

LEARNING SPACES, LEARNING BRIDGES AND TROUBLESOMENESS: THE POWER OF DIVERSE APPROACHES TO PROBLEM-BASED LEARNING

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This address sets out the argument that we need to see Problem-based Learning as an approach to learning that is characterised by flexibility and diversity, in the sense that it can be implemented in a variety of ways, in and across different disciplines, and in diverse contexts – the common factor being the focusing of learning around problem scenarios rather than discrete subjects. I will begin by suggesting that it is possible to see at least five diverse models of Problem-based Learning in operation (Savin-Baden, 2000). Secondly, I will suggest that although there are five such models the ways these are played out in practice are affected by staff perceptions of learning, knowledge and students. Thus the ways curricula are enacted will be reflected through the “modes of curriculum practice”; in short, the means by which Problem-based Learning is placed and used within the curriculum. Finally, I will suggest that Problem-based Learning offers both “learning spaces” and “learning bridges” for staff and students but that, as an approach to learning, there is also an exciting “troublesomeness” about it.

FIVE MODELS OF PROBLEM-BASED LEARNING

The forms of Problem-based Learning in operation in curricula can largely be differentiated by the ways in which knowledge, learning and the perception of the student are enacted within those curricula. This conceptualisation may initially seem simplistic, but when the idea of staff's espoused theories and theories-in-use is examined, then what becomes apparent is that a complex, integrated course document, whilst often espousing the development of critique, does not often operate in a way conducive to such development. Although much has been written about knowledge which challenges existing concepts, from forms of knowledge, through critical theory, to the post-modern movement, it is in fact staff's pedagogical stances that will reflect what is seen as valid knowledge by students. Thus the positioning of knowledge in a Problem-based Learning programme will tell us more about the pedagogical stances of the staff than the forms of knowledge in action. Learning will be defined almost inevitably by the ways in which problems are expected to be solved or managed, as well as

through the assessment process. In practice, therefore, this might mean that within the same curriculum any number of models could be in operation. The following series of models is offered as a means of understanding ways in which learners are enabled and disabled in the process of constructing knowledge for themselves, depending upon the form of Problem-based Learning with which they are faced.

Model 1 – Problem-based Learning for epistemological competence

Model 1 is characterized by a view of knowledge that is essentially propositional, with students being expected to become competent in applying knowledge in the context of solving, and possibly managing, problems. Those wedded to a concept of knowledge of this sort would be unlikely to debunk the myths connected with this view of knowledge, since in Model 1 what counts as valid knowledge is defined in advance and all other viewpoints are largely ruled out. Students are expected, therefore, to know how to use propositional knowledge to solve given problems. Problem-based Learning is therefore used as a means of helping students to learn content. Thus problem situations are seen as the means by which students become competent in knowledge management and covering the required content in the curriculum. In practice, Problem-based Learning will largely be based within a particular discipline area, such as economics or engineering, and the problem scenarios will be based on key concepts about which students are expected to know. Model 1 has many of the components of problem-solving learning. What is different in Model 1 is that Problem-based Learning is also being used to enable students to develop problem-solving abilities, to become competent in applying their knowledge to solve problems and, in parallel with professional practice, to test students' understanding of what has been taught. Thus there may be conflicts within the Problem-based Learning programme, between tutors who expect students to adopt a step-by-step model to solving problems in order to "cover ground" and gain depth and rigour in basic sciences, and other tutors who are expecting students to use a more creative approach for gaining the answer.

Model 2 – Problem-based Learning for professional action

This model of Problem-based Learning has, as its overarching concept, the notion of "know-how". Action is seen here as the defining principle of the curriculum, whereby learning is both around what it will enable students to be able to do, and around mechanisms that are perceived to enable students to become competent to practice. Through this process of Problem-based Learning, students learn how to problem-solve and to become competent in applying this ability to other kinds of problem scenarios and situations within given frameworks. So the students develop critical thinking skills for the work place, interpreted somewhat narrowly as the ability to use problem-solving abilities in relation to propositional knowledge as a means of becoming competent in the work place and being able to turn on these skills at any given point.

