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Application of Mezirow's Transformative Pedagogy to Blended Problem-based Learning

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Abstract

At the pedagogical level, transformative practice has the potential to engage students as critical thinkers, by encouraging them to be both participatory and active. This paper reports on a qualitative study in the context of academic development which explores the application of Mezirow's transformative pedagogy on the blending of face-to-face and virtual problem-based learning (PBL). Blended PBL is regarded as inherently formative with respect to the role it plays in the development of individuals, but the transformative dimension deserves to be clarified, revisited and ultimately deconstructed with regard to the responsibility of educators to transcend their traditional role and expand the scope of their work towards an active participation to knowledge advancement. Inherent in this is the role given to e-learning technologies to act as mediating artifact of emerging networked educational systems, supporting peer-to-peer collaboration as well as learners' autonomy and responsibility for learning.

Keywords

Blended learning; E-learning; Interaction; Problem-based learning; Transformative pedagogy

Biography

Dr Roisin Donnelly is Programme Co-ordinator for the Msc Applied eLearning in the Dublin Institute of Technology. Previously, she has taught in universities in Northern Ireland and was a lecturer and visiting research fellow in the University of New South Wales, Sydney. More recently, she has guest tutored on a range of international online courses, including Oxford Brookes, the University of Queensland and the University of Tampere in Finland. She has a wide range of publications to date reflecting her teaching and research interests, including eLearning Pedagogy, Design, and Collaboration, Blended Learning Models, Peer Observation, Mentoring with Academic Staff, and Teaching Portfolio Development and Support. Her first edited book on Applied eLearning and eTeaching is available in 2009 through IGI Global Publishers. She also tutors/supervises on postgraduate programmes in Learning and Teaching for academic staff in DIT.

Introduction

The concept and practice of transformative pedagogy lies at the heart of this study. The research agenda on transformative pedagogies is wide-ranging, referring not only to strategies or styles of instruction but also to the facilitation and management of sustainable transformations, whether individual, social, structural or institutional. From a definitional perspective, descriptions of transformative pedagogy originated in the adult education literature and Myers (2006) believes it has been regarded as an approach to teaching that encourages students to grapple with disorienting dilemmas, critically examine their assumptions related to the contradictory information, seek out additional perspectives, and ultimately acquire new knowledge, attitudes and skills in light of these reflections – all in order to experience personal and intellectual growth.

The stance adopted in this study is that the transformative dimension of pedagogies deserves to be clarified, revisited and arguably bent with regard to the responsibility of academic developers and educators alike, to transcend their traditional role and expand the scope of their work towards an active participation to knowledge advancement. The intentions of transformative educators have not changed much in the last decades but the context of their action is no longer the same. In the context of today's knowledge-driven, technology-oriented society, it is important to take advantage of the possibilities offered by eLearning to support innovative conceptualizations of problem-based learning. Calvert (2006), amongst others, has argued that learning technologies have been recently presented as the panacea to democratise education, improve the quality of learning, advocating peer-to-peer collaboration and giving learners a greater sense of autonomy and responsibility for learning.

Pearson & Somekh (2006) discussed the current strong interest among policy-makers internationally in the idea of transformative learning and point to considerable evidence that existing educational institutions are not equipped to provide this kind of learning experience for students. There has been a sense of disappointment that the transformatory potential of technology is being missed or resisted. Transformative learning theory is being proposed in this study as a means to understand the complexities of education in an age where information and communication technologies (ICTs) are constantly reshaping and redefining our accepted notions of what it means to teach and learn in a higher education environment.

As part of the pragmatic approach taken to this research study, the extant research literature was explored in order to learn from the experience of predecessors in the field.

Transformative Pedagogy

One of the most illuminating definitions of transformative learning was put forward by O'Sullivan (2003):

> *Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Such a shift involves our understanding of ourselves and our self-*

> *locations; our relationships with other humans and with the natural world; our understanding of relations of power in interlocking structures of class and gender; our body awarenesses, our visions of alternative approaches to living; and our sense of possibilities for social justice and peace and personal joy"* (203).

Mezirow's approach (1997) is more direct in describing transformative learning theory as covering the conditions and processes necessary for students to make the most significant kind of knowledge transformation: paradigm shift, also known as perspective transformation. In 1990 he described perspective transformation as

> *the process of becoming critically aware of how and why our assumptions have come to constrain the way we perceive, understand and feel about our world…changing these structures of habitual expectation make possible a more inclusive, discriminating and integrating perspective…and involve making choices or otherwise acting upon these new understandings* (167).

Other models of transformative education, particularly those of Boyd & Myers (1988) (concept of individuation) and Freire (1985) (view of social transformation), have contributed to the discussion. One of the recognised unresolved issues in the theory and one which this study aims to address, is adult development, involving shift or progression. According to transformative learning theory, paradigm shift or perspective transformation is the result of several conditions and processes. In his earlier work, Mezirow (1975) names stages leading to transformation, starting with a disorienting dilemma and ending with restored equilibrium. The exploration of the transformative potential of blended PBL in this study is based upon Mezirow's (1975; 1995) conceptual framework of stages leading to transformation: activating events, the identification and articulation of underlying current assumptions, critical self-reflection, critical discourse and opportunities to test and apply new knowledge and perspectives.

