000).

The consciousness of the role of emotion in the thinking or representation of critical thinking is encompassed by the notion of **metacognition** in which the thinker / writer monitors the way in which she is engaging in the thought or writing processes. She might, for example, be aware that she is feeling negative today and that this could bias her choice of evidence in making a judgement. Metacognition is important therefore, in the evaluation of a judgement.

Appendix 2

Critical thinking and other academic activities – reflection and argument

There is one more matter to consider and that is the place of the new description of critical thinking alongside other academic activities such as reflective learning and argument. The writer has explored reflection (reflective learning) and reflective writing in detail elsewhere (Moon 1999, 2004). Reflective learning is seen there as a form of cognitive processing of complex issues when the material under consideration is largely already known. The relationship between reflective learning and writing is similar to that between critical thinking and its written form. It is of particular relevance to critical thinking that the quality of reflective writing is seen as a continuum from descriptive writing in which ideas are displayed but not subjected to further processing, through three more stages of 'deepening'. In the deepest level of reflective writing, there is conscious taking of multiple perspectives, the engagement with relevant prior experience, metacognition and the taking of the broader context of the issues into account. There is an awareness of relevant emotional issues and the manner in which they can relate to and influence thinking (Moon, 2004). Deep reflective thinking / writing has qualities that are close to those of proper critical thinking. We cannot therefore say that critical thinking and reflective learning are completely separate activities - however there are shades of difference in connotation. There is a sense

of critical thinking being more purpose -driven towards the reaching of a judgement, and more focused on the identification and evaluation of evidence. In this connection there is a connotation of precision about critical thinking that is not generally associated with reflection. While identification and evaluation of evidence may be involved in reflective learning, the latter may be more concerned with the exploration of ideas, which may be about the seeking of potential evidence. Also reflection is often (but does not need to be) associated with the functioning of the self. Metacognition is common to both reflection and critical thinking. In particular, it seems that the development of effective reflection and effective critical thinking are both contingent on the progression of the learner away from an absolutist position and towards contextual knowing.

As with reflection, there is a broad literature on argument in the higher education context. Like critical thinking, the nature of 'argument' is unclear or has local meanings in different contexts (see Mitchell and Andrew, 2000). In many ways it might exactly fit the statements about critical thinking, being dependent on a reasonably sophisticated set of epistemological beliefs (Jackson, 1997; Sweet and Swanson, 2000), the appropriate management of evidence, and the qualities of representation (Andrews, 1997).

Sometimes, as with critical thinking, there are more formal aspects of argument - eg use of the language of logic (Mitchell, 1997). As with reflection, we are in the position of looking at connotations. There is a sense that one argues for a specific purpose – in order to reach a point. While the statement about critical thinking above emphasises the 'good' processing of evidence rather than the final making of a judgement, the connotation of argument might be the effective reaching of the goal, the justification or the judgement is made, there is an emphasis on the 'winning' of one point over another.

In terms of connotation, therefore, we would say that effective reflection may entail critical thinking and that both may be a part of the process of argument. However, they are all cognitive processes that, in reality, are not likely to be represented as separate processes within our heads - in their neurology. We should therefore take care in the presentation of these terms to students who might well be concerned about their lack of understanding of what they reasonably take to be three distinct terms.

Appendix 3

Learning, thinking and writing – a first look

In this section, we step aside from the direct consideration of critical thinking to establish some links between learning, thinking and writing as a basis for our further considerations (Mitchell, 2002), and introduce some new vocabulary about teaching and learning. We use an example. A level one chemistry student, Joanne, has to learn about a chemical process used in industry. She might learn from a book, lecture or from a website or elsewhere. The material as presented in any of these situations is the material of teaching - the product of the teacher's teaching. What Joanne perceives of it is then her material of learning and this is not the same as the material of teaching (Moon, 2004). For example, when Joanne is in the lecture, she drifts into thinking about what she will be doing tonight. She misses hearing detail of one stage of the chemical process. What she perceives as her material of learning is now a distortion of the material of teaching. In the process of learning, we relate new external experience (ie material of learning) to what we know already (our internal experience - (Marton and Booth, 1997). In a second example of the distortion between teaching and learning for Joanne: Joanne's teacher makes some assumptions about the prior experiences of the class - that the students are familiar with particular terms. Joanne is not familiar with one term and guesses its meaning incorrectly. As a result of her prior experience being different from those assumed, another distortion arises in her understanding of the

chemical process. Joanne's misunderstanding remains in her head; no-one can realise that she has misunderstood the chemical process until she represents her learning in some way. She might talk about it or discuss it in a tutorial, or she might write about it in an essay or examination. The principle here is that what we have thought or learnt is only evident once it is represented, and writing is a particularly significant form of the representation of learning in higher education (whether on screen or on paper). At a basic level we would see thinking as a process in which ideas that have been learnt are manipulated, clarified or reprocessed for a purpose. It is similar to reflection (see later). The outcomes of thinking are represented in many different ways including speech – but writing is particularly significant in the higher education process (Moon, 2004).