The danger with Model 2 is that Problem-based Learning is being used as a mechanism to develop narrow sets of skills that may feel to the students somewhat divorced from any other forms of knowledge. For example, an overemphasis on communication skills or teamwork, without students being encouraged to engage with and reflect upon the related theory and current research, can result in uncritical acceptance of the guidance given by tutors. Furthermore, skills taught without the backing of theory and research will not help students to

consider the possibility that different kinds of team work skills may be needed in the workplace, compared with those which they have been encouraged to develop at university. Skills and know-how are not to be thrown out, but what will be needed in this kind of Problem-based Learning are concepts of skills and know-how firmly rooted in the notion of skills *with* cognitive content and professional judgement.

Model 3 – Problem-based Learning for interdisciplinary understanding

In this model of Problem-based Learning there is a shift away from a demand for mere know-how and propositional knowledge. Instead, Problem-based Learning becomes a vehicle to bridge the gap between the know-how and know-that, and between the different forms of disciplinary knowledge in the curriculum. In Model 3 the student works, learns and develops herself *within* subjects and disciplines. She understands that disciplines taught as discrete entities do overlap, but that she must make the necessary connections for herself. The connections she makes are in the relationships *between* the disciplines. Learning is therefore seen here as knowing and understanding knowledge from the disciplines, and also recognizing the relationship between them, so making sense for herself both personally and pedagogically. This kind of Problem-based Learning unites disciplines with skills (of all sorts), such that the student is able to see, from her stance as a future professional, the relationship between her personal stance and the propositional knowledge of the disciplines. She is enabled to develop not only an epistemological position but also a practice-related perspective that integrates knowing-that with knowing-how.

Model 4 – Problem-based Learning for transdisciplinary learning

In this model Problem-based Learning operates in a way that enables the students to recognize that disciplinary boundaries exist but that they are also somewhat illusory, that they have been erected. The student might transcend boundaries but he is not likely to challenge the frameworks into which disciplinary knowledge is placed. In Model 4 frameworks are not reframed (as in Model 5), since to do that would risk jettisoning the framework. Instead, what occurs in practice is that knowledge and skills are “kept in their place” but students have an overview of the frameworks that does not risk disturbing them.

In this model of Problem-based Learning, students are encouraged to adopt a critical position towards knowledge, themselves and their peers, and to use the Problem-based Learning group as a place in which to examine and test out personal and pedagogical frameworks. Students here will tend to develop a highly autonomous position as individuals within a group, and as a group. They will elect to use the group to resolve dilemmas and to discover meaning in their lives, to the extent that the facilitator becomes an orchestrator of opportunities.

Model 5 – Problem-based Learning for critical contestability

This form of Problem-based Learning is one that seeks to provide for the students a kind of higher education that offers, within the curriculum, multiple models of action, knowledge, reasoning and reflection, along with opportunities for the students to challenge, evaluate and interrogate them. Students will therefore examine the underlying structures and belief systems implicit within a discipline or profession itself, in order to understand not only the disciplinary area but also its credence. They will transcend and interrogate disciplinary

boundaries through a commitment to exploring the subtext of those disciplines. Knowledge here is seen as being constructed by the students, who begin to see themselves as creators of knowledge, and who become able to build upon and integrate previously learned knowledge and skills with material which is currently being learned.

The difficulties with this model largely stem from issues of power and control in the learning context. Staff's sense of self is likely to feel at risk or threatened in their role in the group and in relation to their conceptions of learning and knowledge, since they will be under increasing scrutiny from the students. It might be that the enactment of this model is only actually possible in the context of postgraduate programmes, where students are offered more freedom to learn in the context of their own agenda than in undergraduate or pre-registration (professional) curricula.

IMPLEMENTING PROBLEM-BASED LEARNING IN DIVERSE WAYS

I suggest that there are at least fifty ways of getting involved in a problem-based curriculum; but here I just use eight, and have termed them *modes of curriculum practice* (Savin-Baden and Major, 2004). These modes are not meant to be an exhaustive list, but rather are a means of considering what occurs in some programmes as well as the impact of opting for a particular design. Such modes also allow us to point up the pitfalls of opting for those that may disable rather than enable student learning.