Cranton (1994: 22) has discussed how the theory evolved into a comprehensive and complex description of how learners "construe, validate and reformulate the meaning of their experience". Centrality of experience, critical reflection and rational discourse are three common themes in the theory. However over the years, a number of critiques have emerged to Mezirow's theory, the most contentious being the emphasis upon rationality; although many empirical studies support Mezirow's assertion that critical reflection is central to transformative learning, others have "concluded that critical reflection is granted too much importance in a perspective transformation" (Taylor, 1998: 33-34). Although the theory of transformative pedagogy has been much discussed and debated in the literature, Taylor (1998) has suggested that its practice has been minimally investigated and is inadequately defined and poorly understood.

However this study recognises that definitions of transformative learning are problematic and few take account of the radical sociocultural changes resulting from the introduction of digital technologies such as the Internet and wireless connectivity. The transformative nature of the learning in this module is about change in beliefs and attitudes towards eLearning and PBL. In this current study, the learning is not just at the levels of knowledge and skills acquisition in blended PBL. It is argued that the participants need to

radically transform their approach to thinking and learning to both eLearning and problem-based learning in order to maximise the benefits offered by the blend. Presenting new information to them on this area is not enough to guarantee optimal learning; they must recognise the limitations of their current knowledge and perspectives. What is required is a true transformation of the participants' existing knowledge.

It is important to consider if educational transformation can only be obtained by designing for it explicitly, as is the case in this current study. One can argue for a balance in looking at gradual cumulative benefits versus transformation. A number of previous studies, including one by Whitelaw *et al*. (2004), on academic staff participating in instructional development, have shed light on changes in attitudes towards technology-enhanced instruction and change in pedagogical style in relation to the presence of transformative learning experiences. More recently, Kitchenham (2006) conducted a study with 10 teachers who experienced perspective transformation as they learned to use educational technology and integrate it into their classroom teaching. This holds interest for this current study which is exploring perspective transformation at an individual level for a small number of academic staff using learning technologies with a student-centred pedagogy such as PBL; the transformation in perspective is explored in how they approach learning on the module and how they carry it through to their own classroom practice.

Transformative Potential of Blended PBL

Before exploring the blending of PBL and eLearning, it is useful to begin with a description of the PBL tutorial process itself. Much has already been written about the PBL tutorial process and Myers Kelson & Distlehorst (2000: 168) have been useful for providing a detailed description of PBL unfolding. In this approach, students work in small groups to negotiate what Merrill (2001) terms a common understanding of the problem, identify areas that need to be researched, form hypotheses and fully develop a solution that they can present to others. One of the common criticisms of PBL is that, because it moves away from the traditional lecture, reading and discussion model, less subject matter may be covered. The good news is that effective eLearning environments have already recognized this shift as a beneficial one and have embraced a new pedagogy that puts the student in the driver's seat on the journey that is their learning path. In the PBL approach, the content (e.g. traditional lecture materials or assigned readings) is sought out as a part of the larger process of solving a problem. Students decide, often with the help of the tutor, what they need to know in order to successfully devise a solution and then actively seek it out (amongst resources that may or may not be provided by the tutor). In this way, students are actually defining their own learning outcomes and the knowledge acquisition becomes a means to an end, rather than the end goal itself.

Donnelly (2006) suggests that PBL would be considered by many educators as an innovative approach to teaching and learning. Internationally the best known models are the seven-jump model (Woods, 1994) and the eight-step model (Schmidt, 1983), which are both based on Barrows (1980) definition of the PBL process. These models emphasise the aspects of constructivism, problem-solving and individual learning; Uden and

Beaumont (2006) maintain that these processes are constantly under development, with a variety of different versions being applied in different contexts globally. The first applications in the Republic of Ireland, like elsewhere, were in medical education. Subsequently, it has been utilised in fields ranging from business to law and engineering.

The basic principle supporting the concept of PBL is older than formal education itself, namely that learning is initiated by a posed problem, query, or puzzle that the learner wants to solve (Boud & Feletti, 1991). In this problem-based approach, a complex, real problem was given to motivate the participants to identify and research concepts and principles they needed to know in order to progress through the problem. Raising awareness of the issue of pedagogical use of learning technology and its practice within problem-based learning is important. Pedagogically, design issues can centre on whether the integration of the learning technology would make the participants' learning in the problems more accessible and whether it would promote improved learning.

This study examines the ways in which eLearning technology can be used to support PBL and in doing so analyses the transformative nature of such learning for academic staff in higher education. By the year 2000, serious consideration was being given in Ireland, as elsewhere, to the implications of another form of educational delivery *viz.* eLearning. The Higher Education Authority (HEA) stated that Ireland should play a pro-active role in what it called 'Internet-based learning'. It acknowledged the country's leading role in the Information Technology (IT) industry and went on to point out that it would be consistent for Ireland to explore the potential for eLearning (Thornhill, 2000).

