

What Are Problem-Based Pedagogies?

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Since its inception in the 1980s, problem-based learning (PBL) has developed in diverse ways worldwide, yet there has been relatively little mapping of its theories, practice, or disciplinary differences. This has led to confusion within the academic community about which constellation to adopt, or what would be the best fit for a given curriculum. The argument of this paper is that many PBL curricula focus on 'tracing' and 'tracing over' other forms of PBL, yet what is needed is a shift toward imaginative curricula. It will explore where PBL curricula are we now, what is getting in the way, how and PBL pedagogies might be re- delineated.

Keywords: Pedagogies; Quality; Curriculum; Assemblages; Flexible pedagogies

INTRODUCTION

Problem-based learning (PBL) remains a contested area of pedagogy, practice and research. While PBL is still undergoing a process of change worldwide, such change has been analysed by few in the field of higher education. Yet there is relatively little understanding of the different forms of PBL and the terms of inquiry-based, problem-based, and enquiry led learning. Despite the number of programmes that use it globally, many people still seem to be muddled about the use and relative value of scaffolding learning. Furthermore, recent research into PBL Savin-Baden (2016) seems to 'always engaged': texting at dinner or driving illegally while 'facebooking'. It remains unclear as to whether digital tethering and (too much) digital influence are resulting in learning and engagement imbalances. Students might be spending too much time in virtual spaces or being distracted by messaging each other in lectures. Alternatively, young people might be over influenced by virtual realities and immersive virtual worlds. The difficulty with all of these concerns and interesting virtual spaces is that largely we are unaware of their impact, whether too much fuss is being made or whether digital media really is affecting students' engagement, learning and concentration. Although there continue to be debates and discussion, more recent research suggests that young people (12 -18) and students at university are aware of the impact and dangers, as well as the value of technology, to their lives. Perhaps instead there needs to be an appreciation of 'useful tethering'; tethering that can be harnessed for learning and engagement. This in turn will mean that staff will become new pedagogical designers and who create and manage liquid and complex curricula for the 21st Century. Digital tethering would seem to offer students choice about how they use information, how they share it with others (or not), the way they learn together or apart, and how they support each other in ways that current classroom practices often prevent or discourage.

What is getting in the way?

Problem-based learning is a broad field of learning, practice and inquiry that encompasses and even encourages difference, which seems at many turns to be hampered by ideas about what a curriculum should be, and how it should be managed. This is seen in over-managed and over- designed curricula, such as:

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The noise of dominant narratives

It is expected by many university managers that the imposition of staff and students' charters will produce better behaved students and academics. Furthermore, keys and passwords in university life increasingly limit freedom and access to what should be seen as civic spaces, such as university campuses, buildings and libraries. The idea that civic spaces can be patrolled best by controlling movement and limiting access illustrates that spaces such as these are seen as products where risk must be minimized, disruptive intervention avoided, and the possibility of construction of new civic spaces limited.

To challenge, question or query the dominant narratives, the status quo, the way things are expected to 'be' in higher education, can result in marginalization, in being a lone or unheard voice, and can also result in a sense of difficulty. Not supplying a bibliography to students, standing against the research and teaching measurement frameworks or arguing against quality practice would be seen by many academics as being impossible at worst and subversive at best. We need to see the university, and indeed learning, not just as a space to be filled with content, but as a space for the harnessing of technology and useful systems for pedagogic ends, not the other way around. We need to examine the digital flow in people's lives and how they reshape 'things'.

Striated curricula

It appears that apart from the kind of education that occurs in the Liberal Arts colleges of the USA, most curricula world-wide are striated. These curricula are characterised not only by a strong sense of boundedness through the traditions of the discipline and their signature pedagogies, but also by university structures and procedures, exemplified in pedagogies of repression. Such striated systems mean that learning spaces are diminished, and personal engagement with such spaces is often demeaned by others. Dialogue, writing and reflection are not only undervalued, but also viewed with quiet contempt, as being privileged, utopian spaces.

The increasingly striated and stratified university sector is trying to rebuild itself amid the surrounding forces of civic disengagement, marketization and pernicious ideologies that threaten its very being and purpose. Today's curricula, even those that are problem-based, are characterized by a strong sense of organization and boundedness. The consequence is that learning has become delineated by course attendance, defined learning places and set texts. Such striated systems mean that learning is narrow, overmanaged and uncritical. Rather than adopting a notion of curriculum whereby standardized designs are used for all disciplines, instead curricula should be designed with troublesome

knowledge as the centre point and not the counter point. Although it could be argued, in the UK at least, that such creative curricula do exist, it would seem that they are located either in the shadowlands or not presented as transparently as they might be, in order to avoid the scrutiny of those from the behavioural end of the quality assurance (insurance) camp. Central to the creation of these narrow curricula are dominant narratives that pervade the higher education landscape.