Mode 1– Single module approach

In this approach, Problem-based Learning is implemented in one module (possibly two) in one year of a programme, invariably the last year. The lecturer who runs the module is interested in improving student learning and students' ability to think critically, something she believes they may not have done, or not done enough of, elsewhere in the course of study. The module is often designed using the McMaster model of students engaging with one problem at a time and meeting two or three times over the course of each problem. The module is invariably different from all the others that the students have encountered earlier in the degree; examples can be seen in engineering (Cawley, 1997) and English literature (Hutchings and O'Rourke, 2002).

Mode 2 – Problem-based learning on a shoestring

This type of Problem-based Learning occurs with minimal cost and interruption to other areas of the programme. A few tutors who are keen to implement it, perhaps in the face of resistance on the part of other tutors, usually undertake it; so it is done quietly and cheaply. It is a model that can be seen in many subjects and disciplines, and tends to occur where it has been agreed by the head of department that some tutors can use Problem-based Learning in some areas of the curriculum. It tends to be implemented in modules run by tutors interested in it, and avoided by those who disagree with it. In Mode 2, Problem-based Learning modules tend to be scattered throughout the programme, students may not understand the rationale for its use, and staff implementing it may often feel frustrated by the lack of departmental or institutional support for their 'Problem-based Learning on a shoestring'.

Mode 3 – The funnel approach

In this mode, the decision has been made by the curriculum design team or head of department to design the curriculum in a way that enables students to be funnelled away from a lecture-based approach that may be more familiar to them, towards a Problem-based Learning approach. They commence with lecture-based learning in the first year, then move on to problem-solving learning in their second year and then Problem-based Learning in their final year.

Mode 4 – The foundational approach

The foundational approach is invariably one that is seen in science and engineering curricula. Here the assumption is that some knowledge is necessarily foundational to other knowledge, and therefore it needs to be taught to the students before they can begin to solve problems. Thus, in the first year of a programme adopting this approach, the focus is on providing students with lectures, tutorial and laboratory time that will enable them to understand the required knowledge and concepts. In the second and third year, students then utilise Problem-based Learning. One of the underlying principles of this approach is the assumption that if basic concepts are taught first, then the knowledge will be decontextualized and therefore will be available in the students' memories for use in solving new problems. (For an example of this type of curriculum see Gibbs, 1992: 59-76; Savin-Baden 2000, Chapter 3, Lemberg University). The difference between the funnel approach and the foundational approach is that in the funnel approach tutors are concerned to guide students towards the Problem-based Learning process from early on in the curriculum. In the foundational approach tutors believe that some knowledge is necessarily foundational to other knowledge, and therefore students must know this foundational knowledge before they can begin to undertake Problem-based Learning.

Mode 5 – The two-strand approach

In the two-strand approach, tutors see Problem-based Learning as a vital component of the curriculum that has been designed to maximise the use of both Problem-based Learning and other learning methods simultaneously. In the two-strand approach the curriculum has clear strands running alongside one another. The problem-based modules are designed to build on each other, but also to draw from the modules in the mixed approach strand. What tends to happen is that modules in each strand are designed with interlocking themes so that the knowledge and capabilities in the mixed approach feed in to support Problem-based Learning rather than working against it.

Mode 6 – Patchwork Problem-based Learning

The patchwork approach is a complex mode that students often experience as difficult or confusing. Here the whole curriculum is designed using Problem-based Learning, but due to institutional requirements, the modules do not run consecutively but concurrently. The result is that students undertake two or three problems simultaneously in different, but not necessarily related, subject areas. Furthermore, modules are unlikely to last the same length of time, so students may do one problem over a period of four weeks, another over two weeks, and another within a week. Students in this form of curriculum experience Problem-based

Learning as both a disparate and a demanding process that tends to result in the compartmentalization of knowledge, rather than as a means of helping them to integrate it across disciplinary boundaries.

