

## **PROBLEM-BASED LEARNING: AN INSTITUTIONAL PERSPECTIVE**

Hee Soo Yin

Learning Academy

*Problem-based Learning (PBL) promises outcomes of self-directed learning, collaborative learning, metacognitive and creative problem-solving skills for a rapidly changing world. Classroom studies in tertiary education have shown a robust positive effect from PBL on the skills of students (Dochy, Segers, Van den Bossche and Gijbels, 2003). However many still remain hesitant about using PBL. This could be due to the sheer complexity of the process of implementing educational change. This is so even when the need is there, the idea is right and all parties involved have the best intentions. Even though Biggs (2003) suggests that “the reasons why PBL is not used more widely are not educational but organisational”, there is little written about PBL from the organisational or institutional perspective. PBL implementation involves issues of staff and student ownership and competence, cultural climate and other systemic issues.*

*This paper seeks to examine the implementation of PBL from an institutional perspective using Fullan’s (1992) implementation perspective of educational change. An understanding of the change process provides an underlying conception of what should be done when confronted with the problem of change at multiple levels of practice in an institutional context, and the development of corresponding strategies for successful PBL implementation. In the context of PBL implementation in an institution of higher learning, this paper draws implications for staff development and institutional development. It also suggests that an important benefit of implementing PBL from an institutional perspective is that it builds the capacity of the institution to deal with educational innovation and change.*

## THE IMPLEMENTATION PERSPECTIVE OF EDUCATIONAL CHANGE

The promised outcomes of PBL include self-directed learning, collaborative learning, metacognitive and creative problem-solving skills for a rapidly changing world. Whilst classroom studies in tertiary education have shown a robust positive effect from PBL on the skills of students (Dochy, Segers, Van den Bossche and Gijbels, 2003), many academic staff still remain hesitant about using PBL. Besides the challenges involved in a fundamental change of teaching paradigm, issues of staff and student ownership and competence, cultural climate and other systemic issues, the reluctance to use PBL could also be due to the sheer complexity of the process of implementing educational change. This is so even when the need and the idea are right and all parties involved have the best intentions. According to Biggs (2003, p.240) “The reasons why PBL is not used more widely are not educational but organisational.” There is, however, little written about PBL from the organisational perspective of educational change. This paper therefore seeks to examine PBL from the organisational or institutional perspective of educational change.

A leading writer in the field of educational change is Fullan (1992), who points out that when the study of educational change started in the 1960s, educational innovations were seen to be a mark of progress. In the 1970s however, questions were raised about why innovations were adopted, their follow-through and evaluation. Fullan then postulated the implementation perspective of educational change, which focuses on what happens in practice and includes the content and process of contending with new ideas, programmes, activities, structures and policies which are new to people involved. In particular, it concerns itself with the nature and extent of actual change as well as factors and processes that influence how and what changes are achieved. It demonstrates a basis for action in attempting to understand and influence improvements in practice. It also attempts to conceptualise and measure what has changed, and to understand why educational innovations succeed or fail. The implementation perspective, if understood deeply and authentically, can be a powerful resource for real improvements in classrooms and schools.

Fullan (1992) also points out that the assumption that well-designed innovation programmes or projects will find their way easily into school environments where professionals rationally weigh their merits is not necessarily true. Much depends on what different individuals think about the rationale and desirability of the changes, the implementation difficulty, and how well they fit within their particular context. His analysis of studies has shown that teachers underestimate the difficulty of making organisational changes, and administrators underestimate the complexities of changing classroom practices. Both can compromise successful implementation. Both perspectives must be understood.

According to Huberman and Miles (1984), educational change that pertains to the adoption, use and mastery of an educational innovation in the classroom is a complex process involving multiple levels. Practitioners and researchers cannot focus their attention and energies on the change process only from the classroom perspective whilst being disengaged from systemic changes at institutional level. The change process must be seen from a whole-institution perspective to better understand the dynamics at work in the adoption, implementation and sustaining of innovations involving significant changes in day-to-day instructional practice in the classroom. This needs to be borne in mind when we examine the process of change in the implementation of PBL in an institution.

## **THE PROCESS OF CHANGE**

According to Fullan (1992), implementation occurs when teachers interact with and support each other as they try out new practices, cope with difficulties, and develop new skills. Early implementation is fraught with difficulties and the institution more than any other level can provide the kind of environment necessary to address inevitable implementation problems. He provides four useful insights into the complex change process: active initiation and participation; pressure and support; changes in behaviour and beliefs; and ownership. These will be discussed in the context of PBL implementation in an institution of higher learning.