An exploration of eLearning reveals that it represents a convergence of several fields, including education, computer science, design and media studies. Its multidisciplinary nature and rapid evolution has led to individual researchers taking different approaches to research, deriving from their individual contexts, with little reflection on the appropriateness of their approach. The literature abounds with accounts of how initially eLearning was led by the technology rather than by learning theories and pedagogies, but over the past several years, there has been a significant redressing in the balance by combining the best traditional teaching with eLearning models to create blended learning. "It is not just another add-on, but a technology that is transforming our educational institutions and how we conceptualise and experience teaching and learning" (Garrison & Anderson, 2003: 122).

Moursund (2003: ix) contends that one of the constants of technology and education is that they are always changing: newer technology comes along and alternative educational practices are developed. It is important to maintain the commitment to the theories of problem-based learning but reflect the changing nature of technology and emphasise new educational practices. Laurillard (1993) and Collis & Moonen (2001) are some of the most well-known scholars from the educational technology literature which support the view that pedagogy, not technology, should determine how best it is used.

PBL is essentially about the facilitation of learning but it has been also been described as a transformative strategy, which aims for renewing the learning and teaching culture (Portimojärvi & Vuoskoski, 2006). Whilst not advocating a crusading strategy for the

introduction of blended PBL to academic development, learning on this module is seen as a participative, creative, collaborative and above all, transformative process. Within this programme of professional development for academic staff, there is a community of inquiry comprising open and sustained discourse dedicated to developing competencies such as critical and creative thinking, written and verbal communications skills and interpretive and evaluation abilities. It is argued that this higher learning experience is compromised with the persistent reliance on the lecture, rather than on interaction as the key element and standard of a quality learning experience in higher education. The research of Oliver *et al*. (2006) suggests

> *a strong need for researchers to continue to explore authentic problem-centred learning design and investigate design strategies that will guide instructors and designers in the appropriate forms of blended learning they choose to employ*. (513).

Kirkley & Kirkley (2006: 534) report that there is a need for innovative learning environments using appropriate learning methodologies that can support learners with complex problem solving and development of greater expertise. This can be attributed to technology continuing to invoke major changes in society and HEIs. As the creation of new affordances such as Internet-based tools mature and coalesce into new configurations, this creates conditions where engagement with knowledge and what it means to be a learner are being constantly challenged. They believe that PBL meets the need for creating such complex and authentic learning environments. By centering the learning situation in real-world problems, Reiser (2002) believes we have the opportunity to acculturate the learner into the processes, practices and language of a specific domain. In order to blend learning effectively, we need to better understand how to use learning methodologies such as PBL, strategies such as interactive discussion and various technologies such as face-to-face and online learning in order to make learning effective. However, as new technologies continue to emerge, teachers must expand their notion of blended learning and constantly evaluate how to use methodologies, strategies and technologies in order to create highly innovative learning environments.

This blended problem-based learning module, as Boud & Prosser (2002) advocate, takes a learning design approach that looks at the learning goals and aligns them with teaching and learning activities and assessments, thereby ensuring the integration and appropriate use of technology. However Lefoe & Hedburg (2006) suggest that delivering and accessing a blended program requires new ways of thinking about teaching and learning. Valsamidis (2006) suggests that focusing on the delivery of material instead of on the much more crucial interaction of the material with the learner, mediated by a tutor through a rich channel of communication, results in a mismatch in how some academic development is designed.

However in higher education, constraints such as class duration, size, location and availability of technology can provide a formidable barrier to making transformational changes to learning. In spite of this, West & Graham (2005) have reported that a growing number of academics are experimenting with innovative technology-mediated approaches to teaching using tools for simulations, visualization, communication and feedback, all of which are transforming the ways that their students learn. McConnell (2006) asserts that when students interact with each other and available resources, they change. Spector

(2000) believes such transformations may occur in their abilities, attitudes, beliefs, capabilities, knowledge and understanding, mental models and skills. These changes may reside in the individual, or in the group. Furthermore, they may be enhanced by the supportive interaction of the individual and the group in which he/she resides. In attempting to plan and then support meaningful, intentional learning we need to understand the context in which it develops best. Such understanding is clearly important to the management of any professional development blended learning course or event.

In their research, Graham *et al.* (2005) found that overwhelmingly academics chose blended learning for three reasons: for improved pedagogy, for increased access and flexibility and for increased cost effectiveness. The effectiveness of a blended course will be greatly influenced by the skill, enthusiasm and availability of the staff who work on it; it has been highlighted earlier in this study the reasons why they need staff development to be effective. Macdonald (2006), through presentation of a number of case studies, has shown the centrality of enthusiastic and well-trained tutors for a successful blended course; particular challenges to be faced by all are "making the shift from face-to-face tutoring to online tutoring" (166).

