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Essays and Studies

Enquiry-Based Learning: Definitions and Rationale

Dr W Hutchings

Contents

1. An initial example

"All teaching is balanced between the poles of heurism and of didactic suggestion."

This is one of the illustrative quotations for 'heurism' in the *Oxford English Dictionary* (*OED*). Illustrative quotations, introduced into dictionary practice by Samuel Johnson in his celebrated and ground-breaking *Dictionary* of 1755, enable the reader to relate definitions to usage, and suggest the range of contexts within which words have appeared. Johnson's principle, and the principle adopted by subsequent lexicographers, is that language fully reveals its meaning only in examples of its applications. But, further, as has often been noted of Johnson's own personal choices, the accumulated quotations can amount to, or at least approximate to, a body of knowledge on the topic being defined. They constitute a teaching experience, having the power of didactic suggestion.

In order to examine and assess this corpus of knowledge, the learner has, of course, to be inspired to consult the appropriate source. This inspiration may be self-generated, as we happen upon a word of which we are ignorant, and seek for understanding. However, how many of us would think, unprompted, of the *OED* as that source, as opposed to any cheap and serviceable dictionary we have to hand? And, *a fortiori*, how many of us would think, unprompted, of referring to this definitive (insofar as anything terrestrial is definitive) source when reading a word in the corpus of past English literature whose meaning we knew, or thought we knew?

When I taught English Literature at the University of Manchester, I would often begin a series of seminars on eighteenth-century literature by presenting students with one of Samuel Johnson's own poems, his elegy *On the Death of Dr. Robert Levet*.

> Condemned to Hope's delusive mine,
> As on we toil from day to day,
> By sudden blasts or slow decline,
> Our social comforts drop away.
>
> Well tried through many a varying year,
> See Levet to the grave descend;
> Officious, innocent, sincere,
> Of every friendless name the friend.
>
> Yet still he fills Affection's eye,

Obscurely wise, and coarsely kind;
Nor, lettered Arrogance, deny
Thy praise to merit unrefined.

When fainting Nature called for aid,
And hovering Death prepared the blow,
His vig'rous remedy displayed
The power of art without the show.

In Misery's darkest caverns known,
His useful care was ever nigh,
Where hopeless Anguish poured his groan,
And lonely Want retired to die.

No summons mocked by chill delay,
No petty gain disdained by pride,
The modest wants of every day
The toil of every day supplied.

His virtues walked their narrow round,
Nor made a pause, nor left a void;
And sure th'Eternal master found
The single talent well employed.

The busy day, the peaceful night,
Unfelt, uncounted, glided by;
His frame was firm, his powers were bright,
Though now his eightieth year was nigh.

Then with no throbbing fiery pain,
No cold gradations of decay,
Death broke at once the vital chain,
And freed his soul the nearest way.

I would ask the students to consider, in small groups, one or more of a number of questions. The outcome of the exercise was that each small group would prepare a response for oral delivery to the full class, who would then have five minutes to question the group about their findings. One question asked them to decide whether the poem implied a belief-system, and which elements of the poem they would cite as evidence for their conclusion. Groups were usually readily able to identify the poem's last line, "And freed his soul the nearest way", as employing language from the semantic field of religion. But the problem they would thereby encounter is that such language comes across as vaguely spiritual rather than specifically doctrinal: no particular belief-system appears to be indicated. Very few groups were at first able to locate as a source of more precise information an earlier stanza:

His virtues walked their narrow round,
  Nor made a pause, nor left a void;
And sure th' Eternal Master found
  The single talent well employed.

The barrier to knowledge for most modern readers here is that they know what the words mean. Few of us are able to attain to the Socratic paradox that it is our ignorance that is the true inspiration to knowledge.

The clue, as occasionally a student with some theological training would recognize, lies in the word 'talent'. It is, of course, no use looking the word 'talent' up in a modern pocket dictionary. Indeed, why would one want to do so, since it would merely confirm what one already knew? 'Talent' denotes a natural ability or aptitude. But the *OED* provides us with fuller information, based as it is upon historical principles. The etymology of the word explains that it derives from a series of forms, of which the Latin is 'talentum', and originally indicated a weight, in particular a weight of precious mineral of a certain value. Hence it indicates a coin of that value. The illustrative quotations show its use in this sense in Shakespeare, as well as in writings of and after the time of Johnson. Moreover, explanation is provided that its modern meaning of 'natural ability' derives from the figurative use of the word in its earlier sense as taken from the parable of the talents in *Matthew* chapter 25, verses 14-30.

What has this experience taught us? Well, to distrust our own complacency about the extent of our knowledge for one thing. For another, that language has a history and a metaphorical resonance that opens up a rich world of meaning.

Let us apply this knowledge acquired through experience to the point at which we began. My ignorance of the meaning of the word 'heurism' would take me, if I pursued a path parallel to the one we took to the root of 'talent', to the quotation at the head of this section (from *Chambers's Encyclopedia*). This illustrates the definition of 'heurism' as 'The educational principle or practice of placing a pupil, as far as possible, in the position of a discoverer'. The root lies in the Greek 'heurisko'. My journey leads me to the proposition that heurism, learning through discovery, is one pole of the world of teaching, whose opposite is didactic instruction. But the metaphor used by *Chambers* suggests that each is part of a balanced whole. If we adapt the metaphor of poles, we might say that the world of teaching turns on the axis defined by discovery and instruction. An initial simple need –

to find out the meaning of an obscure word in something I was reading – has led me to an intriguing proposition about the nature of teaching and learning. From language come ideas; out of knowledge emerge questions.

How, though, are we to ensure that students take the opportunity to pursue a similar journey towards ideas? We can do this only by making them realize that a full, authoritative and creative source – such as the *OED* – can provide rich material for our intellectual development and for our understanding of the subject-matter with which we are dealing.

There are broadly two ways in which we can do this. We can tell students about the *OED*, describe its format, demonstrate an example, and provide information about how to gain access to it, in printed and electronic formats. This is what I myself have done in many a plenary session on research sources for foundation courses in English. This is the method of didactic suggestion. Alternatively, we can attempt to engineer situations in which students are led to *experience for themselves* the power of the *OED* by means of discovery. This is the heuristic method.

It was the latter strategy that my seminars on Johnson's elegiac poem for Robert Levet were attempting to follow. The problem in implementing the method lies in *how* we create the situation and encourage students to pursue the pathway. The tutor's role in this kind of teaching includes the provision of resources and decisions about the choice of stimuli, but also, crucially, the role requires on-the-spot responses to the dynamic of group work in all its variety and unpredictability. In the case of the *Levet* poem, the text itself provides the stimulus: the word talent is lying in wait. But *how* can students be encouraged down the road towards it? The answer to this question lies within the complex and infinite nature of facilitation (cf. section 6). Facilitation signifies the method by which the tutor sets about enabling the learning to take place. There can, ultimately, be no absolute rules, only guidelines that have to be interpreted within each event. For example, if a group tackling the *Levet* question is completely stuck, it may be appropriate for the facilitator to assist the process of examination of the text for clues by drawing attention to the capital letters and the adjective in the phrase "Eternal Master"; or it may be that the group has already noted this, but is not pursuing the implications for the rest of the sentence. (Incidentally, an additional question, which itself opens up a pathway to knowledge and which may or may not be appropriate to raise in this learning situation, is that of the status of those capital

letters. Are they authentic to original texts or are they editorial embellishments? For the present exercise let us, correctly, assume their authenticity.) If a group gets to the stage of acknowledging that “Eternal Master” suggests a reference to the divine, then raising the possibility that the remainder of the statement might similarly have a theological referent may be sufficient to set students off on a journey of discovery. Such a journey reaches its first stage at the moment when one or more members of the group who have been delegated to check out all possible sources of information about the word ‘talent’ finds the text of the *OED*.