### ***Active initiation and participation***

Educational changes require some impetus to get started. Widespread involvement at the beginning is usually not feasible or effective. It is more likely that small groups of people embark on a change and, if they are successful, the process builds momentum. Active initiation, starting small and thinking big, bias for action, and learning by doing are all aspects of making change more manageable and getting the process going in a desirable direction.

At Temasek Polytechnic (TP), PBL started with a group of lecturers in the Diploma in Computer Engineering in 1998. The decision was then made to adopt PBL across the entire curriculum of the Diploma in Computer Engineering. This made an impact on student-learning and received positive feedback from industry. It also encouraged other Diploma courses to adopt PBL as it promised to be an effective way of equipping students with life skills and a thirst for continuous improvement, skills essential for a future of dynamic change. PBL was adopted in varying measures across different Diploma courses in the Applied Science, Business, Design, Engineering and Information Technology Schools. In 1999, the Temasek Centre for Problem-Based Learning (TCPBL) was established. A team from the Diploma in Marketing and TCPBL co-pioneered a project, "Education Innovation for Knowledge-based Economy using PBL", that received the Enterprise Challenge Award from the Prime Minister's Office in 2000. In 2001, TP also received the Innovators Award. In 2003, TP was awarded the Enterprise Challenge Shield, a top award for an innovation creating the most value in the public service.

In 2000, TCPBL organised the 2<sup>nd</sup> *Asia- Pacific Conference on PBL*. Over 500 international and local participants attended the Conference, with over 100 paper presentations and workshops on how PBL is being implemented across disciplines around the world. Papers from TP staff reflecting on their early practice of PBL were presented. TP staff also published papers or presented papers for educational conferences both in Singapore and overseas subsequently. In 2001, TCPBL appointed its first International Advisor, Professor Howard Barrows. Selected staff trained by Professor Howard Barrows provided training for other staff. Other PBL consultants were invited for consultation with staff. Research on PBL practice at TP was undertaken by staff pursuing their Master of Education programme. Other action- research projects were jointly done by staff developers and practitioners. These research projects have begun to provide some evidence of the impact of PBL on student learning. Continuing efforts are being made to obtain student feedback on PBL. TCPBL started to provide external consultancies with various agencies and schools both in Singapore and overseas.

### ***Pressure and support***

In school improvement, certain forms of internal turbulence, pain and disorder are healthy signs. Huberman and Miles (1984) warn that smooth initial implementation of significant changes may lead to rapid decline when key people leave or turn their attention elsewhere, and when they are replaced by people with a different agenda. External turbulence such as budget cuts, personnel movements and other educational reforms impacting educational institutions also add to the complexity. The implementation of educational change is therefore exceptionally challenging when it involves changing the status quo of teachers' stable working arrangements with new practices, as yet unproven in the immediate context.

After the early years where the approach to PBL implementation by course teams was more evolutionary, three main forms of PBL emerged at TP. They coincide with the categories identified by Savin-Baden (2004): namely, the pure form where PBL is implemented across a whole Diploma course in an integrated curriculum; an adaptation of the PBL process to encompass their particular disciplines; and the use of PBL as one of the strategies. Changes of key personnel, both at TCPBL and across the different Diploma courses, inevitably involved changes in persuasion and emphasis. Efforts by advocates of the pure PBL model to persuade others to implement the model met with resistance. Those who were not convinced about the efficiency or efficacy of PBL in delivering the promised results remained non-committal. Staff whose initial PBL efforts were not successful scaled down their practice whilst others persevered. New staff who took over subject leadership of PBL subjects either learnt PBL skills quickly or redesigned the subject under their purview. Diploma courses reviewed their initial PBL efforts in the light of student, staff and industry feedback and made modifications to their practice. Modifications were also made with the introduction of a new modular academic system in 2001 which made it not practicable to integrate subjects.

In reality, educational innovations of any significance are inherently disruptive and take up a lot of teachers' energies in the beginning, with low initial yields in instructional efficiency. Teachers may adapt their responses by cutting back and slowing down on the scale of the project or operate only with the most rudimentary components over time resulting in promised "impacts" not being delivered. Fullan (1992) believes that administrators need to adopt a combination of "pressure" and "support" in order to sustain the innovation such that it delivers the promised outcomes. It is a fine balance, however, between the right combination of pressure and support needed for successful implementation.