On the surface, blended learning is an intuitively obvious design approach that combines the appropriate capabilities of both face-to-face and online learning to meet the particular needs of a course or programme of studies. Educationally, blended learning has the potential to integrate immediate, spontaneous and rich verbal communication with reflective, rigorous and precise written communication, as well as visually rich media and simulations. It is not however, a natural corollary that such capabilities help meet all the disciplinary demands and needs of learners in particular disciplinary contexts.

The literature has been full of enthusiastic predictions about the potential of eLearning in higher education, offering optimistic horizons with halcyon views of online collaboration and learning; however any practitioner from the field who has designed and delivered an online course can recount negative experiences of student retention and lack of participation. According to Macdonald (2006), blended learning seems to have arisen from a general sense of disillusionment with the stand-alone adoption of online media, whose promise whilst felt by many, remained unfulfilled. As far back as 2002, Mason comments "…the earlier eLearning adopters have come full circle in rejecting an 'either or' view of learning online versus face-to-face…so called blended solutions often offer the most satisfactory outcomes." (29). Building on this, it is argued that the choice of appropriate tutor-mediated support is vital to blended learning. Macdonald (2006) echoes Salmon's (2002) earlier call that if tutors are to be deployed in new roles, then they need appropriate training and professional development.

Central to this debate, Laurillard (2002) suggests that a balance of media is essential to make learning and teaching effective. Hofmann (2006) believes that years of academic research and conventional wisdom tell us that "the best programmes are a blend of learning technologies" (29). Blending technologies that take advantage of learning styles, learner convenience and the best practices of instructional design are utilized to create modules that engage the learner and maximize learning retention. So, there have been clear and persuasive messages coming from research studies about the benefits of blended

learning, but at the same time, a number of criticisms have been direct towards the facilitation of blended learning experiences: some have an overemphasis on the live components with a subsequent undervaluing of the self-directed components of the blend and there have been instances of lack of experience in facilitation as a result of no formal training provision. Indeed, from a philosophical perspective it has been criticized, in particular by Offerman & Tassava (2006) who challenge the very assumptions behind blended learning as holding onto relics of an old paradigm of learning.

Arguably, eLearning has the potential of adding three new dimensions to PBL. Firstly, as an aid to carrying out work on a problem (product, presentation or performance). Secondly, as part of the content of a problem, and thirdly, as a vehicle that helps create a learning environment in which students and lecturers are both learners and facilitators of learning. With the dropout rates in eLearning environments typically being even higher than traditional learning, involving issues of isolation, disconnectedness and technological problems which are often cited as factors that influence a student to leave a course, an increased level of motivation and engagement certainly sounds like something from which students can benefit. Combining applicable technologies in such situations in which physical and temporal presence is limited, or in which the technology offers real added value would seem important. The online environment offers unique opportunities for both tutors and students to analyse the collaborative problem-solving process, because there is often a written record of it left behind, which can be analysed, evaluated and reflected upon.

Research Design

A naturalistic, interpretative, qualitative approach was used to analyse the data collected for this study. The open-ended, exploratory, qualitative approach taken in this present study can help document how learners in real PBL situations and contexts, addressing both broad themes and micro-issues helps us understand the complexity of learning and teaching in blended PBL environments and offers insights that can be useful in developing our practice as academic developers. As a research approach, it has presented a series of "slice-of-life" episodes during the blended PBL tutorial process and afterwards, revealing the range of applications and use of the knowledge in professional teaching practice.

The research methods employed to collect face-to-face and online observational data from three PBL groups with a total of 17 participants in this two year study on a blended PBL module were participant observation, online discussion logs, open-ended focus group interview and self-reflective papers to capture the participant's own thoughts and experiences of the blended PBL approach. Each method was chosen for the opportunity it could offer to explore interactions which were central to this study. The approach taken to the collection of data of blended PBL groups was multi-faceted. A main concern has been to provide meaningful and accessible insights into the practice of blended PBL based on the analysis of real-life situations. There were two levels taken to the analysis of the data. Level One was descriptive in nature and through video observations explored the interactions between the peers, the tutors and the content of the blended PBL tutorial. Level Two was a thematic analysis of interactions in blended PBL and through a combination of online logs, focus group interviews and participant self-reflective papers, categories and themes emerged to inform the findings of the study and implications for

practice. Being engaged with the events as they happened in the field and attempting to bring holistic attention to the practices as constitutive of a distinct culture was important to this study. As suggested by Hine (2000: 20) this study has examined those enduring practices through which the blended PBL groups have become meaningful and perceptible to participants.