Once the group has discovered the true meaning of the word and its biblical source, then the initial question is more richly answered. Johnson’s allusion to the parable of the talents in Matthew roots his elegy in the New Testament, in Christianity. But there is more to be discovered. One source, the *OED*, has identified a further source, Matthew’s gospel. Most students with whom I conducted this exercise readily concluded that it might well be worthwhile going back to the biblical passage itself, if only to check on what the parable actually says. For a group that did not do so, it was a relatively straightforward matter for me as facilitator to suggest that the group might need to be armed with full knowledge of the biblical passage when it came to time for the whole class to question them on their conclusions. Once the biblical text is consulted, a crucial discrepancy between it and Johnson’s poem becomes immediately apparent. In Matthew, the master gives five talents to one servant, two to another, and just one talent to a third servant. During the master’s absence, the first two servants use their talents to gain an additional five and two talents respectively. These servants are praised and rewarded by the master when he returns. But the servant who was given just one talent hides it in the earth, and is able only to return it to his master. This servant is rejected as unprofitable. However, in Johnson’s poem, Levet is explicitly described as having a single talent, but one that he has well employed. Why has Johnson alluded to the parable, and then not just updated, but *changed* it? Here now is a challenge to the reader, and here is something for students to question. There is, that is to say, a further level of enquiry for investigation, but in this case *not one that has a clear answer in a research source*. There is no handy note from Johnson or reference in a letter to explain why he made his poem crucially differ from what he - as a committed eighteenth-century Christian - would have regarded as sacred text. The reader is left to interpret.

For what it is worth, here is one possible interpretation. Johnson goes out of his way in the elegy to emphasise Levet's obscurity. This is not, as most poetic elegies are, a paean to a famous person. Levet is described as having employed his single talent, his medical skill (his "vigorous remedy", his "useful care", as Johnson calls it), in "misery's darkest caverns", amongst the poor and needy. Contemporary biographers of Johnson - and there were many, most famously James Boswell - provide information about, and sometimes puzzled or affronted commentary on, Johnson's friendship with the eccentric Levet, who, like a number of other waifs and strays, lived for years in Johnson's house. For example, Sir John Hawkins, in the first full-scale biography of Johnson, speculates that "Johnson in pity loved Levett, because few others could find anything in him to love" (Sir John Hawkins, *The Life of Samuel Johnson*, ed. Bertram H. Davis [London: Cape, 1962], p. 172). There is, then, biographical material that intriguingly fills out the picture of Levet drawn in the poem and that could be productively used in our exercise. A telling stanza is the third:

> Yet still he fills affection's eye,
> Obscurely wise, and coarsely kind;
> Nor, lettered arrogance, deny
> Thy praise to merit unrefined.

Johnson issues a challenge to those inclined to look down on Levet: do not despise this man, obscure, coarse and unrefined as he might have been, for he did good things and among those parts of the population that your pride might disdain. This is a hymn of praise for the common man. By writing his elegy, and, incidentally, publishing it widely in popular magazines of the day, Johnson is publicly asserting the worth of the humblest of us. Johnson is rescuing people of a single talent from a potentially unfortunate, even un-Christian, interpretation of the parable.

The heuristic approach has now led us to profound issues of interpretation, of how we read literature with intelligence, sensitivity and creativity. The process of enquiry has gone beyond its initial aim, that of enabling students themselves to discover the value of a research resource. The level of enquiry we have now reached is one that should engage any student with the slightest interest in the subject (and, one might add, any person with the slightest interest in what it is to be human). *But we could not have reached this second level of enquiry without having achieved the first.* It is a false view of literary studies as a subject that it is 'soft' in the sense that it has no 'facts', no essential knowledge that a student must acquire. This exercise has demonstrated that there is a basic piece of

information that must be gained before the profounder issues of why a writer should produce an elegy can be properly discussed. The pedagogic issue is that of how we can best persuade students of the value of acquiring that essential knowledge. If the power of the *OED* is opened out by this one exercise, then students will be much more likely to regard consulting it as a part of their own private work, unprompted.

The exercise has also demonstrated an important quality of Enquiry-Based Learning. It is sufficiently flexible to be able to encompass two broad models, or levels of enquiry:

a) engagement with problems that present difficulties, but are capable of solution when subject to appropriate enquiry;
b) engagement with problems whose outcomes are more open to question, because they are issues of interpretation.

The flexibility of Enquiry-Based Learning lies also in its capacity to be part of a hybrid teaching model. For example, it might be deemed appropriate to have a plenary lecture about the *Oxford English Dictionary* in order to alert students to its existence and uses as a means of introducing the seminar. The latter could then be seen as a practical exercise that reinforces the message by allowing students to discover for themselves how essential the source is for accurate and creative reading.

2. What is Enquiry?

2.1 Definition

To begin at the beginning:

Enquiry: “The action of seeking, esp. (now always) for truth, knowledge, or information concerning something; search, research, investigation, examination” (*OED* inquiry/enquiry 1.a)

2.2 A note on spelling

The existence of the alternative forms “enquiry” and “inquiry” is due to linguistic history. In Middle English, when the word first occurs, the spelling was with an ‘e’ because the word entered English through Old French (as a result of 1066 and all that) where the word is spelt, as in modern French, with an ‘e’. But in the fifteenth century linguistic antiquarians

reformed the word to accord with its original classical Latin root, where the stem-vowel was an 'i' ('inquaerere'). Thus 'enquiry' reflects the proper course of language development, whereas 'inquiry' reflects historical accuracy. Take your pick.

2.3 Enquiry as process

Enquiry, then, is the "action of seeking" - a *process* of seeking. It may take the form of a closed-ended search, by which specific answers are discovered for specific questions. It may, alternatively, take the form of an open-ended search, in which questions are formulated but answers are multiple or provisional or both. The core of enquiry is the question, and it is in the formulation and/or the analysis of that question that the important initial intellectual activity takes place. In this sense Enquiry-Based Learning is a return to the philosophical roots of the western intellectual tradition, the Socratic perception that our knowledge is formed by questions. If specific questions can produce absolute answers, then there still remains an infinity of subsequent questions. Open-ended questions are inherently infinite. Learning is thus an unceasing process.

The metaphor that naturally reflects this sense of continuing process is that of travel, of movement. It is no surprise that writers have gravitated towards variations on this image when describing this key category of the human condition. Tennyson's dramatic monologue "Ulysses" (1842) expresses this sense of endless continuity that is the inherent nature of human experience. The speaker is the Homeric hero of the *Odyssey* on his return home after his epic travels back from conquered Troy. The life of domestic rest he finds irksome, unsatisfying, and he expresses his frustration in a ringing declaration:

> I am a part of all that I have met;
> Yet all experience is an arch wherethro'
> Gleams that untravell'd world, whose margin fades
> For ever and for ever when I move.
> How dull it is to pause, to make an end,
> To rust unburnish'd, not to shine in use!
> As tho' to breathe were life.

To live is to commit to action, not to be static. Tennyson has his hero express experience as endless continuity through the image of an infinitely receding horizon. The tone is ambiguous, changing, as Ulysses searches for clarity. The word "fades" semantically and positionally suggests loss, the line fading into the emptiness of the space on the page and then the doleful infinity of "for ever and for ever". Yet this incipient mood is met by the

assertion of the following lines, where negatives ("dull", "unburnish'd", "not to shine") are put at the service of rhetorical dismissal and the strong conclusion to the sentence on the word "life".

T.S. Eliot in "Little Gidding" (1942), the last of his *Four Quartets*, replaces Tennyson's infinite recession of the horizon with the idea of a continuing circle of discovery:

> We shall not cease from exploration
> And the end of all our exploring
> Will be to arrive where we started
> And know the place for the first time.
> Through the unknown, unremembered gate
> When the last of earth left to discover
> Is that which was the beginning….

These lines serve as a fine description of the process of Enquiry. As we shall see, Enquiry-Based Learning operates through repeated cycles of discovery (see section 3.5), each of which illuminates the place from which we began, the scenario that initiates the learning process. Eliot, of course, is concerned with far deeper issues. But we shall go on to argue that the power of Enquiry-Based Learning is that it is aligned with living (see section 3.3), so lines about the inherent pattern of life may not inappropriately be cited in the present context.

3 What is Enquiry-Based Learning?

3.1. General propositions

To begin with the obvious: in its widest sense, Enquiry-Based Learning is a term that describes any process of learning through enquiry. This is not simply one tautology, but, many people would contend, one tautology that contains another. For all learning is at root enquiring: the identification of an area of ignorance and the search for the missing knowledge, ideas or hypotheses. However, much traditional teaching has in fact been predicated on an assumption that appears to contradict this self-evident statement. And let us not deceive ourselves that didactic teaching is a thing of the past. In many subject areas a hierarchical model of teaching remains largely intact. Although this stasis in some cases reflects unchallenged conventions, in others it suits and has been adopted by new academic orthodoxies. For example, the dominance of 'theory' in late twentieth-century research in the Arts has produced new manifestations of dogmatic teaching, which

legitimate themselves through a conviction about the necessity and incontrovertibility of the theory espoused by the teacher. Naturally, the specific theory being perceived as necessary and incontrovertible differs from teacher to teacher.