With many forces maintaining the status quo, pressure for change plays a positive role for sustained change. The Principal's role in influencing people at other points than at the locus of actual classroom implementation can bring about attitudinal and behavioural changes in staff executing the innovation. In 2002, PBL was adopted as the central pedagogy for TP. Course teams were required to articulate their pedagogical approaches which had to include PBL, to deliver TP's desired educational outcomes as well as those of their respective disciplines. Schools were also required to set targets for PBL implementation for their Diploma courses.

At TP, all Diploma programmes are required to map their course curricula to the Polytechnic's Target Graduate Profile (Character, Competence and Change-Readiness) and to set targets for the implementation of PBL in their curricula. To assist in this process, TP's

Academic Programme Validation Committee (APVC) revised their guidelines for the preparation of course syllabi to assist course teams to specifically articulate how their course subject objectives and curricula fulfil the TP Target Graduate Profile. More particularly, this includes the articulation of PBL implementation in their courses. Training on course design, including the drafting of revised course syllabi using the PBL guidelines, is also provided to course teams.

TCPBL developed a comprehensive training roadmap for all TP staff including Senior Management. It provided training and consultation for course teams as teams, building on the foundational pedagogical training provided in the mandatory initial teacher training programme (Teaching Higher Education Certificate).

Training and consultation provided to course teams as teams allowed for a model of continuous improvement, where teams work on PBL implementation in actual subjects or courses. This encourages interaction among those implementing PBL, which serves to integrate both pressure and support. Peer coaching, particularly, works effectively because it combines pressure and support seamlessly. This is in addition to the communities of practice (CoPs) formed by Diploma course teams and Schools to support the ongoing implementation of PBL. These initiatives provide the impetus for staff to learn by doing and to share regularly what they have learnt from their practice in knowledge sharing sessions across TP initiated by TCPBL. A PBL portal is also being developed to facilitate on-line CoPs.

### ***Changes in behaviour and beliefs***

The relationship between changes in behaviour and beliefs or understanding is reciprocal and ongoing, with a change in action or behaviour a necessary experience for breakthroughs in meaning and understanding. Fullan (1992) observes that in many cases, changes in behaviour precede, rather than follow, changes in belief. He also notes that often when people try something new, things often get worse before they get better as people grapple with the meaning and the skills of change. He calls this the “implementation dip”.

The first PBL implementation at TP described earlier saw a flurry of PBL initiatives. Staff who implemented PBL have had to change their behaviour and beliefs as PBL goes against the grain of what faculty holds dear (Marincovich, 2000). A good PBL facilitator assumes the role of the “guide by the side” instead of the expert “sage on stage” (Wilkerson and Gijsselaers, 1996). Staff have had to relinquish the authority they are used to of being the expert and move from “covering content” to focus on facilitating student learning. According to Biggs (2003, p. 240) “the reasons why PBL is not used more widely are not educational but organisational”. He observes that it is much easier for experts to give lectures, leaving integration and application to the student years down the road.

Those who desire change in teaching practices must influence the teachers’ context by changing the environment. This includes the structure of the school system, its bureaucracy and procedures, its value system, the reward structure for teachers and the normal educational practices in the institution (Bowden, 1988). Some pertinent questions include:

- Is the educational system able to cope with the changes the teacher wants to introduce?
- Does the school assessment system allow for it?
- Is there pressure from peers to conform because they fear the impact of the proposed activities on their own activities?
- Is the educational system/institution so complex that the task of changing any of its fundamental characteristics is too daunting?

These are all questions which TP staff and administrators have had to deal with in PBL implementation. Questions relating to facilities, teaching allocation, resource and time management, resistant peers and supervisors who questioned the efficiency of PBL have also to be answered as with issues of assessment. Different schools adopted different approaches with regards to these issues. PBL practice in a large class context was developed as manpower constraints made it impossible to reduce class size for PBL. Staff devised schemes to manage their time for consultation with the students when it was found that unlimited consultation time was not feasible. Staff also have learnt to manage students' frustration with the inefficiencies of PBL; students being moved out of their comfort zones experience insecurity as a result of ambiguity, arising from not knowing if they are on the right track in their inquiry.