Discussion of Findings

The use of direct quotes is used in this section to provide evidence of both the shared enthusiasm for the potential of transformation in the blended PBL process and also some real concerns voiced by the participants. Whenever possible by using the words of the participants themselves, key issues will be highlighted. For inclusion of all participant quotes, the following applies:
FG = Focus Group Interview (either indicated by 1 or 2 for the first or second interview)
RP = Reflective Paper (numbered 1-17 for each participant)
PO = Participant Observation (the date of each observation is provided)

Transformative Potential of Blended PBL

A major focus of transformative learning theory within this study is the consideration of ways of what Zepke *et al.* (2003) term working with the participants to bring about a transformation in their learning and practice. Inherent in this is the importance of interaction in bringing about learning, whether or not this interaction takes place face-to-face or online and the need for power-sharing between participants in the groups.

Figure 1 shows the blended PBL tutorial process as discussed in this study at the centre of the transformative learning cycle which participants experienced. The tutorial process consisted of the traditional steps of problem-solving, self-directed learning, critical discourse and reflection and communal knowledge construction. A blend of face-to-face, CMC and video conference (VC) events, preceded by a pre-induction session which all the participants experienced, prompted a series of stages leading towards transformative learning. These stages were activating events, articulating assumptions, critical self-reflection, engaging in discourse and testing and applying new perspectives.

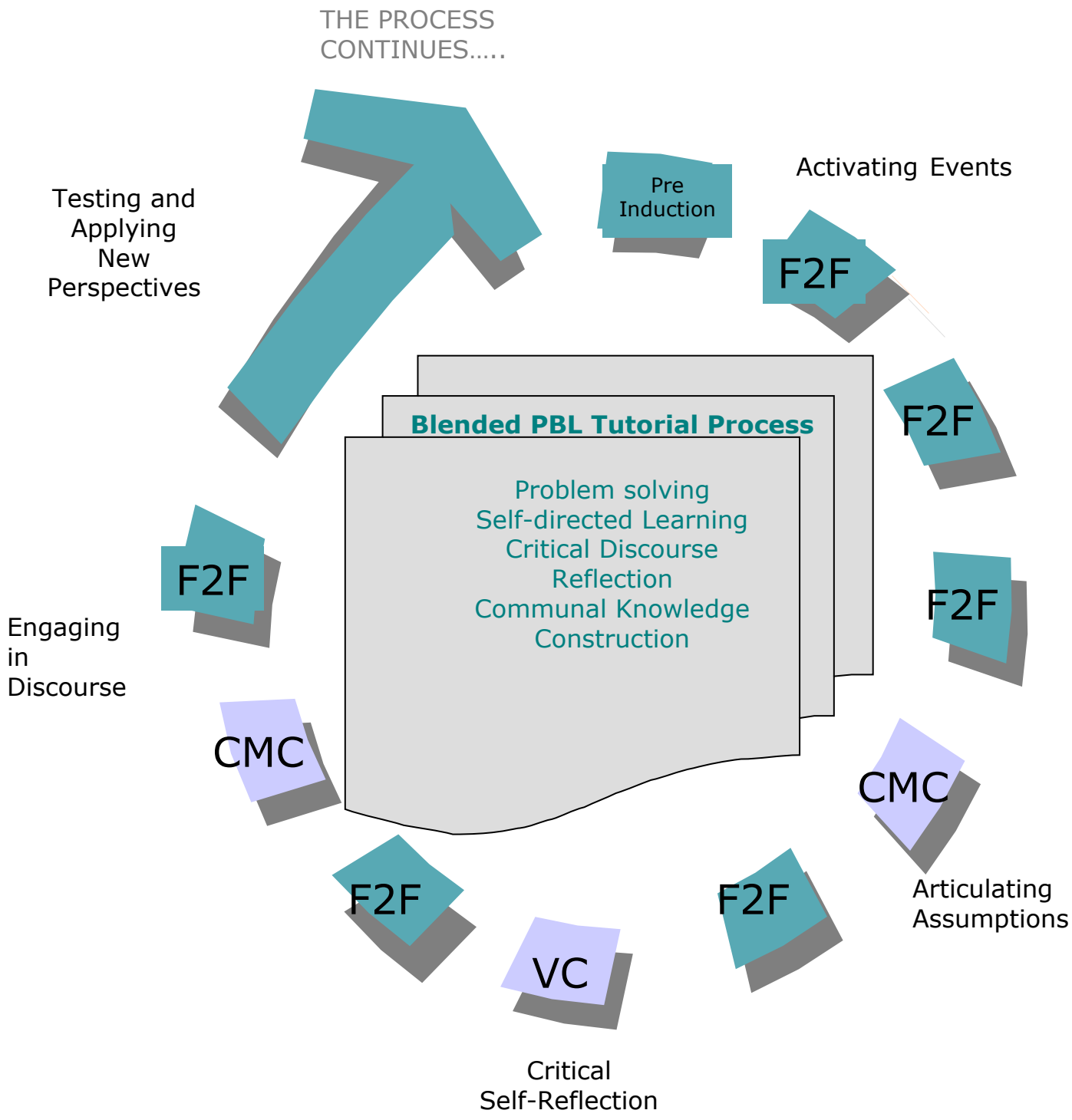

Figure 1 The Transformative Potential of Blended PBL

The following is an overview of the each of the transformative stages shown in Figure 1 which took place on the professional academic development module at the heart of this study. The transformative potential of blended PBL is based upon Mezirow's (1975; 1995) framework of stages leading to transformation: activating events, the identification and articulation of underlying current assumptions, critical self-reflection, critical discourse and opportunities to test and apply new knowledge and perspectives.