The delivery of information that students are expected simply to accept and learn represents an essentially passive mode of learning, and so appears *prima facie* to be contrary to normal human behaviour. So Enquiry-Based Learning is about ensuring that, as far as is possible, students acquire their knowledge by means of a process of active learning, that is to say by a more natural method. The effect of this method is that learning outcomes are more likely to become intellectually embedded: what we discover, we retain.

But how do we discover that there are things that we do not know? Traditional teaching and its modern embodiments may be viewed more sympathetically as predicated on the entirely valid principle that people need to have their eyes opened to experiences and areas that they know not of. We cannot explore an area of whose existence we are unaware. Can we reconcile the apparent justification of Enquiry-Based Learning as natural with the responsibility of educators to enlighten? This issue is central to the *practice* of Enquiry-Based Learning.

3.2 How Enquiry-Based Learning functions

The problem noted in section 3.1, that of reconciling the educator's responsibility to enlighten with the perception at the heart of Enquiry-Based Learning that enlightenment only truly comes to the learner when she or he takes possession of the process of discovery, is addressed by a combination of scenario, the production of which is the responsibility of the educator, and process of addressing the scenario, which is the responsibility of the learner. The scenario acts as the stimulus, the motivation to learning; learning takes place as the students work on the scenario. Devising the scenarios is the creative task for the tutor. The nature of the scenario, the extent to which it is defined or open, the time allowed for work on it, and the amount and level of knowledge required will determine the kind of learning that the students will undertake.

In Enquiry-Based Learning, the learning is self-directed because it is driven by students' own decisions about appropriate ways in which an issue or scenario might be approached. They bring to bear on the topic any existing knowledge or experience relevant to the

issues. No person comes to the table with no knowledge, and the examination and pooling of what is already known allow students to gain confidence, as well as to practise the habit of reflection. They carry out research and investigations into areas that they decide are essential for a proper response to the issue. Thus they discover *how* to research by engaging in practical examples (see section 3.5). In this way, it may be said that the process of enquiry is in the ownership of the students, so that Enquiry-Based Learning is fundamentally concerned with establishing the context, the space, the environment within which enquiry may best be stimulated and students can take charge of their learning.

The process is student-centred, with the onus always on the students to take initiatives, propose routes of enquiry and follow them thoughtfully. By these means, students also acquire experience in a range of intellectual and social capabilities. These include critical thinking, reflection and self-criticism, team-work, independence, autonomous thinking and information literacy. Enquiry-Based Learning does not, it is important to stress, leave the students *entirely* to themselves. The process is accompanied and sometimes motivated by facilitation, which is designed to provide appropriate forms of support. What exactly those appropriate forms are is contentious, but they should always exist (see section 6).

Students also have to make decisions, some of which may turn out to be wrong in the sense that they lead down avenues that are unproductive or fail to reach any outcome relevant to the issue. Such mistakes are themselves part of the learning process, and teach the message that there are often no straightforward, ready-made answers. It is therefore often the case that scenarios for Enquiry-Based Learning are created on the basis that they are sufficiently open-ended for there to be multiple and different possible responses, many of which will have validity. Perhaps most importantly of all, work on scenarios at higher levels involves students in posing their own questions. The appropriate questions are either not given, so that students have to tease out what kinds of questions need investigation, or are questions that follow on from an initial given question. My *Levet* exercise above (section 1) is an example of the latter. The initial question (‘does the poem imply a belief-system?’) led on to a further question that students would need to formulate themselves: ‘why does Johnson change the story he derives from the biblical text?’

3.3 The range and flexibility of Enquiry-Based Learning

A significant consequence of the open-endedness of issues is that Enquiry-Based Learning is ideally positioned to foster a deep level of engagement with problems that are multi-faceted and complex. The exploratory nature of enquiry allows students to grapple with different ways of looking at ideas and issues, and to think creatively about problems that do not possess simple (or perhaps even any) answers. The flexibility of the learning is suited for the flexibility of the problems. Similarly, Enquiry-Based Learning is highly appropriate for issues whose complexity is such that they straddle traditional academic disciplines. Interdisciplinary or cross-disciplinary topics inevitably oblige students to think imaginatively and to search for knowledge in unfamiliar areas. If such problems are considered by a group of students who themselves are formally studying different disciplines, then the pooling of different kinds of knowledge can be a powerful instigator of complex learning. For example, one of the projects funded in the 2005-06 round by the Centre for Excellence in Enquiry-Based Learning at the University of Manchester was an interdisciplinary module that brought together students from Geography, Education, Medicine and Spanish to develop projects that could draw on and integrate the knowledge and skills of these different disciplines, such as issues of poverty in South America (see www.manchester.ac.uk/ceebl/projects/2005). It is easy to see that the proper study of many subject areas necessitates consideration of significant interdisciplinary issues, such as the ethical and environmental implications of engineering projects. For a case-study of an exercise in interdisciplinarity through Enquiry-Based Learning, see W. Hutchings and K. O'Rourke, *Enquiry-Based Learning, internationality and interdisciplinarity: a case-study of a trial Anglo-American student event*, CEEBL Essays and Studies, www.manchester.ac.uk/ceebl.

However, it is equally important to be clear that the flexibility of Enquiry-Based Learning allows it to be a means by which clearly-defined and finite pieces of knowledge are acquired. A key point to the process as described in my example above (section 1) is that it includes both knowledge that is certain and incontrovertible *and* broader, more interpretative issues. At a lower level (say the first year of a university course), it may well be appropriate to restrict the learning to scenarios that focus on the former, so that the necessary building-blocks of a discipline can be accumulated before the more conceptually uncertain aspects of the area are broached. Such approaches may be appropriate for, say,

Mathematics or Modern Languages students. Enquiry-Based Learning does not have to be relativist. It can be as absolute as you like.

And it can be rigorously restricted to a single traditional discipline. There is, after all, a lot to be said for disciplines. John Henry Newman, in his *Discourses on the Scope and Nature of University Education* (a classic statement of the values of a university as a teaching institution), trenchantly reminds us of the inherent danger in multidisciplinary or interdisciplinary approaches to study, that of trying to teach so many things that nothing is properly learned at all, "the error of distracting and enfeebling the mind by an unmeaning profusion of subjects; of implying that a smattering in a dozen branches of study was not shallowness, which it really is, but enlargement, which it is not" (Discourse VI: "Knowledge viewed in Relation to Learning"; John Henry Newman, *The Idea of a University*, ed. I. T. Ker [Oxford: Clarendon, 1976], p. 127). Newman's warning about the danger of spreading knowledge too thinly is a particular application of a general principle that must underlie the practice of Enquiry-Based Learning, as it must any educational method. It is the academic specialists, the people, that is, who have acquired significant knowledge and insight into an area of learning, who must be in charge of the entire teaching process. General educational theory may (or may not) be helpful, but the selection and application of it must lie in the hands of the academics. It is they alone who can judge the appropriateness of methods to their subject, to the levels and aims of their students. In the century before Newman wrote, the great English artist Sir Joshua Reynolds observed: "...I am convinced that one short essay written by a Painter, will contribute more to advance the theory of our art, than a thousand volumes such as we sometimes see; the purpose of which appears to be rather to display the refinement of the Author's own conceptions of impossible practice, than to convey useful knowledge or instruction of any kind whatever" (Sir Joshua Reynolds, *Discourses on Art* , ed. Robert R. Wark [San Marino, Cal.: Huntington Library, 1959), Discourse XV: p. 267). How much writing about education reflects the author's conceptions of impossible practice is perhaps best left to the reader to estimate. What we can assert here is that Enquiry-Based Learning provides not a straitjacket of directive-driven theory, but a method that is open and adaptable to the local geography of the discipline and the institution. It is the locals who should be the ultimate arbiters.

Another key aspect of the flexibility of Enquiry-Based Learning as a teaching method is that it is fully at ease with an overall course structure that presents a mix of teaching situations.

Arguments for imposing a single method of teaching, as opposed to a variety of approaches, rest on the premise that that single method suits everyone. This premise itself derives from the *assumption* of the uniformity of nature. But Enquiry-Based Learning is derived from the *inductive* argument that it constitutes an effective learning process. Inductive arguments cannot prove that they will always be correct; they can never be absolute. Enquiry-Based Learning is consequently inherently opposed to absolute systems, and it would be destructively self-contradictory to attempt to apply it absolutely. For further discussion of this point, see W. Hutchings, *The philosophical bases of Enquiry-Based Learning*, forthcoming on www.manchester.ac.uk/ceebl.