Mode 7 – The integrated approach

The integrated approach is based on the principle that Problem-based Learning is not merely a strategy but a curriculum philosophy. In practice, relatively few examples of this mode of curriculum exist, although it is an approach that many espouse. This model is based on the McMaster model whereby students work in teams, encounter one problem at a time and are facilitated by a tutor. The curriculum exists in an integrated fashion so that all the problems are sequential and are linked both to one another and across disciplinary boundaries.

Mode 8 – The complexity model (following Barnett and Coates, 2002)

This mode is an approach to curriculum design that transcends subjects, disciplines and university curriculum impositions, and embraces knowledge, self, actions and curriculum organizing principles. Although Barnett and Coates (2002) have not termed it as such, we would argue here that in their notion of curriculum, what they are proposing is a complexity model, since it reflects the earlier work of Barnett (1997) on supercomplexity. The model takes Barnett's earlier notion of curriculum a stage further and seeks to embed his theorising in a view of curriculum that reflects the fragmented world of both the learners and the curriculum designers. In reality this means that the mode of curriculum practice becomes one of Problem-based Learning for critical contestability (Savin-Baden, 2000). What I mean is that Problem-based Learning of this sort enables students to develop a critical position from which to interpret the practice of others, to (re)develop their own critical perspectives and thence to critique them. This form of Problem-based Learning is one that seeks to provide for the students a kind of higher education that offers, within the curriculum, multiple models of action, knowledge, reasoning and reflection, along with opportunities for the students to challenge, evaluate and interrogate them.

IMPLEMENTING PROBLEM-BASED LEARNING

Experiences and learning opportunities that staff and students gain from their involvement in Problem-based Learning are diverse. Clearly such opportunities are likely to be less positive for staff in institutions where Modes 1, 2 and 6 are adopted, since many of them will have to use time and energy winning over line managers and “fighting” the system. In institutions where leaders and senior staff members are committed to supporting Problem-based Learning and planning it effectively, learning opportunities for staff and students will be more positive, and it is more likely that Modes 5, 7 or 8 will be the result. In these more positive cases lecturers and tutors with high levels of student contact should be spared the frustrations of inadequate resources and preparation time and instead be given the support to provide students with high quality learning opportunities. These lecturers and tutors will probably find that their most significant professional challenges emerge from managing “troublesome knowledge” and enabling their students to maximise their use and understanding of “learning spaces” and “learning bridges”.

Problem-based Learning is troublesome

Perkins (1999) describes conceptually difficult knowledge as “troublesome knowledge”. This is knowledge that appears, for example, counter-intuitive, alien (emanating from another culture or discourse), or incoherent (discrete aspects are unproblematic but there is no organizing principle). Perkins categorizes such encounters as “inert”, “ritual”, “conceptually difficult”, and “foreign”. However, what seems to be particularly pertinent to Problem-based Learning is that he suggests that “qualitative problems lead students to confront the character of the phenomenon rather than just to master computational routines”.

The reason I suggest that Problem-based Learning is “troublesome” is that the foundations feel fragmented – like pieces of a jigsaw strewn across the sea. This is largely because engaging with it as a new or different approach to learning and teaching creates disjunction, a feeling of being stuck or confused, along with a sense of fragmentation and possibly anger and frustration. Catalysts to disjunction become apparent through staff and students' increasing awareness of an interplay of multiple realities, roles and identities that seem to arise when Problem-based Learning is in operation. In learning contexts there exist distinct contradictions for different individuals, groups of people and organizations, which may prompt disjunction for individuals in different ways. For example, issues that at first appear enabling for a number of students, such as the opportunity for self-direction, can in fact be disabling for others. Alternatively, the implementation of Problem-based Learning by a particular group of staff within an institution can, at one level, be seen as something that will promote reasoning skills and prepare students more effectively for the world of work; whereas in practice it can result in conflict for a number of staff, students and practitioners about what is seen to count as knowledge, and how notions of accountability are to be understood within professional education.

LEARNING SPACES

A learning space is a place in the curriculum or life-world¹ of the student where opportunities to reflect and critique their own learning position occur. In such spaces students often recognise that their perceptions of learning, teaching, knowledge and learner identity are being challenged, and realise that they have to make a decision about their response to such a challenge. Students may experience disjunction as a result of being in a learning space, but they also may experience transition. Transition is used here to denote shifts in learner experience caused by a challenge to the person's life-world.