Pedagogies of repression

[Giroux \(2016\)](#) argues that we need to move beyond pedagogies of repression:

At a time when the public good is under attack and there seems to be a growing apathy toward the social contract or any other civic-minded investment in public values and the larger common good, education has to be seen as more than a credential or a pathway to a job, and pedagogy as more than teaching to the test.

Pedagogy is not just a set of strategies and skills. It is not just a technique or method, but it should be something that brings to the fore relationships between knowledge, authority and power. Following [Giroux \(2016\)](#) I believe PBL pedagogy should:

- Raise questions, such as
 - what knowledge is of most worth?
 - what does it mean to know something?
- Emphasize critical reflection as a means of bridging the gap between learning and everyday life
- Embrace the idea that pedagogy is not about receiving knowledge but transforming it
- Enable students to explore the relationship between knowledge and power

The problem-based learning of the 21st Century needs to move away from standardisation, striation and repression; it needs to move out of the shadows.

Quasi quality?

We need to rethink pedagogy and move away from quasi pedagogy and quality. The challenge we face is that despite efforts to establish problem-based learning as a legitimate approach to learning, uncertainty still prevails about the most effective way to implement it, with the result that new models, approaches and conceptual frameworks continue to emerge. The brinkmanship we face is the codification of staff and students' lives through signs, signposts and maps. These are characterized by benchmarks, and quality committees led by administrators who attempt to tame learning.

Quality, credit transfer and standards are all tightly bound within the current system and held on to by tenacious academics.

Institutions that will engage only with managed risk, are concerned about their student retention and contentment, and are worried about being lambasted by the local competition (the university up the road). At the same time, they are afraid of the quality agencies and funders, and as a result have become increasingly managed by bureaucratic administrators, who insist on courses being run in particular, and invariably inflexible, ways. A prime example was the need for a UK-based horticulture diploma to begin in September even though it needed to coincide with the growing season, beginning in March.

METHODS

What are Problem-based pedagogies?

Mapping PBL pedagogies (as has been done in the past) results in many ways in an oversimplification of the complexity of curriculum making. What I suggest we need instead are to explore components and concepts that together can begin to build pedagogies for PBL.

These need to be ones that provoke new ideas, imagine other futures and blur boundaries. We need to recognize and remember that there is no 'gold standard' PBL.

PBL Pedagogy as wisdom

The concept of wisdom has received attention since the ancient Greeks sought to discover its basis. For example, in the 5th and 4th Century BCE the Sophists became the first to consider the epistemological question, 'what is the nature and reliability of human knowledge?' The Sceptics in this tradition believed that the human mind was incapable of taking in knowledge without distorting whatever it perceived or conceived. The metaphysical perspective peaked during the 5th and 4th Century BCE, when the trio of Socrates, Plato and Aristotle fundamentally changed views of knowledge acquisition. Socrates, the first of these famous Greek philosophers, believed knowledge was unattainable. To prove his claim, he used dialogue and questioning approaches to probe student understanding of moral concepts such as justice and applied formal logic to their ideas to show inconsistencies, inadequacies and weaknesses of their beliefs. He wanted students to think harder and search to discover truth within themselves. His method evolved into the current notion of the Socratic method or Socratic dialogue. This questioning and probing of assumptions and beliefs is inherent in research methodologies today, but often the whole issue of wisdom is side stepped.

PBL Pedagogy as uncertainty

The concepts of uncertainty and liminality have not yet been

fully explored in problem-based learning. In the early part of the 20th Century, investigations by philosophers such as Husserl, Merleau-Ponty and Sartre into a sense of being in the world produced various differently expressed disjunctions, from received experience to the uncertainty of labelling, naming and dealing with that experience, which was itself related to a sense of relationship between the identities and shared realities. Today, problems in problem-based learning should not be straight-forward and easy to solve, but instead should prompt shifts and change, ensuring students engage with deep approaches to learning.