One of the principal attractions of the model of Enquiry-Based Learning being described is that it embodies opposition to the tendency for educational theories to become ossified into set patterns. Such a tendency is present in the development of Problem-Based Learning, with which Enquiry-Based Learning obviously shares many characteristics. This tendency to ossification is largely, in the case of Problem-Based Learning, a result of the development of step-models, stages of the process that *must* be followed (see section 3.4). Such an approach is one that puts process before content, preventing the learning from being *organically* structured, from the inherent nature of the task. The danger is that we end up with an intellectually fallacious division of process and content.

A further important observation is that we should guard against a glib interpretation of 'active' learning. Active learning is not just about *doing* things; it is about students actively *thinking*. A task that sends students off to the internet to do a bit of googling and stitch the results together is not a task that is encouraging active *thinking* and *questioning*. Conversely, an apparently contrasting situation, such as a lecture or a session that includes an element of tutor delivery, is not *per se* a passive experience. (Cf. "Enquiry as a constituent of all learning", section 5.4.)

The results of Enquiry-Based Learning should be that it stimulates deep learning (as opposed to surface learning) and engenders in students a spirit of engagement (as opposed to indifference, and even alienation). I say "should be" because, like all educational ideas, it is in the application that it succeeds or fails. And application depends upon the people who are responsible for the course, the tutors themselves. For what it is worth, my own researches with students have taught me one essential lesson. When asked what are the

most important factors for a successful and productive learning experience, they almost always answer: the commitment, engagement, interest, enthusiasm of the teacher. To apply Enquiry-Based Learning without demonstrating these qualities is to ensure its failure. The extent of the tutor's commitment to the process of enquiry will dictate the extent to which life is brought into the potentially artificial context of a scheduled teaching session. Enquiry-Based Learning is about releasing our natural spirit of enquiry, about showing that learning is natural. If we can make what is happening in class relate to engagement with real life, aligning it with how we live our ordinary lives, then we break down the destructive artificial barriers between life and learning. One of the principal effects of successful enquiry work will be that it involves students in taking their learning outside the confines of seminar room time and space, developing its own rhythm and its own momentum.

A further effect of tutors' open engagement in the Enquiry process is that it establishes mutual trust: both students and tutors can see that they are collectively enthused. This trust can be creatively extended by applying the principle of flexibility to the events themselves. Students should be trusted in the use of the time and space within which sessions take place. Allowing students to bring in coffee as they wish, to move chairs around, to leave for a cup of tea or to go the library attributes to students a degree of respect as well as freedom. This freedom is the natural accompaniment of the free discussion among peers that allows ideas to flow naturally. Moreover, by trusting students to use scheduled time as they wish and see fit, you encourage a reverse attitude, that is a willingness to use their own resources, time and space. Let life into learning and learning will be released into life. For learning is living. (Cf. "Enquiry as a constituent of all learning", section 5.4; and, for a study of a group in action, W. Hutchings and K. O'Rourke, *A Study of Enquiry-Based Learning in Action: an Example from a Literary Studies Third-year Course, University of Manchester*, CEEBL Essays and Studies, www.manchester.ac.uk/ceebl.)

3.4 Enquiry-Based Learning and other types of learning

Enquiry-Based Learning is often regarded as an umbrella term, covering a range of approaches to learning that are driven by a process of enquiry. Beneath the umbrella shelter a number of categories, including Problem-Based Learning (as we mentioned above, section 3.3) and such varieties of active learning as field-work, project-work and case-studies.

- In Problem-Based Learning it is the 'problem' itself (however conceived and expressed) that generates students' learning. Students acquire the necessary knowledge by working through the problem. An authentic or virtual scenario acts as the prompt to the learning process. To this extent there is clearly common ground with Enquiry-Based Learning. In addition to the observation made earlier that Problem-Based Learning methods, if insensitively applied, can become ossified into monolithic structures, the word 'problem' is itself something of a problem. Use of it to define a learning process places the focus on the 'trigger', the starting-point for enquiry, rather than on the process of enquiry itself. Not all enquiry necessarily starts with a 'problem' in the sense that it presents problematic situations. Enquiry can begin with a question, a hypothesis, a statement, a text, a picture, a word (cf. W. Hutchings, An Enquiry-Based Learning Course on Jane Austen, CEEBL Resource Pack 002, www.manchester.ac.uk/ceebl), a commission from an outside agency (cf. W. Hutchings, Designing an Enquiry-Based Learning Course, CEEBL Resource Pack 001, www.manchester.ac.uk/ceebl).

- Problem-Based Learning should be distinguished from problem-solving. Problem-solving is the application of knowledge already acquired to set tasks, the application of given knowledge to a new set of circumstances. It is therefore about transferring accepted principles to a different example. The implication is that a 'solution' to the problem exists: students simply have to apply their knowledge to the new situation, as in a new mathematical problem requiring the application of the same process (say, differentiation and integration) that has been already learnt. This knowledge may have been transmitted through conventional teaching methods. For Problem-Based Learning purists, this is taboo. The flexibility of Enquiry-Based Learning is that it can encompass, as appropriate, both relatively straightforward problem-solving and full-scale enquiry (see section 1). However, it is important that Enquiry-Based Learning is not artificially restricted to the thinner, less rich model. For example, Ron Oliver in "Exploring an inquiry-based learning approach with first-year students in a large undergraduate class" (Innovations in Education and Teaching International, 44: 1 (February 2007), pp. 3-15) treats inquiry-based learning as a learning method in which learning is achieved through the research carried out in response to set problems in order to formulate solutions to them. That may well be appropriate for

the particular group - a first-year group - studied in this essay; but this should not lead readers to think that this is all that Enquiry-Based Learning can do.

- The creative arts have extensive experience of project work, especially on courses relating to professional practice and industrial placements. Learning activities in these contexts are generally grounded in practical project work in which are addressed design issues that are open-ended. There exist no specific, fixed solutions, so that students have to make their own crucial decisions about processes and outcomes. By so doing, they gain an understanding of the activity, the nature of design and the research methods necessary to achieve the outcomes. The learning is therefore active, as it is related to an ongoing project, and its research element has similarities to action research. These qualities are all central to enquiry and Enquiry-Based Learning. The project work process is part of becoming a practitioner in the trade and entering a community of practice. Students learn through engagement with others, particular those (tutors) who are experienced practitioners. Learning takes place within a specific and functioning context. See J. Lave and E. Wenger, Situated Learning: Legitimate Peripheral Participation (Cambridge: Cambridge University Press, 1991); E. Wenger, Communities of Practice. Learning, Meaning and Identity (Cambridge: Cambridge University Press, 1998).

These - and other - categories may validly be regarded as enquiry-based in the sense that students engage in a process of discovery driven by their own decisions. However, a more distinct and distinctive definition of Enquiry-Based Learning requires a further and fundamental criterion. It is true that legitimate forms of enquiry may be carried out within intellectual parameters that, to a greater or lesser extent, set the limits of students' enquiry. But the truest, most radical and most empowering forms of Enquiry-Based Learning are those which endow students with the challenge, freedom and responsibility of determining all – or at least as much as is possible – of their learning within the field. Formulation of the real and crucial questions that are to be asked lies within the responsibility of the students themselves. It was to this point that the example in section 1 moved. The example began with a clearly given question ("does the poem imply a belief system?"). But the crucial question reached much further down the path of discovery ("why has Johnson changed the parable to which he alludes?") was formulated by the students themselves as a result of their enquiries. At advanced levels, Enquiry-Based Learning enables this challenge to be presented immediately, without interim directed enquiry. The

evolution of the student is from more directed forms of enquiry to more self-directed or group-directed forms. Such Enquiry-Based Learning comes closest to replicating genuine research, and is its ultimate power as a learning method (see "Enquiry-Based Learning and research", section 3.5).

3.5 Enquiry-Based Learning and research

Five models of research-based teaching are identified in Andrew Castley's essay, "Professional Development Support to Promote Stronger Teaching and Research Links" (in Carolin Kreber, ed., *Exploring Research-Based Teaching*, *New Directions for Teaching and Learning*, no. 107 (Fall 2006), pp. 23-31).

- Outcome. Academic staff introduce their undergraduate students to their research work. This can be done by straightforward conventional teaching.
- Tools. A 'research methods' module or element is included in a student's course. Again, this can be taught by entirely conventional means.
- Process. Enquiry drives a substantial amount of a student's learning.
- Context. An ethos is fostered within a department that includes all its members within a community of learners. Hence the research work conducted by academic staff and postgraduate research students is perceived as part of a whole within which undergraduate students feel a part.
- Pedagogy. Teaching and learning in the discipline or the department are themselves treated as a subject for research.