Activating events in the module triggered the participants to examine their thinking and that in turn exposed the limitations of a participant's current knowledge/approach. Strategies used for this involved understanding the participants' backgrounds through a pre-module questionnaire and blended induction activities, providing conflicting viewpoints to motivate the participants to examine their own perspectives of eLearning and PBL and creation of disorienting dilemmas through the PBL problem to challenge what the participants believed about eLearning. The goal of the problem was to confuse and intrigue the participants to increase their motivation to learn. Furthermore, allowing the participants to reach a problem-solving impasse recognised that they could be motivated to learn when their current knowledge was insufficient to solve an interesting problem. The participants needed to recognise that new information or a new approach was required. It was not enough to hand participants an unsolvable problem, the tutor needed to convince them that the impasse could be resolved and create conditions that encouraged their success. Tutors can present missing pieces in many ways – from a simple explanation to helping the participants derive an idea or approach for themselves.

It has been suggested that in a learning community such as on this module, the initial (induction) stage of activity should not be attempted without adequate opportunities for face-to-face interaction. Within the blended PBL module, it was vital that group members did not become disenfranchised and it was essential that further events be provided for rich interactions for the group in order to maintain, revise and develop the initial intentions. Cranton (2006) believes that becoming self-directed learners, through the establishment of learning goals, leading discussions and sharing resources to generate knowledge is wholly consistent with the emphasis on learner decision-making advocated by proponents of transformative pedagogy.

The activating event typically exposed a discrepancy between what a person has always assumed to be true and what has just been experienced, heard or read. In order to bring about a catalyst for transformation, the participants on the module needed to be exposed to viewpoints that may have been discrepant with their own. They were introduced to new technologies such as video conferencing, asynchronous and synchronous discussions, audio, blogging and online reflective journals, all displaying information to them in interesting and different ways.

Opportunities for the participants to **identify and articulate the underlying current assumptions** in the their current knowledge/approach all required that they explain their thinking. Strategies employed were the use of a critical questioning technique, asking the participants to explain their reasoning and the thought processes which propelled them. This helped them identify their assumptions by offering counter-examples, alternative scenarios and differing perspectives. It involved having them make a prediction about an

event or procedure in designing eLearning and required them to explain their predictions in online discussion. This was particularly effective when the actual outcome provided a disorienting dilemma. Having the participants talk through their thinking and problem-solving strategies was especially helpful by using a failure-driven approach as the critical event. Providing them with a challenging question or problem and having them talk through the thought process was done in small groups of five-seven and through direct interaction between the participants and tutor online and face-to-face. Having them evaluate specific positions and solutions and reading and justifying their critique was done as a small group discussion or as a written assignment. Through an exploration of conflicting readings or alternative solutions, participants were asked to defend one online and provide in-depth reasoning. This process marries contemplation about the subject matter with self-scrutiny.

Critical self-reflection occurred as the participant considered where these underlying assumptions came from and how these assumptions influenced or limited understanding. Strategies used to promote critical self-reflection were online reflective journals and reflective writing assignments, requiring a response to specific tutorial experiences either face-to-face or online. Transformational learning was both a social and solitary process (Taylor, 1998). The most solitary part of transformational learning was critical reflection, which required that participants privately examined their current assumptions. Critical reflection was likely to occur outside the PBL tutorial, as the participant absorbed and integrated what happened in the tutorial. Writing assignments were a very useful vehicle for inviting participants to engage in solitary reflection. They kept an online reflective journal for the 10 weeks of the module duration, which consisted of questions, observations and experiences, both positive and negative. It involved keeping track of the 'eureka' moments of transformational learning (when they suddenly understood a new concept or perspective), as well as conflict and confusion. Allowing the participants time at the end of each PBL tutorial to write in their journals was an effective tool to encourage participation. At the half way point in the module (5 weeks), the participants had the option to turn their journals into the tutor for formative feedback and at the 8 week juncture, to exchange aspects of their journal with their peers.

Critical discourse with other participants and the tutor took place as the groups examined alternative ideas and approaches. Critical discourse was the most social aspect of transformative learning. Strategies were used to create opportunities for the participants to reflect through dialogue, both face-to-face and online, thus extending the discussion and debate from the face-to-face tutorial to the online environment. When introducing a new eLearning strategy, concept or paradigm in the PBL tutorial, asking the participants to analyse the approach and compare it with their previous assumptions on concepts led the discussion. Making time in class for more extended periods of discussion and debate was important. However, not all the discussions were critical. Transformative learning is unlikely to occur when participants use discussion to reinforce their existing perspectives or to persuade others of their viewpoint. All participants needed to have their assumptions respectfully challenged. Inviting a participant to play devil's advocate and challenge everyone's assumptions, including that of the tutor was useful when asking them to explain and defend a viewpoint they disagreed with. This challenged participants' thinking habits and brought to the discussion points that might not otherwise have been raised.