PBL pedagogy as ecology

The concept of learning ecologies seems to draw on the work of Bateson (1972) who saw the mind not as just something cognitive but rather as a network of interactions between the individual, the society and the universe as a whole. It also relates to more recent work such as Guattari (2000). Guattari argued that we have a narrow definition of ecology and this needs to be broadened to include 'ecosophy' which are three interrelated ecologies of environmental, mental and social worlds. Learning ecologies, whilst narrowly defined in some areas of higher education, can be said to draw on wider environmental, political and individual concerns about being human and what it means to learn. This is important in the context of models of learning that fail to recognize students' experiences of becoming stuck in learning. It is suggested here that liminal ecologies of learning, the recognition of stuckness and the subsequent liminality is vital for students' development and growth towards becoming flexible and fluent learners. In the context of PBL, ecologies of learning comprise forms of learning in which the learner co-constructs meaning, deconstructs knowledge and locates identity within learning spaces that are both formal and informal.

PBL pedagogy as liminal tunnels

The liminal tunnel, as described by Land, Rattray and Vivian (2014), begins with a portal or gateway triggered by the threshold concept or disjunction. Learners move through the tunnel through the liminal - space and emerge with a shift in learner subjectivity, a discursive shift, or a shift of a conceptual, ontological (such as identity shifts) or epistemological nature. Land et al (2014) depict this transformation as a cognitive tunnel where the liminal space within the tunnel is entered when triggered by a threshold concept, or a 'disjunction', that challenges previously held ideas about something. Disjunctions are 'spaces' or 'positions' which are reached through the realization that knowledge is troublesome. For instance, after encountering a threshold concept, the learner will move into a liminal space that can be transi-

tional and transformational. Learning in the liminal space often entails oscillation between different states and emotions. The liminal space is characterized by a stripping away of old identities, oscillation between states and personal transformation. In a recent study (Fredholm, Henningsohn, Savin-Baden, & Silén, 2019) data were analysed using the theoretical representation of the cognitive tunnel Land et al. (2014). Students' narratives in PBL curricula described their disjunction, their experience of the liminal spaces and their resulting shift over the thresholds. Instead of focusing on a cognitive tunnel as Land et al. (2014) suggest, this was related to a particular practical experience functioning as a trigger for moving into the tunnel, learning in the tunnel and coming out 'on the other side' of the tunnel with a changed view. The driving forces for movement through the tunnel were the students' inner motivations for learning, originating from the perceived meaning of the practical experience. The self-evident nature of the practical experience, and the need to master these situations created movement and transformational learning. Table 1 depicts movement into, through and out of the tunnel with triggers and consequences.

Insert Table 1. Depiction of movement into, through and out of the tunnel

It is proposed here that the liminal tunnel is not merely cognitive as Land et al (2014) initially suggested, but ontological and rhizomatic. Ontological engagement with the liminal tunnel is concerned with shifts in identity and subjectivity, rather than just cognitive shifts; it is more than working through and solving a cognitive problem. It is also rhizomatic because the options for moving in, though and out of the tunnel are complex and multifaceted and require an examination of one's learner identity and learning ecology.

PBL pedagogy as constellation

There are many constellations of PBL, each affecting the possibility for flexibility within the curriculum. This has led to confu-

sion within the academic community about which form of PBL would be the best fit for a given curriculum, since it is an approach to learning that is affected by the structural and pedagogical environment into which it is placed (that is, the discipline or subject, the instructors, and the organization). In some areas, possibly most notably in some medical curricula, there is a sense of performative rules about how PBL should be used, but instead it would seem that we need pedagogically informed guidelines. Performative rules define how learning should be and the ways that knowledge should be presented, whereas pedagogically informed guidelines do not adopt such a narrow stance, and instead offer curriculum flexibility and a broad interpretation of professional body guidelines.

The growing number of constellations of problem-based learning illustrate the value placed on this approach to learning. The idea of locating different formulations of PBL as a series of constellations develops the idea that there is a broad range of PBL approaches. It helps us to see that there are patterns not just within the types of PBL but across the different fields of practice, as exemplified in Table 1, Savin-Baden (2014). The idea of grouping PBL approaches in this way is drawn from Bernstein (1992), who argued for the use of constellations as 'a juxtaposed rather than integrated cluster of changing elements that resist reduction to a common denominator, essential, core or generative first principle.'

Insert Table 2 Constellations of PBL.