Bowden (1988) also observes that whilst some individuals may be able to maintain local change even in the long term, the system is unlikely to be affected unless a comprehensive effort is made. Appropriate student induction is a part of the comprehensive efforts in PBL implementation at TP. All courses implemented student PBL induction programmes which include an understanding of why they need to do PBL, the PBL process, time management, conflict management and research skills. Initial student experience of PBL has to be carefully managed and appropriate levels of support extended to enable students to build up their confidence in the use of PBL skills as well as their self-efficacy with regard to PBL. This is because students' self-efficacy affects their choice of activities, effort and persistence, their behaviour in the classroom and consequently their performance and achievement (Bandura, 1997).

Some staff using PBL also have had to deal with peers and supervisors who do not have similar convictions about PBL. With staff resignations, subjects designed for PBL may be redesigned if they are taken over by a staff member who is not convinced about using PBL or who may not have the requisite PBL skills. Staff have to manage their PBL resource sessions within traditional classroom facilities which do not offer the flexibility that PBL sessions require. They may even have to contend with the notion that they may be disadvantaged if they use PBL since they run the risk of being rated poorly by students and their supervisors who are using traditional criteria. As Huberman and Miles (1984) observe, implementation is a political process, one that involves conflict. What may be seen as improvement for some may not make sense to others, at least initially. In 2002, revisions were also made to TP's Teaching Observation and Student Feedback Forms used both in formative and appraisal evaluation of staff to accommodate student-centred learning paradigms and methodologies like PBL.

The consolidation of early implementation efforts saw TCPBL developing the TP PBL framework and setting out PBL essentials to address inconsistencies of practice which

evolved in the initial stages and which were confusing students. Many members of staff however construed the TP framework and essentials as prescriptive and were uncomfortable with change being mandated or prescribed. As Bailey (2000) points out, mandated change directs teachers rather than engaging them. She opines that it is impossible for change to be mandated when the disjuncture between the assumptions embedded in mandated reform and teachers' realities are not taken into consideration. These assumptions include the particular disciplinary and classroom context for the application of the change and the teachers' core values. Subsequent dialogue clarified that the TP framework and essentials are intended to be used as a guide, and that what is desired is that course teams and domain experts in the various disciplines adopt a considered approach to adapt the use of PBL in their courses to deliver the desired student outcomes suited to their particular disciplines and domains. This saw new openness among course teams in using the framework as a guide to implement PBL in their courses, adapting it where necessary.

### ***Ownership***

Deep ownership of something new by large numbers of people in the institution is not acquired easily. Ownership in the sense of clarity, skill and commitment is a progressive process. Ownership does not automatically come once a decision is made to pursue educational change. In successful change projects, ownership is stronger in the middle of the process than it was at the beginning, and stronger still at the end. True ownership comes out at the end of a successful change process. It is also not necessarily true that if people participate early on in the process of designing school-level changes, they will develop "ownership" of the project and have a clearer sense of what it entails. Huberman and Miles (1984) find that teachers developed commitment to changes only as they began to master them in the classroom. It is the experience of increasing skill and mastery in delivery and the achievement of results initially thought to be beyond one's reach that produced ownership. It is therefore important for educational change involving classroom practices to put most of the effort in the achievement of technical mastery through institutional support mechanisms, rather than trying to get everyone to buy in at the beginning.

Fullan (1992) observes that it is often assumed that once an educational change has been implemented, the outcomes will be what was intended or articulated at the outset. He points out that innovations implemented need longevity to have any durable effects. It is only after an innovation can have proven and acknowledged successful that it can be said to be institutionalised. Success in institutionalisation is measured not only in terms of success in technical capacity of staff or revised institutional arrangements. It must have a measurable impact on students' achievement or development.

Whilst Marinovich (2000) highlighted that greater emphasis should be placed on producing convincing research that would effectively document PBL's effectiveness, Norman and Schmidt (2000) called for more theory-based research. A meta-analysis of 43 empirical studies across the world on PBL in real-life classrooms in tertiary education concluded that there is a robust positive effect from PBL on the skills of students (Dochy, Segers, Van den Bossche and Gijbels, 2003). It is observed that staff and students who have demonstrated ownership of and commitment to PBL in TP are those who have experimented with and developed mastery of PBL skills. Staff who believe that teaching is a didactic process of delivering content may not be pre-disposed towards using PBL. They may need to have their

beliefs challenged by the need for a more facilitative stance towards student learning before they are ready to embark on PBL. Staff who gave up after an initial negative PBL experience will need to reflect what went wrong and consider how they should change their practice. They need to know that their experience of an “implementation dip” as novices is a norm in educational change implementation and be encouraged to try again using informed strategies to manage the change implementation, tapping on the support structures available in TP for PBL. Expertise in adapting the practice of PBL to suit the educational needs, and the domain reasoning and practice, of the different disciplines needs to be developed. This can only be achieved by the commitment of the different course teams to actively engage in the use and adaptation of PBL to suit the particular requirements of their disciplines.