Transitions are a learning space because they occur in particular areas of students' lives, at different times and in distinct ways. The notion of transitions carries with it the idea of movement from one place to another, and with it the necessity of taking up a new position in a different place. Leaving the position and entering the transitions may also be fraught with difficulties that may result in further disjunction for the student. Thus transitions can often be difficult and disturbing, and yet simultaneously be areas where personal change takes place.

¹ The concept of life-world is taken from Habermas (1989), and represents the idea that as human beings we have a culturally transmitted stock of taken-for-granted perspectives and interpretations that are organized in a communicative way. Thus challenges to students' life-world(s) may be at odds with, or bear little relationship to, their current meaning systems, so ultimately prompting transitions in their lives.

By acknowledging that transitions have their costs personally, pedagogically, and interactionally, and hence have a life cost, staff and students' values will not be lost amidst the learning process; for example, values about what it is that holds meaning for individuals, and what it is that frames belief.

Perry (1981) has argued for the practice of "allowing for grief" in the process of growth and development in learning. By allowing for grief, it will be possible for educators to help students to acknowledge and come to terms with their sense of loss. That done, students will need to be helped to take further steps towards transcending their knowing and encouraged to develop new meanings, to prevent them from slipping towards disabling disjunction, isolation and alienation. If educators can offer students space for learning and for managing their grief in the transitional process, then transitions can be managed, not necessarily without pain or loss, but at least with meaningful and realistic support that helps students to legitimise their experiences.

New and different learning experiences and seminar spaces are examples of where learning spaces are often encountered by students and seen in action by staff – although it is noticeable that staff themselves do not always realise that they have created learning spaces for students.

New and different learning experiences

Many students who believe, on joining the course, that they understand what constitutes Problem-based Learning may not realize the challenges and conflicts that may ensue. For most, prior experiences will be of traditional, didactic methods of teaching that offered little opportunity for them to value their own knowledge and perspectives. However, over a period of time students may learn to use Problem-based Learning groups to make sense of the interrelationship between their problem-solving processes, prior experience and the new material being learned. This learning space offers opportunities for dialogue and dialogic learning to occur. For example, through dialogue with peers they are helped to tackle the given problem and subsequently integrate that which had been incomprehensible and unfamiliar into their life-worlds.

Problem-based Learning also enables students to explore and to develop their own tacit understandings. For example, the group can be a place in which students are able not only to connect with problems but also to make sense of inner inchoate understandings. However, making sense of incoherence can be a precarious affair. O'Reilly (1989) has argued that there are risks involved in moving from experience that is incoherent to making public statements about one's self. For example, experience is often incoherent, and in speaking of that experience to others (publicly) we risk sounding as if our experience is meaningless, contradictory and multiple (which it probably is). Experience is not something that can be tied into neat packages, and thus to speak of it is to risk being seen as stupid and incoherent, when it is in fact the *reflections* upon those experiences which are incoherent.

Meanings, particularly about prior experience and learning, seem to need eventually to become coherent in order that they can then be interpreted and subsequently valued. Problem-based Learning programmes in which staff place value upon prior experience must be prepared, therefore, to offer students the space and support to explore incoherence (and not just to resolve it prematurely). Such space and support extends the degree to which students

are enabled not just to value prior experience but also to value the multiple and often contradictory meanings which emerge through it and from it. Reflection appears to play a key role in this process. This is particularly important for students where reflection upon the learning process appears to be absent in lecture-based components of the course. Thus Problem-based Learning seems, for many, to be the catalyst that prompts ways of working with and through their experience, often enabling them to link new experiences and knowledge to those of the past and thereby prompting new (more and less coherent) meanings. Table 1 indicates the way in which these forms of learning affect students' ability to engage with learning spaces.