Rethinking PBL curriculum making as assemblage

Assemblage is not something that is created from discipline-based pedagogies professional guidelines and dictates form quality committee but the merging and emergence of creative pedagogical ideas and practices. It involves the process of mustering, mapping and folding. Deleuze and Guattari (1988) argue that assemblages occur through the process of selection, composition and completion of a territory. A territory in this case is a

Table 1. Depiction of movement into, through and out of the tunnel (Fredholm et al, 2019)

	Triggers to movement	Consequences
Moving into the tunnel: experiencing disjunction	Disjunction in the form of an ontological experience	Feeling confused, stuck and frustrated. Experiencing challenge to previously held beliefs.
Learning and developing within the tunnel while being in the liminal space	Movement triggered recognition of need to learn and shift	Transitional learning and sometimes transformational learning
Moving toward the end of the tunnel and crossing the threshold: the shift	Movement triggered by a sudden or gradual understanding, a stripping away of old identity, and personal transformation	An ontological shift evident in change in any or all of personal, professional, and learner identity
Exiting the tunnel	Confidence gained though threshold shift	Seeing the world afresh and valuing the disjunction and subsequent shift

Table 2. Constellations of PBL (Savin-Baden, 2014)

	Constellation 1	Constellation 2	Constellation 3	Constellation 4	Constellation 5	Constellation 6	Constellation 7	Constellation 8	Constellation 9
Problem type	Problem-based learning for knowledge management	Problem-based learning through activity	Project-led problem-based learning	Problem-based learning for practical capabilities	Problem-based learning for design-based learning	Problem-based learning for critical understanding	Problem-based learning for multimodal reasoning	Collaborative distributed problem-based learning	Problem-based learning for transformation and social reform
Level of interaction	Solving of problem	Management of problem	Team learning and practical action	Practical action	Activity-focused	Critique of knowledge, skills and context	Taking a critical stance	Critical Collaboration across boundaries	Exploring and deconstructing structures and beliefs
Form of facilitation	Directive	Activity-focused	Project management	Guide to practice	Project management	Coordinator of knowledge and skills	Orchestrator of learning opportunities	Enabler of group reflection	Decoder of cultures
Focus of assessment	Testing of knowledge	Competence for the world of work	Project management	Competence for the world of work	Design critique and professional capabilities	Use of capabilities across contexts	Integrate capabilities across disciplines	Self and team analysis	Flexible and student-led
Example paper	Alamro & Schofield (2012)	Chan, Lu, Ip, & Yip (2012)	Hayashi (2013)	Beaumont, Savin-Baden, Conradi, & Poulton (2012)	Ng, Bridges, Law, & Whitehill (2013)	Good, Howland & Thackray (2008)	Beaumont (2012)	Chan, Bridges, Doherty, Ng, Jin, Sharma, Chan & Lai, (2015)	Savin-Baden, Bhakta & Burden (2016)

PBL curriculum. PBL curricula need to assemble and map, not ‘trace’ or ‘trace over’ those of others, there are no reusable learning objects here. Instead it requires a process of Mustering, Mapping and Folding as illustrated in Figure 1 and explained below.

Insert Figure 1 Mustering, Mapping and Folding

Mustering

Mustering is a term often used to gather troops for battle and this has resonance here, in that curriculum makers gather themselves, gird their thoughts and ideas and begin the assemblage. There is a sense at this stage of curriculum creation of living and working with order and chaos simultaneously. What emerges is an appreciation that what was once frayed meaning becomes an holistic depiction which is both fragile and emerging. This mustering then moves into a folding process.

Folding

The notion of folding Deleuze (1993) disrupts the idea of curriculum making as straightforward, since a fold allows for recognition of valuing of disjunctions, discontinuities and labyrinths. It interrupts the idea of outcomes of objectives as the force for pedagogical design. Folding means there is disruption between the idea of an inside and an outside so that inside and outside are both inside and outside; to reiterate: ‘a fold is always fold within a fold’ Deleuze (1993). Just as students, learning and lecturers live inside and outside the university, so does the curriculum, none of them is fixed but are complex, disrupting, changing, and fluid.