It is not easy to achieve deep ownership of PBL in an institution. The way forward in achieving deep ownership is to develop increasing skill and mastery of PBL practitioners to achieve results initially thought to be beyond one’s reach through strategic research projects and ongoing staff development and institutional development.

## **IMPLICATIONS FOR STAFF DEVELOPMENT AND INSTITUTIONAL DEVELOPMENT**

### ***Staff development***

Whilst staff development for PBL provides support for PBL implementation, Huberman (1989, cited in Fullan, 1992) sees enhanced professional capacity as usually a component and a by-product of educational change. Innovation mobilises administrators, lecturers and students to change their practice where they would probably have retained the status quo. He also calls for staff development that is close to one’s everyday practice, close to one’s peers, with tailored training and assistance, in continuous cycles of experimentation and reflection. The collective implementation of change also has the important effect of creating interdependencies between administrators and lecturers, and involving lecturers with lecturers in an institution. On an institutional level, this has a cascading effect of changes in climate, in collaboration and in collective responsibility for student learning outcomes.

Fullan (1992) insists that novice innovators need “hands-on” tutoring. To support his view he cites Huberman (1989) who advocates that advanced technical mastery dictates another pattern of assistance and support: observations of more experienced peers and experts, more technical exchanges, and more conceptually demanding forms of training. Support of real-time, within-the-classroom observation, demonstration and coaching from outsiders can speed up the process. Training and coaching have to occur, not only outside the classroom, but also inside it. Mastery of complex instructional programmes is not done best by single experimenters through trial and error in the classroom, no matter how experienced they are.

As technical mastery and delivery of results in PBL for both staff and students is vital to deep ownership of PBL, research findings on the motivational construct of self-efficacy can be instructive. Teacher self-efficacy has been increasingly shown to affect student motivation and be linked to student achievement outcomes. Teacher self-efficacy refers to personal beliefs about one’s capabilities to help students learn. In this context, it refers to personal beliefs about capabilities of staff and students to use PBL effectively. This affects one’s

choice of activities, effort, persistence and achievement. Research by Tschanen-Moran & Hoy (2001) indicates that teachers' sense of efficacy has a strong positive link with student performance, the percent of project goals achieved, and the continued use of project methods and materials after the project ends. To increase student self-efficacy, engagement, effort, persistence and achievement, therefore, one should focus on increasing teacher self-efficacy. Bandura (1997) theorized that the most efficient method of effecting change in feelings of efficacy is through the use of modelling, guided performance and self-directed mastery experiences. This has implications for staff development for PBL implementation which will then need to be structured as powerful mastery experiences to help them garner evidence of improved learning of the students, to reap the efficacy pay-off. Interventions to increase efficacy expectations include structuring performance accomplishments, observational learning, anxiety management, verbal persuasion and encouragement to build confidence and increase self-understanding (Bandura, 1997).

Staff development also plays an important role in institutional development as the discussion in the next section will demonstrate.

### ***Institutional development***

Ashton's (1985) studies of efforts to change teacher behaviour and attitude have led her to believe that individual change strategies are not likely to have a long-term impact on teachers' sense of efficacy without organisational supports that ameliorate conditions threatening teachers' sense of efficacy. Structural changes are also necessary to provide teachers with collegial, supervisory, and other assistance. Ashton also sees classroom learning as affected by the:

- microsystem (immediate or present setting)
- mesosystem (interrelationship between major organisational and interpersonal settings)
- exosystem (factors outside school)
- macrosystem (cultural beliefs and attitudes of teachers and students)

Mesosystem variables likely to have a reciprocal effect on teachers' sense of efficacy include school norms, collegial relationships, principal-teacher relationships, and school decision-making structures. School effectiveness studies suggest that the principal influences teacher motivation and student achievement. The principal's recognition and support, how he allocates resources to support teaching and his influence on the decision-making structure influences teachers' perceived self-efficacy. It is suggested that student performance is likely to increase if teachers are allowed to participate in making school decisions that affect them. The principal also influences the culture and some studies have suggested that strong collegial support may enhance and sustain teachers' sense of self-efficacy, enabling teachers to be more effective with their students (Ashton, 1985).