The relationship between writing and thinking does not stop here. When we represent the outcome of learning or thinking, we have a chance to review it, evaluate it and recognise that it needs clarification. Writing is probably the easiest method in current higher education to represent learning because a record is produced. Speech, unless recorded, is transient. When we think about what we will write in order to make the representation that best fits the purpose for the writing, we organise what we have learnt (Moon, 1999). When we revise or redraft something because there are better ways of

representing the ideas, we reorganise it - in other words, via writing, we reformulate our internal experience, which, in turn, will be the basis for further learning or thinking processes. Joanne might discover the errors in her conception of the chemical processes as she writes up her notes, or when she reads back the material and feels that there is something amiss.

To make the next point about the relationship between writing and thinking, we return to general principles. The nature of the new learning that we can achieve from the process of representing our thinking or learning differs according to the form of the representation (Eisner, 1991) - we learn different things from representing the same learning differently. Writing about something is likely to yield different learning than drawing it, talking about it and so on. There are many different modes of writing (reflective, concept map, formal essay, narrative, poetry etc) and it seems reasonable to assume that we learn differently about the same subject matter from the different modes of writing. Joanne might discover her misconceptions through a concept map of the process about which she has written when she has not recognised it from her lecture notes.

These paragraphs link with the basic idea of assessment. When we assess student work, we do not directly assess learning or thinking, but we assess the representation of the learning or thinking. In effect, we test the learner on both her learning/thinking and the effectiveness of the representation. One of the other reasons for giving 'assessment tasks' to students is to create a possibility of a number of kinds of feedback on the pedagogical situation. At last Joanne might find out that she has misconceived the chemical process because in an essay, she gets poor marks and appropriate feedback from her teacher.

To summarise, links between thinking and writing are evident in the following processes:

- thinking is involved when we see what we have written and revise it to make better meaning;
- when we are stimulated to think in the process of writing (meaningful writing, not copying);
- when we are stimulated to think differently when we represent the same material in different forms of writing;
- and in putting our thinking into written words, we can give ourselves feedback and get feedback on it from others.

Appendix 4

Progression in critical thinking and its representation in writing in undergraduate education – a tentative guide for the purposes of pedagogy

This represents a tentative set of descriptors for the progressively increasing capacity of students for critical thinking and its representation in writing. It is based on the literature of this paper, and particularly on work on the developing conceptions of knowledge. In terms of that work, the progression covers the transition from absolutist thinking towards, but not as far as, contextual thinking (a stage that

would normally be fully reached after the first degree). The progression is a continuum and it is not assumed that students will shift along it in an even manner. Their capacity for critical thinking and its representation in writing will interact with the complexity of the material with which they are dealing.

Position in terms of conception of knowledge / epistemological beliefs	Pedagogical implications
<p>Students at the beginning of undergraduate education are likely to be at the beginning of the shift from absolutist /dualistic thinking</p>	
<p>Students are often somewhat daunted by the 'expert culture' of higher education and this may knock back their confidence in self- expression (voice) and in their understanding of knowledge. They are beginning to understand that knowledge is not an accumulation of facts but are bemused by uncertainty and the idea of theory unless these concepts are explained regularly. They start by seeing teachers as experts who will pass them the knowledge that they need</p>	
	<p>The nature of teaching at this stage tends to be somewhat fact-driven. It is helpful for future development of critical thinking if students are set tasks to solve alone or in groups (in some form of problem-based learning). The general principle is that students should be just beyond their 'comfort zone' in terms of thinking.</p> <p>General tasks – learners should:</p> <ul style="list-style-type: none"> - be given plenty of examples of what is expected of them in critical thinking (in all of the situations below) - should be helped to become aware that knowledge is not made up of 'facts', that uncertainty exists and that judgements need to be made - be exposed to the idea of critical thinking as fundamental to their progress in HE (Higher Education), the concepts of evidence, evaluation, conclusions or judgements. This should be illustrated in everyday material - be given tasks in which they deal with making judgements in everyday situations to illustrate critical thinking