Table 1 Comparison of forms of active learning

Method	Organization of knowledge	Forms of knowledge	Role of student	Role of tutor	Type of activity	Learning space
Problem-based learning	Open-ended situations and problems	Contingent and constructed	Active participants and independent critical inquirers who own their own learning experiences	Enabler of opportunities for learning	Development of strategies to facilitate team and individual learning	Usually comprehensive and varied, as spaces occur in PBL seminars
Project-based learning	Tutor-set, structured tasks	Performative and practical	Completer of project or member of project team who develops a solution or strategy	Task setter and project supervisor	Problem-solving and problem management	Often limited because the project is very task focussed, but there may be space in long term projects
Problem-solving learning	Step-by-step logical problem-solving through knowledge supplied by lecturer.	Largely propositional, but may also be practical	Problem-solver who acquires knowledge through bounded problem-solving	A guide to the right knowledge and solution	Finding solutions to given problems	Usually limited because the problem is bounded
Action learning	Group-led discussion and reflection on action	Personal and performative	Self-advisor who seeks to achieve own goals and help others achieve theirs through reflection and action	A facilitator of reflection and action	Achievement of individual goals	Comprehensive and varied, often more so than in PBL seminars because the focus is on personal goals

Seminar spaces

Another form of learning space is the seminar space. Seminar spaces are locations within the seminar where students are given reflective space to consider and discuss personal learning concerns. Reflection is the process through which social beings examine themselves within a cultural context. It is a process whereby the frameworks by which people live and operate are challenged and transcended in the act of evaluating the world and themselves, and even that very act of self-evaluation. Yet opportunities for individual and corporate reflection can only emerge within curricula where reflection is not only espoused as a belief but also undertaken in practice. Such belief can only emerge from the premise that independent inquiry and reflection upon one's life-world is worthwhile and to be valued within professions and academic institutions. Weil argues (1989:140):

Space for learning implies opportunities to reflect on individual and collective goals, within the boundaries and possibilities of a particular programme or subject area. Enabling teachers and groups can go a long way to counteract the impact of disjunction arising from forces that seem outside the bounds of one's personal agency, and to create an oasis of integration in which the experience of other kinds of disjunction can be made sense of and more effectively managed.

Opportunities for reflection within groups can offer oases of integration for some students; oases where transitional learning can and does take place. Thus personal reflection, along with reflection and discussion with others, equips many students to use skills and life experience in order to utilize the knowledge they have gained, and to reflect upon these processes. Groups are also locations in which reflection upon disjunction being experienced can be supported, and where transitions can be managed.

LEARNING BRIDGES

Learning bridges vary in their structure and appearance, as well as their perceived relevance by students. Broadly speaking, learning bridges are mechanisms that help students link or connect different past and present personal and pedagogical positions in a learning environment. For example, students may have been silenced in lecture-based approaches to learning. In circumstances where students are not allowed to speak or debate they are often prevented from understanding their own epistemological position. Opportunities to explore their own experiences, critique knowledge and have experiences legitimated by others allow them to develop a stance towards knowledge and to connect old knowledge with new learning and knowledge. For example Dave, a mechanical engineering student explained how he connected learning knowledge and retaining knowledge in new ways through Problem-based Learning:

I think really I've learnt a lot more, and more to the point, retained a lot more than I have on previous courses, and retained a lot more at a technical level as well. Rather than it being the process of from lecturer's mouth to the paper via the ears but not the brain.

Students who engage with disjunction in a learning environment tend to speak of “gaining a voice” (Savin-Baden, 2000), as a way to depict an intellectual and ethical process whereby the development of a sense of voice, mind and self are interlinked. The ability to “construct a voice” (Belenky *et al.*, 1986) encompasses the way in which students speak of engagement with their disjunction and the transitions that often ensue. Constructing a voice is thus a dynamic process through which construction, deconstruction and reconstruction occurs. For example, students may be able to “speak for themselves” in some circumstances and not others, yet there is not always a conscious realization of voice (or lack of it). Students perhaps are able to speak within their peer group and Problem-based Learning group, but are not always able to interact with tutors whom they see as experts. For students the ability to articulate their own confusions around disjunction often results in a shift towards a greater consciousness and/or understanding of their learner identity.