Enquiry-Based Learning is evidently related to the process model and is consequently strongly committed to enhancing the relationship between teaching and research. It crucially establishes an identification between research methods and the learning process by modelling undergraduate learning on research methods. This identification is founded on the comparability of Enquiry-Based Learning and research procedures.

- What does 'research' mean, at its root? The word derives from the Late Latin 'circare', meaning to seek, to look for. This is the same root as for the modern French 'chercher'. The root of 'circare' is the classical Latin word 'circus', meaning a circle. '*Re*-search' therefore has at its root the idea of circling round a physical place/a mental space again and again. It is a process of reiterated investigation, with implications of thoroughness of procedure and re-testing of discoveries.
- What does 'enquiry' mean, at its root? The word derives from the Latin 'inquaerere', meaning to ask. This is the root also of the modern word 'query'. Enquiry is thus fundamentally about questioning. The *Oxford English Dictionary* defines 'enquiry' as

> 'the action of seeking…search, research', thus proposing that the words research and enquiry are synonymous (see section 2.1).

This closeness between the two terms suggests that Enquiry-Based Learning is not so much research-led learning as research-like learning. What, then, do research and Enquiry-Based Learning have in common? They are about questioning, seeking, circling. They are about repeatedly returning to the question we began with, now (we hope) informed and illuminated afresh by new learning, but always initiating new enquiries.

We could, in outline, describe the journey thus:

Research:

- Identification and selection of the area of research, the point of departure;
- Identification and formation of key issues and appropriate questions;
- Preliminary analysis of issues raised;
- Investigation of primary and secondary sources and evidence;
- Analysis of issues on the basis of further research;
- Formulation of provisional conclusions and reporting to one's peer community;
- Reflection on the process, a return to the place where we started in order to re-assess and identify gaps and further areas for research;
- Reiteration of process until satisfactory conclusions are reached;
- Publication of outcomes.

An Enquiry-Based Learning group activity (see section 4, "What is the process of Enquiry?" for further development of this structure):

- Establishment of the area of investigation, a stimulus to questioning usually in the form of a scenario, a task or a problem;
- Identification by the student group of key issues and appropriate questions; the absence of a specified reading-list means that resources are discovered by students. Decisions about which resources are appropriate are taken by the students, thus following a full research method;
- Investigation of sources and evidence by individuals or sub-groups;
- Reporting outcomes to the whole group;
- Group reflection on the process so far, identifying remaining gaps and analysing the scenario afresh in the light of new learning;
- A process reiterated, re-circling until a provisional halt is called by the exigencies of assessment deadlines.

Thus the paradigm for the Enquiry-Based Learning process is closely modelled on research methodology. Because of the fundamental generic alignment in process, this paradigm is that which is appropriate for all productive learning, whether at the level of advanced creative research or at the level of introductory engagement with a subject.

The research/Enquiry-Based Learning parallel would suggest that a dissertation, whether at undergraduate or postgraduate level, represents the closest relationship. But, as by definition an example of advanced work, a genuine Enquiry-Based Learning dissertation ought to display the full research paradigm. Thus a key characteristic of a genuinely Enquiry-Based Learning dissertation will be that the research question itself is essentially generated by the student, and not provided by the tutor. Naturally, the process of research will again be student-generated and student-centred, with the dissertation supervisor acting as expert facilitator of the learning.

There is an increasing body of writing on the research/teaching nexus. See, for example:

Angela Brew, “Teaching and research: new relationships and their implications for Inquiry-Based Teaching and Learning in Higher Education”, *Higher Education Research and Development*, 22 (2003), pp. 3-18

Angela Brew and David Boud, “Teaching and research: establishing the vital link with learning”, *Higher Education*, 29 (1995), pp. 261-273

Lewis Elton, “Research and Teaching: conditions for a positive link”, *Teaching in Higher Education*, 6 (2001), pp. 43-56

J. Hattie and H. W. Marsh, “The Relationship between Research and Teaching: a Meta-Analysis”, *Review of Educational Research*, 66 (1996), pp. 507-542

J. Hattie and H. W. Marsh, “The relation between research productivity and teaching effectiveness”, *Journal of Higher Education*, 73 (2002), pp. 603-641

Alan Jenkins, *A Guide to the Research Evidence on Teaching-Research Relations*, The Higher Education Academy (2004)

Alan Jenkins and Mick Healey, *Institutional strategies to link teaching and research*, The Higher Education Academy (2005)

Alan Jenkins, Mick Healey and Roger Zetter, *Linking teaching and research in disciplines and departments*, The Higher Education Academy (2007)

See also W. Hutchings, *Bringing Research and Teaching Together* (CEEBL Essays and Studies in Enquiry-Based Learning, www.manchester.ac.uk/ceebl).

4. What is the process of Enquiry?

There is a range of possible paradigms for the process of learning through enquiry.

It is entirely possible for enquiry to be conducted by an individual student working in isolation. In this respect, as we noted in section 3.5, Enquiry-Based Learning intersects powerfully with some forms of postgraduate research work. However, no work is in reality carried out in complete isolation. The guidance and support of a supervisor always provide some degree of human interaction to benefit the process, and it is rare – even in disciplines where the traditional research model has been and remains that of the solitary scholar – for there to be no additional support through structured research panels, research seminars and general consultation with the academic community in the area.

At the undergraduate level and in Masters programmes, it is usual for Enquiry-Based Learning to be conducted through some form of group work. The advantages of a group format for the work are many. Principally, they are:

- Ideas can be generated more powerfully, more rapidly and more variously by many than by one. In a group, two or more students can come at a problem from different directions and address it in different ways. The result of such dissonance can be unexpected and creative harmonies. This kind of moment is the equivalent of Arthur Koestler's idea of 'ripeness'. There may be a moment when the situation allows people to put together two matrices out of which new knowledge may be formed (Arthur Koestler, The Act of Creation [London: Hutchinson, 1964; London: Pan, 1966], book one, chapter 5, "Moments of Truth"; see "Enquiry as 'contestation'", section 5.6).
- Tasks, such as information retrieval, can be delegated to individuals or sub-groups, so accelerating the process and increasing the extent of potential outcomes. This also develops students' qualities of responsibility and trust.
- Students gain experience in additional and transferable skills, such as communication and team-building, where emotional intelligence is brought strongly to bear.

The group-work format of Enquiry-Based Learning has many similarities with established processes in Problem-Based Learning, which are designed to relate to a wide range of graduate skills. See Bill Hutchings and Karen O'Rourke, "Problem-Based Learning in

Literary Studies" (*Arts and Humanities in Higher Education*, 1:1 (2002), p. 79) for a chart that maps Problem-Based Learning processes onto graduate skills.

It was noted above (section 3.3) that Enquiry-Based Learning is opposed to set structures of the kind that can afflict some implementations of Problem-Based Learning. Thus any paradigm of Enquiry-Based Learning is inherently open to emendation and adjustment to meet local needs, disciplinary requirements, the level of student experience, and a host of unquantifiable factors that only the facilitator on the ground can decide on. The following model is therefore presented as representative rather than definitive.

- Module title defines general area
- Generation of the topic, question, task, scenario: this may directed by the tutor/facilitator, or be devised by the student group or through facilitated discussion
- Analysis of topic in order to identify the key issues, problems, difficulties, uncertainties
- Identification of areas of existing knowledge in the group that are relevant to the topic
- Discussion of issues emerging from existing knowledge in relation to topic
- Identification of gaps in existing knowledge, or aspects of existing knowledge that require further exploration or clarification
- Identification of sources of information
- Distribution of tasks among the student group: search for valid and relevant evidence, consultation of primary and secondary sources, conducting of original research and experimentation where appropriate and possible
- Interpretation and assessment of evidence
- Collation of new information
- Application of evidence to identified issues
- Discussion of issues emerging from new knowledge in relation to topic
- Repetition of above processes if required and if time allows
- Decision about format of outcomes: this may be wholly or to an extent determined by module requirements or tutor's demands, but may be open to a degree to student decision-making.
- Presentation of outcomes
- Reflection on outcomes and the process of learning
- Assessment (which may or may not include peer assessment)
- Generation of next topic

5. The Power of Enquiry

5.1 'Lifelong learning'

One of the commonest arguments for adopting an Enquiry-Based approach to learning is that it provides training in skills that are appropriate – indeed, essential – for the modern world of work. Given the vast amount of information presently available and given the rapid development of knowledge, it is often argued that it is less important for education to provide students with *content* than for students to acquire a capacity to navigate the sources of up-to-date information and an ability to make sense of the information received:

"Educators must understand that schools need to go beyond data and information accumulation and move toward the generation of useful and applicable knowledge" (Concept to Classroom, <http://www.thirteen.org/edonline/concept2class/inquiry/index.html. Accessed 16.02.2006>)

This constitutes a movement away from a clear and well-defined body of knowledge to be learned and towards a process of learning, from 'what?' to 'how?' Such a movement entails a radical perception of the open-ended and changing nature of knowledge. Concept to Classroom again:

"Through the process of inquiry, individuals construct much of their understanding of the natural and human-designed worlds. Inquiry implies a "need or want to know" premise. Inquiry is not so much seeking the right answer – because often there is none – but rather seeking appropriate resolutions to questions and issues. For educators, inquiry implies emphasis on the development of inquiry skills and the nurturing of inquiring attitudes or habits of mind that will enable individuals to continue the quest for knowledge throughout life."