Sustaining these conversations outside the PBL tutorials through the asynchronous discussion forum and synchronous chatroom sessions provided an opportunity for participants to continue challenging assumptions and consider new perspectives. The PBL group problem encouraged the small groups of five-seven participants to engage in critical discourse especially as it involved analysis, comparison and integration of ideas, readings and approaches to eLearning course development in higher education.

For transformational learning to move from thought to action, participants need **opportunities to test and apply new knowledge and perspectives** (Taylor, 1998). Creating activities that empowered the participants to apply new approaches with a high likelihood of success were used through the presentation of the PBL problem. A number of strategies were implemented: returning to the disorienting dilemma and having the participants approach it with their new knowledge; and requiring the participants to embrace the development of the PBL problem by approaching it from multiple perspectives. The participants were assigned different perspectives and they discussed the varying outcomes in the tutorial or they were asked to tackle the same problem more than once. Online role-playing and debating activities gave the participants the opportunity to try out new perspectives. Asking them to observe and interpret events, readings and experiences using their new knowledge was also instructive.

When all these processes occur, participants are more likely to revise their underlying assumptions, adopt a new paradigm and apply it accordingly (Cranton, 2002). Within it, the tutor needed to strike a careful balance between support and challenge. Trust amongst the participants and the tutor was especially important in a module that uses writing and discussion as a strategy for critical reflection and discourse. Conversely, Cranton (2002, p66) argues that although student empowerment and support are important, an "environment of challenge" is the central ingredient for transformative learning. It is asserted that the participants on the module must have their beliefs and assumptions actively challenged. Boyd & Myers (1998: 98) recommend that tutors practice "seasoned guidance" and "compassionate criticism". Push too hard and the participants resist, push too little and the opportunity for learning quickly fades. It is argued that to be an agent of change, the tutor must understand the process of change and be both the catalyst and support mechanism necessary for transformative learning in blended PBL.

Transformative learning theory also recognises that changing one's perspective is not simply a rational process. Being forced to consider, evaluate and revise underlying assumptions can be an emotionally charged experience. Participants have successfully used their current paradigms to do well in school and to their in their own disciplines in the past and they may be reasonably reluctant to abandon what they believe is the right way to think, create and solve problems. Illeris (2003) has suggested that resistance to perspective transformation is common, even among participants who are motivated to learn. For this reason, tutors who wish to facilitate transformative learning must create an environment that encourages and rewards intellectual openness (Taylor, 1998).

The change to a new way of learning through blended PBL, with associated changes in the participants' beliefs about different aspects of learning and teaching can mean that the

learning can be difficult as it is working at the transformative level of beliefs, values, attitudes and ideologies. When any of these, having been held for years are challenged, turned upside down or replaced by new ones, it can be experienced simultaneously as difficult and enjoyable.

New learning requires the activation of prior knowledge and the active construction of richly elaborated relationships among ideas. Wilkerson & Gijselaers (1996), in writing theoretically about PBL, believe these networks or schema make it possible for learners to retain new concepts and skills and through practice during the process of learning, to organise them in a variety of ways for use in familiar and unfamiliar situations. Knowledge embedded in a context similar to that in which it may eventually be used is more easily recalled than isolated knowledge.

Johnson-Bailey & Alfred (2006) submit that transformative pedagogy not only focuses on developing participants' understanding of alternative perspectives and experiences on an individual basis, it also expands their awareness of how societal forces impact people. However, the blended PBL approach adopted in this study seeks to fundamentally and respectfully change participants' attitudes and analytical skills to facilitate their growth, whilst the module is delivered through a face-to-face and online format.

Individual Perspective Transformations

According to Mezirow (1991), the principal goal of adult education is reflective and transformative learning. However, not all change is transformative and not all critical reflection leads to transformative learning. Conceptually critical self-reflection in this study involved internalisation of learning for each participant. Both Illich (1970) and then later, Kolb (1984) have argued that learning is the creation of knowledge through the transformation of experience and transcends the particular institutional context that society has reserved for that purpose. Using Kolb's view on learning, if we substitute a particular type of change for transformation, then arguably, change becomes a condition for learning. Kolb has identified *reflective observation* as one of four important steps in the transformative process. Through reflecting on their observations, experiences and learning throughout the module, the participants transformed their assumptions about eLearning and PBL, becoming open to alternatives and news ways of thinking.