Thus learning bridges include:

- Developing an epistemological position
- The development of critique
- Prior experiences of learning
- Legitimated experiences

Developing an epistemological position

The concept of an epistemological framework captures the idea that students take up a particular position towards propositional knowledge. For some students the delineation of knowledge by staff is something that is seen as helpful and acceptable, as such strategies enable students to gain high marks. However, for other students the way in which knowledge is defined results in anger and frustration. Such students believe they should have the right to define knowledge on their own terms, so that knowledge is constructed and contextual. They can therefore see themselves as creators rather than receivers of knowledge. Students may adopt different strategies for managing learning that connect with their perceived notions of staff's views of knowledge. These differences relate to the emphasis put upon different forms of knowledge, and the ways in which students are expected to explore this knowledge by staff and practitioners. However, the process of students developing an understanding about how staff see knowledge, and making decisions based about what they might do in response to this, could be viewed as constructing a learning bridge.

The development of critique

Critique is to be seen as a form of criticism of the discipline (Barnett, 1997). Thus a notion of critique brings with it the transcendence of the discipline and reflexivity around that very transcendence in which differing views are celebrated. Barnett (1997) has offered a model of criticality in which he suggested that what is required is three interconnected levels of criticality, namely critical action, critical self-reflection and critical reason. These three interconnected strands offer a map not just for developing critique in students but for developing critical beings with complexity skills for the globalized age. The development of critique is a learning bridge, as it offers students a means of examining past learning and knowledge in relation to new knowledge and concepts set before. An inability to critique results in disjunction for many students, as Sally a nursing student, illustrates:

You need to know, are you doing the right thing? Are you doing the wrong thing? You don't know if you've never come across it before what is right and what is wrong, do you? What is the right way to go about something and what is the wrong way? And you might be doing it all wrong but because nobody's said any different to you, you go through with the feeling you're doing it right.

Sally's perspective also reflects the impact of prior learning on her initial encounter with Problem-based Learning.

Prior experiences of learning

Sally's prior experiences did not create a learning bridge because in common with other students' prior experiences of learning and views of themselves as learners, she assumed that learning comprised rote memorisation of facts. Difficulties students have experienced in learning in the past through didactic methods then result in a belief that it is necessarily *they* who are unsatisfactory, rather than the course or the system. Thus, for many, their perceptions of themselves as failures or as individuals who find learning difficult constitute places where barriers to learning become evident. Yet other students often speak about the way in which their prior experiences of learning in didactic programmes have been both frustrating and isolating. Thus, when they first encounter Problem-based Learning they find that their lived experiences, and those of others, are of worth. For example, Olive explained the connections she made:

Because I've got three kids, it's actually brought up quite a lot of stuff about socialising children and what is right, you know. . . Part of it has been a review of how I did, and having a look at my own practice of child rearing, which has brought up quite a lot of painful stuff, but it's also been quite reassuring as well . . . Part of it is about getting rid of stuff and moving on, and it's about acquiring skills as well.. And an awareness that there are things I do want to be acquired.

Legitimated experience

Legitimated experience captures the idea that learners learn to value the worth of their experience. Learners in a variety of learning contexts find it difficult to take their prior experiences seriously. It is often through realizing the value of their experience that students are enabled to manage disjunction and subsequent transition. Learning bridges are evident in the connections students make in the very process of legitimating their own experience. This enables them to acknowledge and interpret the text of their experiences, and thus reconstruct prior notions of legitimate forms of learning, knowledge and personal experience.

CONCLUSION

Problem-based Learning is contested ground and research into it remains complex and difficult, largely because of the different ways it is implemented and enacted in various institutions in different countries by assorted staff. Yet such diversity demonstrates the versatility of Problem-based Learning for both staff and students, and also indicates that it is a

challenging approach because it generates disjunction and ‘stuckness’ in people’s lives. Problem-based Learning can be seen as a troublesome but also a *threshold* philosophy that promotes not just transitions but transformation in the lives of learners, whether staff or students. It is an approach to learning where we continue to stand on the threshold, and it should thus be both the brink and the borderland of our teaching practice and our research – whichever troublesome model or mode we use.

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