This is a powerful argument, and one that applies – as the choice of source quoted above indicates – to all levels of education, primary and secondary as well as higher. It fits with contemporary perceptions of a technologically-driven world and with the bewildering pace of change in many areas of thought and discovery. No-one wants to be treated by a doctor whose treatment is based upon a stationary and so probably out-of-date set of ideas, and so there have grown up medical programmes that place emphasis on training the students to become habituated to continuing learning and to acquire critical ability, the ability to

understand and interrogate ideas. The University of Manchester's medical programme is one such. As its information for applicants states,

"The programme is delivered via problem-based learning, with an emphasis on self-education, development of critical faculties and communication skills."

Such an approach also coincides with the fashionable concept of 'transferable skills'. This notion has been given raised consciousness through, for example, subject criteria. (See W. Hutchings, *Designing an Enquiry-Based Learning Course*, CEEBL Resource Pack 001 (www.manchester.ac.uk/ceebl) for an example of mapping learning outcomes onto subject criteria).

In truth, the category of transferable skills is largely a means of rendering explicit what has always been implicit within disciplines. For example, it has long been argued in the United Kingdom that one of the reasons for studying Classics is that the process of gaining a command of Latin, with its complex but precise syntax, is excellent training in logical thinking. It is certainly the case that many people from the post-1960s British generations, when the teaching of English grammar in schools became unfashionable and before the teaching of Latin in schools suffered a decline, will happily admit that their knowledge of grammar (that is, the logic of sentence-structure) came from their being forced through Latin classes. This does beg the question of whether classical grammar-structures provide appropriate models and categories for application to modern English or indeed any living language, a question that has long exercised and animated linguistics academics. But, putting this vexed question on one side, we can at least say that thinking about cases and verb endings does train the mind in a certain way.

However, this argument may appear to contain a touch of desperation and underestimate the inherent value of the subject. Why not assert that studying Latin is a good thing *in itself*? Why reduce study of the Classics to being merely a means to an end? After all, generations of writers have found stimulus and inspiration in the literary achievements of the Classics, and classical forms and attitudes underpin a great deal of western culture generally. But, conversely, why not point out any additional learning that comes with the territory? It is more productive to think in terms of 'both/and' than 'either/or'.

5.2 In defence of content

It is important to enter a qualification at this point.

To advocate Enquiry-Based methods is not to propose a content-free syllabus. An Enquiry-Based Learning course is not just about how to learn and to question. Indeed, how could there be such a course if there were nothing to learn and nothing to question? Such courses, rather, propose a method of learning that delivers *both* existing knowledge *and* the additional attributes described above. The means by which the curriculum is delivered have changed, but there still is a curriculum. We do not want a medical student to graduate with no ability to update knowledge and to treat patients sensitively, but we also do not want to be treated by a doctor whose course did not provide a necessary basic level of anatomical knowledge. We want one with *both* a fundamental level of core knowledge *and* the ability to keep up-to-date with medical advances. How an enquiry-based course ensures that essential content is acquired is largely a matter of how well-designed the 'problems' are.

That content is essential for education has always been implicitly accepted or explicitly stated. For example, John Henry Newman, in his *Discourses On the Scope and Nature of University Education*, clearly pointed out that knowledge is a necessary prior requirement for learning. A university is, as it is popularly assumed to be, "a place for acquiring a great deal of knowledge on a great many subjects". Such acquisition is the basis: "there is no true culture without acquirements, and ... philosophy presupposes knowledge". Therefore that knowledge "is the indispensable condition of expansion of mind, and the instrument of attaining to it" is, for Newman, the first principle. (Discourse VI: "Knowledge viewed in Relation to Learning"; John Henry Newman, *The Idea of a University*, ed. I. T. Ker [Oxford: Clarendon, 1976], pp. 115-117). What Newman goes on to argue is that this is not *all* that a university and true learning should be. The pattern we saw in section 1 again applies: without the primary linguistic knowledge, further learning cannot occur; but acquiring that knowledge is part of a larger process, and not an end in itself.

5.3 In defence of knowledge as an end in itself

Some accounts of enquiry-based education can be misleading on this crucial point. For example, to state that the knowledge base for disciplines is constantly expanding and changing is true; but it is not a valid corollary to claim that "Content of disciplines is very important, but as a means to an end, not as an end in itself." (Concept to Classroom, <http://www.thirteen.org/edonline/concept2class/inquiry/index.html. Accessed 16.02.2006>)

Such a claim may appear, *prima facie*, to have validity for vocational disciplines, and it is this appearance of validity that has led the doctrine to infect non-vocational subjects as well. But it is a profound vulgarization of education to reduce it to a set of skills. Moreover, it is also a radical disempowerment of the capacity of Enquiry.

In order to develop a genuinely critical approach to learning and ideas and knowledge, a mental attitude of engagement with ideas is essential. Human beings have to love ideas, to want knowledge, to be vitalized by thought if they are to operate as successfully critical self-educators. An attitude that regards learning as merely instrumental downgrades it to a specific, unitary, focused function. In order to sustain the mental excitement required for lifelong learning, knowledge must be accorded a much higher status, indeed the highest status of all.

It is the power of true Enquiry that it maintains an essential link between knowledge as free-standing and potential applications of it: because I am fired by ideas, I want to keep learning; because I want to keep learning, the professional aspects of my knowledge will be kept vital and not allowed to lapse. Enquiry defines a whole approach to life, not just a method to be switched on at a professionally appropriate moment.

We might adapt Walter Pater's celebrated (and contentious) remarks in the "Conclusion" to *The Renaissance*: "Not the fruit of experience, but experience itself, is the end….art comes to you proposing frankly to give nothing but the highest quality to your moments as they pass, and simply for those moments' sake." (Walter Pater, *The Renaissance* [London: Macmillan, 1910], pp. 236, 239) So Enquiry, learning itself, is not to be reduced to the

merely instrumental. It is, profoundly, what we humans are about; it is our nature and our end.

5.4 Enquiry as a constituent of all learning

If the mental set of Enquiry is perceived as permeating all aspects of human behaviour, it follows that enquiry should take place in situations that are not formally Enquiry-Based Learning teaching situations. This is a point often missed by those who argue for teaching to be conducted entirely by an enquiry method such as Problem-Based Learning, to the total exclusion of any other form. To adopt this attitude is to become as inflexible as adopting the approach that teaching should take place solely within lectures and seminars. It is to underestimate radically the power of enquiry as a holistic concept. Enquiry is an activity that is not confined to 'Enquiry-Based Learning' sessions. A major value of Enquiry-Based Learning is that it should encourage students to think of their time outside the designated class as equally learning time. Not only are specific tasks, such as consultation of resources in a library, performed at a time outside the Enquiry-Based Learning session, but in successful groups much of the preparation for the presentation of outcomes will be so done (see W. Hutchings and K. O'Rourke, *A Study of Enquiry-Based Learning in action: an Example from a Literary Studies Third-year Course, University of Manchester*, CEEBL 'Essays and Studies', www.manchester.ac.uk/ceebl). The value of Enquiry-Based Learning is that it encourages this breaking-down of the artificial divisions between teaching time and living time, developing the naturally enquiring character of human beings into a holistic sense of what education is (cf. "The range and flexibility of Enquiry-Based Learning", section 3.3).

It thus follows that elements of traditional teaching methods are entirely appropriate as part of an Enquiry-Based Learning package if they are rendered consistent with the underlying philosophy. So lectures, often viewed by theories friendly to Problem-Based Learning as anathema because they are 'passive' rather than 'active', can be valid events. If students are fully engaged with a lecture, they are applying skills of listening, observing, selection and interpreting. 'Active' listening is an important and valuable skill in its own right, and, incidentally, a lifelong skill. There are myriad situations in which we are listening to others, and creativity in how we listen is a vital tool for learning.