> *Reflection on this module has led to my changing the way I feel about group work and the activities and interactions associated with it. Looking back now I realise that I lacked the fundamental attitudes necessary for genuine reflection: open-mindedness, responsibility and wholeheartedness. This journey took place during the entire module but I only realize it now.* (Loirin, RP4)

> *Reflecting during and after this module has made me realize what a learning journey I have been on; it has been a long time since I felt so unsure of my footing in learning but I feel I am a much stronger person as a result of coming through it.* (Maeve, RP14)

Mezirow (1991) has suggested that individuals can be transformed through a process of critical reflection in his theory of transformative learning. Specific indicators are becoming more reflective and critical, being more open to the perspectives of others and

being less defensive and more accepting of new ideas. Kelly *et al*. (2007) have argued that online communities which rely on written communication between participants have great potential in encouraging reflections. This was the case on this blended PBL module as writing involved more than reporting, it was also a reflective act which was an essential part of the process of knowledge construction and arguably in this study, a transformation in learning. As it is writing, CMC is useful for promoting higher order learning say Garrison & Anderson (2003):

> *There is sufficient evidence to suggest that writing has some inherent and demonstrable advantages over speech when one person or a group is engaged in rigorously thinking through a problem.* (34)

Arguably, lecturers have the freedom and responsibility to choose those pedagogical strategies that will provide the most appropriate environment and experiences for their students. However Butler (2003) in an Australian HE academic development study, reports that when academic staff who have been lecturing for some time meet authentic educational models (such as PBL) for the first time, they will go through some form of adult transformational learning process where their world views are challenged and changed. This process will be experienced by them as disorienting and confusing in the early stages but will eventually be resolved by authentic learning.

Catalysts for transformative learning are "disorienting dilemmas", situations which do not fit one's preconceived notions. These dilemmas prompt critical reflection and the development of new ways of interpreting experiences. When adults world views are challenged and perhaps changed, their perceptions of their learning can be negative and the learning event can be perceived as making their lives more difficult, more confused and they question the worth of this unsettling process. Their long held beliefs about learning and teaching are challenged and contested by the educational model. Butler (2003: 5) has termed this negative period of learning as "the pit" and reports that at some idiosyncratic point, each person's learning perceptions start to head upwards very rapidly and they eventually reach what he calls "the ecstasy of learning that rewards adults who change their behaviours to more fulfilling processes for themselves and their students." In this way, transformative learning involves reflectively transforming the beliefs, attitudes, opinions and emotional reactions that constitute our meaning schemes.

The presence of specific conditions in the blended PBL experience suggests that the participants have experienced a transformation in their learning. These conditions include: learning creatively, through contributing, experimenting and solving problems; learning as active citizens by taking responsibility for their own learning; engaging intellectually with ideas by using thinking skills and grappling with ideas and concepts; and reflecting on their own learning through the use of metacognition to evaluate their own progress.

Nevertheless in exploring what a transformation is in the context of blended PBL an important factor to consider is how different can it be for each of the participants? All perceptions of transformation can be considered valid, as everyone is different. For some there was a change in mindset, in how they think about and design problem-based and eLearning:

> *The whole process of learning in blended PBL requires a change in mindset as a teacher - that is the biggest thing for me.* (Darragh, FG2)

> *We were required to work with PBL, collaborative group work and eLearning which are three very difficult approaches to deal with in themselves. Trying to get someone's mindset around them all in a blend, that was the transformation for me.* (Ryan, Participant Verification Session, 05/02/07)

This module has shown that radical change is possible and quickly. Wells (2000: 56) has suggested that learning is "the transformation that continuously takes place in an individual's identity and ways of participating through his/her engagement in particular instances of social activities with others." However, we cannot teach transformation; we cannot even identify how or why it happens. This module was about teaching as though the possibility always existed that the participant would have a transformative experience. There are ingredients in the blend of problem-based and eLearning which have the potential for transformation, but it is not guaranteed. In every strategy we use, we need to provide an ever-changing balance of challenge, support and learner empowerment.

The transformations on the module experienced by participants occasioned a significant shift in perception of a subject or a new world view; for some, such transformation was sudden and for others, it was protracted over a number of weeks. The transformed view may represent how learners think or practise within a particular discipline, or how they perceive, apprehend or experience particular phenomena within that discipline.

Conclusion

While it is not feasible to extrapolate the findings of the investigation beyond the present context, the analysis of the potential of transformation within blended PBL raises a number of issues worthy of comment. Transformation can be reached in blended PBL within a ten week period, particularly at an individual perspective level. This can be evidenced by a change in participants' behaviour in the group setting, individual changes in attitude, belief and value towards pedagogy and technology and transformations in learning approach extending to their own professional practice.

It is contended that there is a need to focus on interactivity within blended PBL and its critical application. The blended format coalesces web-based and face-to-face instruction into an entirely new model that holds potential to transform both learning and teaching in higher education. However, the improvement of educational practice is notoriously difficult, especially when the goal is to foster transformation in thinking and practice. Tyack & Cuban (1995) have argued that pockets of effective teaching exist but they seldom last long or spread beyond a few dedicated pioneers. Clarifying the principles of effective problem-based and eLearning pedagogies and sustaining the means to support its enactment in a wide range of departments and institutions constitutes an abiding challenge of professional development for teachers.

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