Position in terms of conception of knowledge / epistemological beliefs	Pedagogical implications
	<ul style="list-style-type: none"> - be exposed to the idea that teachers / experts are also learners, and can 'get it wrong' - see experts in their discipline in the process of disagreeing, and there should be discussion of both content and the idea of the disagreement of experts - be involved in discussion about the idea of 'a theory', and the idea that several theories can legitimately be held about the same thing (illustration from own discipline – but done simply) - be exposed to uncertainty (eg as illustrated in everyday life and in the research fields of their discipline) - be engaged in tasks in which they have to seek for evidence to justify a claim in everyday life - students need to be given some tasks in which they make their own judgements and have a chance to express their own voices about an issue – probably an everyday example - be introduced to the idea of developing conceptions of knowledge in a manner well illustrated by everyday issues in thinking - exposed to general discussions about how knowledge is 'produced' – publication, media distortion, expert agreement, common usage, etc.
	<p>Writing tasks – should be used in which there is practice:</p> <ul style="list-style-type: none"> - In being precise and clear - In being able to draw a conclusion from the provision of written evidence - In being able to summarise the main points of an argument – such as introduction of the issue, the evidence, the reasoning about evidence and the conclusion and/or judgement made - In referencing. Students need to understand referencing as an acknowledgement of other people's work
	<p>General statement -</p> <p>These ideas need to be brought together coherently in a discussion of critical thinking and not introduced and then left as isolated ideas</p>

Position in terms of conception of knowledge / epistemological beliefs	Pedagogical implications
<p>During the middle period of an undergraduate programme, learners need to be supported in shifting towards a stage of contextual / relativistic thinking</p>	
<p>This is a time when there can be considerable differences in a classroom with some learners still at an absolutist stage and others who have moved beyond it</p>	
	<p>Teaching may still be fact-driven, and yet we need students to be beginning to realise that teachers have a viewpoint on issues and may not agree with each other. When alternative theories are introduced there is a tendency to present them as 'something that you need to know' (ie as a 'super-fact') rather than as a real uncertainty. This is a kind of absolutist teaching of contextual ideas</p> <p>General tasks – learners should:</p> <ul style="list-style-type: none"> - be given examples within their discipline of good quality critical thinking and attempted critical thinking where there is inadequate reasoning, or assumptions are made, etc - be shown how assumptions in research in their discipline have led to distorted judgements / conclusions - be exposed to situations in their discipline where experts clearly disagree - be shown how knowledge has been constructed within their discipline (eg by following the history of one line of research thinking...) - be given case studies / sample ideas from real issues in their discipline where, with guidance, they assess evidence and make a judgement - be exposed to teaching /tutorial situations in which issues of real uncertainty in their discipline are discussed - be required to make judgements that have direct significance for themselves or others (eg this could be in a work placement or work experience)

Position in terms of conception of knowledge / epistemological beliefs	Pedagogical implications
	<ul style="list-style-type: none"> - experience responsibility for significant actions – in or out of class - be introduced to the manner in which knowledge is produced and agreed in their discipline - be involved in well-illustrated discussion about how knowledge has come to be produced in their discipline (including notion of peer review) – and sources of distortion
	<p>Writing tasks – where learners:</p> <ul style="list-style-type: none"> - improve their clarity and precision in writing - draw conclusions effectively - demonstrate critical thinking in written form, using straightforward material from their discipline (probably with given or guided seeking of evidence) - demonstrate critical thinking in writing about an everyday issue in which they express their own voice, and are encouraged to be creative in seeking their own evidence - use referencing more as a matter of course
	<p>The discussion of the nature of critical thinking needs to be continued in an explicit manner</p>
The further shift: this is the final stage of undergraduate education	
<p>Few students will be consistently recognising and working with a contextual view of knowledge, but the challenges in their learning should be of this nature This is a time when learners tend to think that knowledge is about reaching and holding an opinion – without taking the context, fully into account</p>	

Position in terms of conception of knowledge / epistemological beliefs	Pedagogical implications
	<p>The teaching of final year undergraduate students can be much more 'research-based', dealing with uncertain situations, and areas of disagreement in the discipline. They should be working within the main body of knowledge of their discipline, and exposed to 'the cutting edge', but not expected to work at that level</p>
	<p>General tasks – learners should:</p> <ul style="list-style-type: none"> - display competent critical thinking in the relatively familiar areas of their discipline (ie not 'cutting edge') - the opinions that they form in written or spoken work should be subjected to challenge by peers or teachers - they should be able to recognise and challenge assumptions - their general attitude towards the discipline should be one of questioning - they should be expected to argue a case in their discipline - be exposed to situations in which they make judgements for which they have to take responsibility. This may be in a placement or work experience situation
	<p>Writing tasks – learners should:</p> <ul style="list-style-type: none"> - be able to judge the competence of their own writing and that of others (peers) - demonstrate critical thinking in a literature review, skills of evaluation and the making of discipline-related judgements, the writing of a conclusion to their own work - understand referencing as a matter not only of properly acknowledging sources, but also as a means of judging the quality of a piece of work (how many and which references are used, how have they been used, etc.)
	<p>General statement: The discussion of the nature of knowledge should be revisited. By showing learners how their views of knowledge have changed over their undergraduate education, it is possible to make ideas around the notion of the contextual knowing stage explicit, and to help learners to make sense of their 'learning journey'</p>