Of course, it is up to the lecturer to ensure, as far as it is possible so to do, that the method of delivery of a lecture is conducive to active listening, and that its ideas are

sufficiently interesting to merit active listening. There have to be genuine questions and issues for the audience to think about, so that intellectual activity is generated. A simple recital of a set of givens for unquestioning acceptance does not constitute active lecturing. It helps if at least some issues are presented openly, so that the audience is invited to consider the possibility of a plurality of outcomes. But, then, it is equally up to the course developer to ensure that an Enquiry-Based Learning course contains topics/scenarios that are conducive to active enquiry and prompt or imply ideas that merit enquiry.

5.5 Enquiry as generic

Enquiry-Based Learning defines a conceptual paradigm for learning that is generically applicable. This is because it is modelled on general research methodology. However, this is not to conflate all disciplines into a homogeneous whole. The specific content remains discrete, defined by subject specialists, except in areas of genuine disciplinary overlap. But the possibility of a generic paradigm does highlight the extent to which the disciplines share essential intellectual and academic qualities.

An emphasis on the centrality of enquiry to general academic activity may have the additional benefit of breaking down the more virulent divides as, for example, set up in the infamous ‘two cultures’ debate between C.P. Snow and F.R. Leavis and perpetuated in many assumptions made by representatives of the sciences on one side and the humanities on the other. The Dutch scientist Hendrik Brugt Gerhard Casimir addressed a dinner of the Institute of Electrical Engineers in 1965 on the subject of jam and marmalade. He pointed out that the English differentiation between jam and marmalade is not reflected in Dutch, a language which considers jam to be a general genus of which orange jam (that is, marmalade) is one sub-species. Curious observers of the English abroad will frequently be diverted, even in today’s more multicultural and travelled society, by the sight of a group picking their way through a set of tiny breakfast pots of jam in search of the elusive English panacea for all morning ills. Casimir’s serious point was that a similar linguistic distinction may be at the root of the peculiarly English desire to separate the Arts from the Sciences. Many languages, such as Dutch and German, possess a word meaning ‘science’ that refers to all branches of learning (‘wetenschap’, ‘Wissenschaft’). It is only in English that the word ‘science’ is used to refer to physics, chemistry and so on, but not to history or literary studies. Such differentiation undermines recognition that all disciplines share essential

processes, including the search for evidence, the analysis of material and the pursuit of general principles. (I am indebted to Professor Lewis Elton for this reference.)

It was not always thus. The word 'science' etymologically derives from the Latin 'scire', meaning to know, and right up until the eighteenth century 'science' was used to refer to knowledge as a whole. In the eighteenth century, what we would today call 'science' was called 'natural science', that is knowledge of the natural world, the physical world. There were no 'two cultures', no artificial divisions of knowledge. The great epic poem of the eighteenth century, James Thomson's *The Seasons* (1730-46), is a long rhapsodic celebration of the union of beauty and knowledge. For example, in "Spring" he has a passage describing a rainbow:

> Meantime, refracted from yon eastern cloud,
> Bestriding earth, the grand ethereal bow
> Shoots up immense; and every hue unfolds,
> In fair proportion running from the red
> To where the violet fades into the sky.
> Here, awful Newton, the dissolving clouds
> Form, fronting on the sun, thy showery prism;
> And to the sage-instructed eye unfold
> The various twine of light, by thee disclosed
> From the white mingling maze. (ll. 203-212)

Conventionally poetic language and scientific language sit effortlessly side by side: the precise language of scientific description ("refracted"; "prism") and the traditional language of poetry ("yon"; "thy") exist in the same phrases. The passage is a transformation of the principles of Newton's *Opticks* (1704) into an eloquent hymn to the magnificence and harmony of nature ("Bestriding earth, the grand ethereal bow"; "in fair proportion") and the magnificence of human intellect ("awful Newton": Newton as the object of awe, of reverence).

Perhaps a side-effect of Enquiry-Based Learning will be to return us to the roots of our language and to a whole view of culture.

5.6 Enquiry as 'contestation'

The final level of empowerment provided by Enquiry is that it can enable learners not just to respond to stimuli, but to question the reliability, relevance and status of the elements within the stimuli. This is what Maggi Savin-Baden has termed 'contestation'. It provides

the most radical level of learning, where students can achieve the capacity to question the very bases of the subject themselves. See Maggi Savin-Baden, *Problem-based Learning in Higher Education: Untold Stories* (Buckingham: SRHE/Open University Press, 2000); Bill Hutchings and Karen O'Rourke, "Medical studies to Literary Studies: Adapting Paradigms of Problem-based Learning Process for New Disciplines", in *Challenging Research in Problem-based Learning*, ed. Maggi Savin-Baden and Kay Wilkie (Maidenhead: SRHE/Open University Press, 2004), pp. 174-189.

Profound changes and advances in human understanding happen when such radical questioning takes place. These moments may be rare within history, but they are vital determiners of human progress.

The twentieth-century writer Arthur Koestler, whose output straddled the worlds of the arts and the sciences, describes in his book *The Act of Creation* a powerful model of human creativity. His argument is that the greater part of human thinking operates within a set of inherited codes, "fixed stable rules which, once switched on, automatically govern the thinking routine" (London: Hutchinson, 1964; London: Pan, 1966; book two, chapter 16, 644). The majority of our thinking, and so of our teaching and learning, works within the boundaries of these accepted rules. Codes or rules are acquired, which are then applied to new situations. This is the essence of problem-solving, and may be likened to how we learn to play a game such as chess:

"The problem in problem-solving consists firstly in discovering which routine is appropriate to the problem - what type of game is to be played; and secondly, *how* to play it - i.e. which strategy to follow, which members of the flexible matrix are to be brought into play according to the lie of the land". (pp. 644-45)

Having learnt the moves allowed to the different pieces on the board, each new situation asks us to make our choice of those moves possible. We have a 'matrix' - that is, the rules governing the operation of the game - which is adaptable in myriad ways. The player has to decide on which way is likeliest to result in the outcome: check-mate, or the solving of the problem. However, as players become more experienced, they begin to apply tried and tested methods to most situations:

"We learn, or discover, with strenuous effort, a new method of thinking; after a while, with practice, the novelty changes into semi-automatized routine, based on an invariant code with an adaptable matrix, and is incorporated into our repertory of habits....not only the *rules* of the newly learnt game become soon automatized to such an extent that it becomes increasingly difficult to go against them, but strategy, too, tends to become stereotyped and incorporated into the code." (p. 645)

So the experienced chess-player learns a set series of gambits, mid-game desirables such as to try to find open rook-files, and to engineer situations that provide familiar end-games.

Habits of thought are necessary in dealing with most problems, because they provide a modus operandi that has been shown to be effective. No-one has the time or energy to go back to and question basic principles when confronting a new situation: time dictates that we reach for the familiar and the tried and tested. But, argues Koestler, habit brings its dangers. If chess players wish to move from a level of proficiency to one of mastery, then they have to go beyond the embrace of the familiar with which most of us are satisfied:

"...reification of tactical pseudo-rules into automatized sub-codes contains a mortal danger, because considerations of strategy on a higher level demand that each of these tactical rules should be broken if the occasion warrants it. Sacrifices in material, and moves which look cockeyed (that is: positionally unsound), are signs of combinative power, i.e. originality; the mediocre player always remains a slave of habit and cautious orthodoxy." (p. 645)

In the world of learning, all of us have to acquire the fundamentals, whether the laws of physics or the historical meanings of language. The application of those fundamentals to new situations - that is, problem-solving - allows the student to achieve a praiseworthy level of proficiency based on the accurate deployment of existing knowledge. But, at the higher level of enquiry, such reliance on inherited orthodoxy may be restrictive:

"In biology or theoretical physics there are no clean-cut distinctions between canonical rules of the game and heuristic rules of strategy and tactics. We are inclined to believe, as popular books on science tell us, that the 'permissible moves' are laid down for ever by the

laws of formal logic and the criteria for judging evidence; and that strategy is determined only by the lie of the land, that is, the data of observation. In fact, however, the rules turn out to be infiltrated with implicit assumptions and 'self-evident axioms' which as often as not are specious contraband; and the empirical strategies are often weighted by a stubborn adherence to methods of interpretation and biased techniques, promoted to canonical status." (pp. 645-46)

It is vitally important to recognize and accept that such stubborn adherence has its virtues. Many a teacher wishes that some learners would get to that level on a consistent basis. We all need to adhere to that level most of the time. But advances in learning require something more:

"Habit is heir to originality; without the hierarchies of organized habits life would be chaos; creativity means breaking up habits and joining the fragments into a new synthesis." (p. 646)

The central thesis of Koestler's book is that creativity occurs when we break out of the habits acquired by customary adherence to the principles of a single, given matrix. It is when separate matrices are brought together in unaccustomed ways that unexpected and creative ideas may emerge. To this process Koestler gives the title of 'bisociation': the clash between different sets of ideas, requiring flexibility of thought, re-thinking, risk-taking.