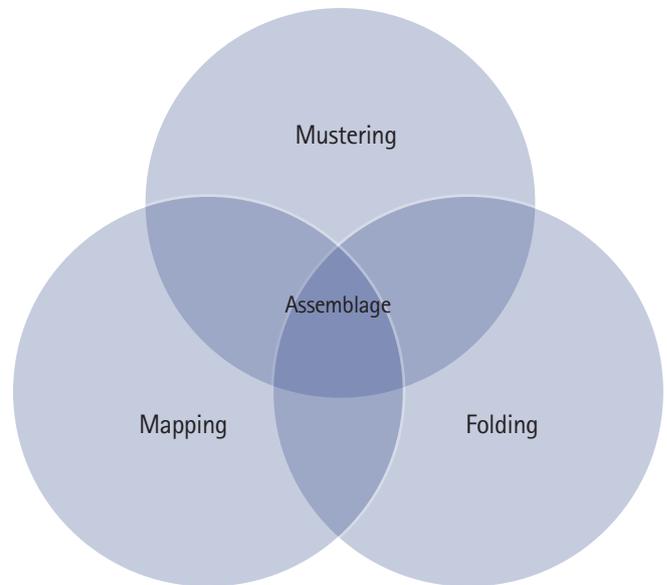


Figure 1. Mustering, Mapping and Folding

Mapping

Changes in technology have meant that cartography has a role both in the creation of physical maps as well as in the graphical presentation of geospatial information about the environment and people. Curriculum makers are cartographers who collect, represent and create curricula. Yet they are there to trace or trace over curricula but rather to create curricula that at a times troublesome and messy, and at other times that are tidy, manageable and managed.

Curricula are like maps, they can be interpreted in a myriad of ways and it is important to recognise that they are not necessarily (and often not ever) portable across contexts and cultures, but often may not be.

Creating curriculum assemblages

The question then is how do we begin to create curricula through creating assemblages? One of the central difficulties in higher education that faculty are provided with templates, criteria and guidelines about what curricula should be and should look like. These restrictions result in highly defined and delineated curricula which prevent the creation of new forms of curricula. Assembling curricula should not be 'templated' but instead consider

- What knowledge is of most worth?
- What might a flexible curriculum look like?
- Should we see facilitators as fools rather than teachers of defined knowledge?

What knowledge is of most worth?

What is missing from the arguments and formations of knowledge and knowing is not only the way in which the spaces between these forms of knowledge are managed, but also what it is that enables students and staff to make the connections between all of them. It might be suggested that the missing links here are disregarded forms of knowledge, for example. The concept of disregarded knowledge encompasses knowledge often equated with emotional intelligence, such as when and how to use self-promotion, when to keep silent and when to intervene, but also with [Haraway's \(1991\)](#) concept of responsible knowledge – the need to take responsibility for the position from which we speak. Disregarded knowledge is neglected because it lacks status in academic life and is just that – disregarded. The question is how do we 'teach' disregarded knowledge? Can PBL provide a space for the recognition and learning of these kinds of knowledges? Epistemology, and indeed higher education of the 21st Century would seem to be neglecting a whole area of knowledge, that of knowing people, since:

pressures to prepare students for employment often conflict

with the desire to develop their critical faculties and to encourage them not only to participate in the production of knowledge, but to believe, too, that if they want to, they can change things ([Taylor et al., 2002](#)).

Yet to rethink our conceptions of knowledge or even knowledge what is needed are flexible curricula.

What might a flexible curriculum look like?

Despite moves, in the UK at least, towards flexible pedagogies, considerable resistance does seem to remain. The question is then how teachers might create flexible pedagogies that enable students to develop their own learning ecologies. [Barnett \(2014\)](#) has argued for 15 conditions of flexibility, which he believes will promote flexible provision in higher education as well as ensuring educational integrity. He argues that programs should lead to a qualification that contributes to major awards and offer all students access to suitable materials and with real-time interaction with tutors and other students. As well as other sound suggestions he argues, importantly, that programs should contain sufficient challenges so that students are likely to be cognitively and experientially stretched and to be informed by a spirit of criticality appropriate to each stage of a program of studies.

If flexible pedagogies are to be adopted that focus on human beings, as [Barnett \(2014\)](#) suggests, then the use of behavioural objectives needs to be dismissed in favour of

[Stenhouse's \(1975\)](#) learning intentions. The idea of conditions of flexibility is a challenge in the face of claims by staff that students remain entrenched and still want to be given lectures and write essays – despite little reflection from academics about how students may have become quite so entrenched in the first place. Some of the questions that need to be asked in the context of a desire for flexible pedagogies are:

- Why are objectives still useful?
- What are the boundaries and borders of a discipline and who decides?
- To what extent does credit transfer and modularity result in flexibility?
- What are the most effective ways of ensuring quality?
- How can shifts be made away from quality standards and professional bodies that are risk averse?
- To what extent are disciplinary norms and learning outcomes useful in the 21st Century?
- How can institutions become 'unmanaged' by bureaucratic administrators?