Koestler's model of creativity may strike us as having some similarities to Thomas Kuhn's thesis in his celebrated, highly influential and contentious book, *The Structure of Scientific Revolutions* (1962). Kuhn there argues that, while day-to-day science operates within set paradigms, radical scientific progress is characterized not by steady increases in knowledge, but by periodic paradigm shifts, revolutions in scientific thought by which the entire pattern of thought in a field is altered. These shifts are caused by the accumulation of anomalous results within a present paradigm that ultimately force a revolution in thinking. Day-to-day thinking is inherently conservative because we attempt to relate all experience to a set pattern. We cannot break out of that pattern without a wholesale revolution by which a new paradigm replaces the old in its entirety. 'Progress' is not evolutionary, but revolutionary.

Koestler's model, however, is less radical than Kuhn's and more in tune with what happens in Enquiry-Based Learning. It allows for interaction between students as they work on a task because it proposes that the juxtaposition of ideas can itself be creative.
Within the humbler sphere of day-to-day student learning - indeed, within the humbler sphere of the day-to-day learning of most of us - the levels of perception involved in major scientific revolutions are way beyond us. But they can be replicated on a reduced scale by individual and sometimes group moments of revelation. It is worth remembering that the notion of originality is most productively seen as relative: ideas are perceived as new *within the context of the situations in which they are discovered*. Only at the very highest level of human development are ideas new absolutely. For learners, the discovery of something that the tutor has discovered years before may still be a profound moment.

A parallel may be that of artistic performers for whom the work they are presenting is familiar, sometimes all-too familiar. It will not have that familiarity for at least some members of the audience, and true artists will ensure that this is reflected in the commitment with which the performance is given. The conductor who walks out to perform yet again Beethoven's fifth symphony, the actor who steps out to do yet another basic repertory role have to remember that there is someone out there who has not heard or seen the work before: for all of us, there is that first occasion, that moment of engagement with the excitement of the new. So the great conductor, the great actor will commit the same level of energy to familiar works as they do to those that possess for them the excitement of novelty. They realise that this performance might be life-changing for someone in the audience. The great teacher will do the same, energised by the knowledge that, for the learners, this moment could be a moment of revelation that remains with them and shapes their lives.

6. The tutor's role in Enquiry-Based Learning: Facilitation

The function of the facilitator of an Enquiry-Based Learning process is to guide, support and encourage students to develop their own learning. The facilitator encourages by asking questions (not providing 'answers') and exploring options with a group. The purpose is to nurture the students' own initiative and sense of responsibility for their learning. The

working relationship is not hierarchical or tranmissive, but more consultative. The model shifts from being tutor-centred to being learner-centred.

It is important not to confuse this transition of roles (from the traditional academic instructor to facilitator) with opting out of academic responsibility. However much Enquiry-Based Learning stresses the active role of students in their own learning, it does not (should not) ignore a crucial fact: *lecturers and professors are, by the very fact of their employment as such, further down the road of learning than students*. It is an absurd (and self-destructive) fiction to pretend otherwise. It is a misuse of intellectual property to prevent students from gaining access to the crucial academic resource, the academic staff themselves. This is why students attend a university. Direct contact with the (we hope) creative but reflective and understanding minds of sympathetic academics is, when all is said and done, the most powerful impetus to learning (see “The range and flexibility of Enquiry-Based Learning”, section 3.3).

Thus the tutor, when acting as facilitator, remains that more experienced academic. How can this fact be used to good effect? How can the benefits of Enquiry-Based Learning be reconciled with the potential benefits to students of contact with subject experts? We should aim to *maximize* benefits to students, not artificially restrict them.

There are models of facilitation in Problem-Based Learning that operate through a system of non-specialist facilitators. The theoretical basis of this system is the argument that facilitation is about *process*, not about *content*. Thus any trained facilitator can satisfactorily perform with any Problem-Based Learning group. This theory is tightly linked to the structured models of Problem-Based Learning activities. In these models, the primary function of the facilitator is to ensure that students follow the steps, completing one stage thoroughly before moving on to the next, but moving on to the next in time for the entire process to be successfully completed within the determined schedule.

It was argued above (see section 3.3), that the separation of process and content is intellectually indefensible. It is consistent with this argument that a similar division in facilitation is not desirable. Even at the basic level of acting as an encourager of others’ learning, the ability of the facilitator to encourage must be impaired by ignorance of what that encouragement is essentially about. Further, to provide non-specialist facilitators risks

the de-motivation of students who have, as we have argued, come to university with the aim - among others - of coming into contact with specialists. Removal of the specialist from the process is, in addition, to remove a potential *resource*. The question is *how* that resource can best be utilized. How does the tutor facilitate learning?

- Show that he or she too is involved in the process of learning as a model of academic behaviour;
- Create appropriate conditions within which Enquiry-Based Learning can take place: physical and intellectual spaces;
- Enter into appropriate discussions which may include elements of guidance where needed (guidance does not mean imposition or direction);
- Monitor the group's and individuals' progress;
- Support intellectually and socially where appropriate;
- Encourage discussion in the whole group;
- Help the group to evaluate their learning procedures;
- Be the safety net;
- Provide feedback on outcomes;
- Encourage peer feedback on outcomes.

But, in addition, the facilitator can become, where appropriate, a resource in the same way that a library or a text-book may be a resource: that is, as an authority that may be consulted. And if that authority is a living, present tutor, then the flexibility, the excitement and the immediacy of the student experience are all enhanced. The key to reconciling the academic expertise of the tutor with the students' ownership of the process of enquiry is that the facilitator should function as an expert when the students request it and in a way that is consistent with being a resource to help with enquiry rather than the holder of the 'solution'. In this way the academic expert is like a book: there is knowledge to be gained from this source, but it has to be sought after, selected, evaluated and applied by the student. An Enquiry-Based Learning scenario is not a simple question to which there is a simple answer. But the academic has the advantage over a book of being a human being who can therefore enter into a productive dialogue with the students. And one of the additional effects can be the opening up of further avenues of enquiry that may not be directly relevant to the present case, but which may become part of the store of knowledge that students may apply to future scenarios.

For example, the scenarios presented on the Eighteenth-Century Poetry course outlined on the CEEBL website (W. Hutchings, *Designing an EBL Course* CEEBL Resource Pack 001,

www.manchester.ac.uk/ceebl) are designed to encourage students to investigate a variety of poems, rather than stick to a set series of designated poems. On several occasions, groups found themselves venturing into unfamiliar territory (genres, forms or individual poets). I was therefore sometimes asked about the contexts within which the new material was located, such as the earlier history of a genre or the status of a poet. The standard response in purist theories of facilitation is to encourage students to think about how they might retrieve this information for themselves. But the request to talk to a group for a short time about such issues should be viewed as an appropriate use of an expert facilitator. A creative way to respond is to demonstrate one's willingness to engage with the material, to throw out some ideas that do not directly bear upon the task and to raise some questions that might or might not. This sets up a dialogue, widens intellectual horizons and plants seeds for some future reading.

Such facilitation responses supplement one of the academic advantages of Enquiry-Based Learning processes, that the work on a task often includes learning that is in addition to what is necessary for the actual product. This learning may be the result of the need to research a field before narrowing down to what is finally decided as appropriate for a response. For example, a group on the Eighteenth-Century Poetry course mentioned earlier decided that they would respond to the task of providing a booklet to accompany an exhibition on landscape poetry by choosing poems about rivers. By this means they sought to address the problem of coherence in the finished product. But, in order to make this decision, the group had previously needed to look at a wider range of topographical topics. Only by this means could they observe that rivers were a common feature in the range of poetry. (See *Problems: Defining Learning Outcomes*, www.manchester.ac.uk/ceebl) Hence a broader knowledge is acquired. Facilitation that assists that broader learning is creative and academically admirable.

For further reflections on the facilitation process, see *Facilitating Enquiry-Based Learning: Some Digressions* (CEEBL Essays and Studies in Enquiry-Based Learning: www.manchester.ac.uk/ceebl).