A curriculum should be a creation and a composition, a thinking space that is complex and multi-layered. Perhaps learning and the development of fluency in learning demands the ability to

live and learn liminally. Such gaps and thinking spaces are not narrow and linear, but complex, multidirectional and multilayered, similar to [Corner's \(1999\)](#) mapping practices which he names: drift, layering and rhizome. Such curricula will encourage rhizomatic travel since the curriculum itself is a liminal learning space

Facilitators as Fools

Shakespeare portrays fools as clowns or court jesters. To see facilitators as fools in a Shakespearean sense is to see them as wise-fools, such as Touchstone of *As You Like It*, Feste of *Twelfth Night*, and King Lear's unnamed Fool. Such fools (or court jesters) are generally seen at a simplistic level as pointed satire, but in fact they are used to comment on society and to present a different world view [Ellis \(1968\)](#). For example, Feste throughout the play (*Twelfth Night*) never really shows us what he stands for, instead shaping his behaviour according to the context. Viola, a character in the play, remarks about Feste that 'This fellow is wise enough to play the fool, and to do that well, craves a kind of wit' (Act III.i.53–54). She realizes that a good fool must be able to judge mood and personality, knowing when to challenge and when to be silent. Feste is skilled both as a fool and as one of the play's most intelligent characters.

[Stengers \(2005\)](#) suggests that the idiot (or in this case fool) is one who 'resists the consensual way in which the situation is presented and in which emergencies mobilize thought or action.' Facilitators as fools reflects Giroux's idea that teachers need to interrupt norms, change the processes of interaction and move away from the idea of just finding a solution.

The facilitator as fool prompts students to engage in imaginative and inventive problem-making and prevent the sanitisation of pedagogy. Facilitators need to be background noise who are both absent and present in their role and who make knowledge seem troublesome.

DISCUSSION

Emphasis at the moment at 'what works' in PBL this is epitomized in the focus on quality and containment. The result is that there is a tendency to ignore the 'not-yet-ness' [Collier and Ross \(2016\)](#) of curriculum making. Problem-based learning pedagogies must educate people to challenge dominant narratives and shift away from seeing education as merely training. Instead PBL needs to inspire passion for learning, justice and radical imagination. What we need to be asking ourselves is whether PBL is an emerging pedagogy and an emerging practice, and I suggest it needs to be both. Perhaps PBL needs to be seen as post-pedagogy, as learning as unbundled, as something that no longer largely

takes place within educational institutions, but instead includes some of the following practices:

- Mentorship: using mobile devices to keep in touch with parents or other significant adults in order to get advice, feel supported or use as a sounding board through WhatsApp or Facebook messaging.
- Gaming: alone and together to share, teach, learn, offer advice, negotiate, and give and receive hints, tips and solutions.
- Co-operative online learning: supporting and guiding each other about homework, assignments, exam revision.
- Teaching technology: sharing and teaching each other about apps, new devices and helpful sites.
- Emotional learning: using digital media for peer to peer support to manage personal challenges and difficulties, and to receive advice.
- Playful learning: trying things out and fiddling around, in order to experiment and discover.
- Co-production: creating presentations together, making and creating posters, mashups and vidding.

Problem-based learning needs to be a pedagogy of imagination and surprise: one that values critical engagement and diverse ways of seeing the world and challenging dominant narratives. Facilitators should not be call-centre teachers who just answer questions according to the disciplinary rules and company (institutional) policy.

What research needs doing?

This stance towards PBL pedagogy means that new research needs to be undertaken that promises to ensure that PBL does not become a pedagogy of repression. Questions could include:

- Which forms of PBL can help students to learn in ways that enable them to become?
- How can PBL be used to reduce/remove Pedagogies of repression?
- What is the impact of creating PBL curricula that are inventive?
- How can we ensure PBL is transdisciplinary?
- What is the impact of moving away from outcomes-based education?

CONCLUSION

Problem-based pedagogy should be about meddling with uncertainty, underpinned by wisdom so that students are encouraged to wrestle with difficulties that arise from the knowledge put before them. Pedagogy is more than the transfer of received knowledge from a disciplinary perspective. PBL pedagogy offers opportunities to enable students to have a will to learn, to engage with their passions and motivations and to see learning as an op-

portunity to challenge, change and transform the world.

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