The commitment of TP's Principal and Chief Executive Officer was demonstrated in his articulation of PBL as a central pedagogy for TP. Senior Management and Course Managers were trained in PBL. School Directors set targets for PBL for their courses and support the involvement of their experienced PBL practitioners as Associate Consultants with TCPBL. Together with the full-time staff of TCPBL, the Associate Consultants provide the collegial training and support for the practice of PBL at TP. Training in PBL was also provided for the

Academic Validation Programme Committee (APVC) which approves all course and subject documentation before delivery. The Teaching Observation and Student Feedback Forms used in staff appraisal were also redesigned to be more appropriate for PBL. These provide mesosystem support for PBL implementation.

Collective self-efficacy refers to the self-efficacy of a group, team, or larger social entity or system (Bandura, 1997). It includes both perceived capabilities of individual members and group members' perceptions of the effectiveness of links among tasks, skills and roles. Belief of collective efficacy affects the sense of mission and purpose of a system, the strength of common commitment to what it seeks to achieve, how well its members work together to produce results, and the group's resilience in the face of difficulties. Whilst educational research on the influence of collective efficacy of school professional staff is only beginning, evidence suggests that the collective efficacy of a faculty can be a stronger predictor of students' achievement than the socioeconomic level of the students. An examination of collective teacher efficacy found that this efficacy, as a school-level construct, was directly linked with student achievement variance (Goddard, Hoy and Woolfolk Hoy, 2000 as cited in Tschannen-Moran and Hoy, 2001).

At TP, TCPBL provides customised PBL training and consultation for course teams using the respective teams' particular context as material. Modelling, guided performance and self-directed mastery experiences are built in where possible. This facilitates and encourages the development of individual staff and collective efficacy of course teams in PBL. Course Managers, trained together with their course teams in PBL, provide staff with supervisory as well as collegial assistance. This working together on actual materials to be used in the classroom provides staff development close to one's everyday practice, close to one's peers, with tailored training and assistance, in continuous cycles of experimentation and reflection. CoPs and knowledge sharing sessions initiated by TCPBL also provide ongoing collegial support. Ongoing professional development, which includes reflection on theoretical and applied practice and research, will assist in the increasing skill and mastery and consequently student results desired and a deep ownership of PBL. Ongoing professional development, together with student PBL induction programmes, provides microsystem and macrosystem support for PBL implementation.

Yet another way forward is the "cross-institutional model" as suggested by Huberman (1989, cited in Fullan, 1992), where "clusters of change" are drawn from different institutions. The collective stimulation, the possibility of "de-centering" from one's own surroundings, the novelty of the situation and some of the actors, the greater wealth of ideas and instructional expertise are all additional resources. An organisation of teams and networks, each working on circumscribed projects, may be a better design than relying only on an intra-institutional model. The PBL Conference 2005 will provide an opportunity for communities of practice to be formed amongst PBL practitioners in Singapore. This will provide exosystem support for PBL practitioners at TP.

## **CONCLUSION: BEYOND PBL IMPLEMENTATION**

Since the implementation of an innovation involves learning to do something new, it follows that institutions that foster a learning orientation among their staff and students are more likely to bring about improvements. With strong collegiality as well as a commitment to continuous improvement, backed by policies and structures designed to support purposeful teacher or lecturer interaction, the chances of successfully implementing an innovation is much higher.

Whilst Fullan (1992) sees educational innovation implementation as staff development opportunities, he goes beyond that to stress that with the changing sea of innovations, what is also important is the capacity of teachers, both individually and with others, to manage change continuously. This view is shared by many others, including Harris and Hopkins (2000). This includes being able to find meaning amongst innovative possibilities: to become adept at knowing when to seek changes and when not to; and understanding the change process. More emphasis should be placed on developing a greater institutional capacity to innovate and to manage change as routinely as one manages stability than on the implementation of distinct innovations. This institutional capacity to innovate, however, takes several cycles of trial and error, of collective reflection on the process, of honing the process and developing the skill in managing both the technical and social-emotional aspects of the change and the pace of change.

Fullan (1992) points to the institution as the centre of change where people involved in improvement efforts also contribute to significant and enduring organisational change. It involves interactive professionalism where staff learn continuously, working in small groups, to plan, test new ideas, solve different problems, and assess effectiveness (Fullan and Hargreaves, 1991). Cultural change, which includes changes in teaching and the institution's culture, requires strong persistent efforts since much of current practice is embedded in structures and routines and internalised in individuals. As forces reinforcing the status quo are systemic, achieving improvements will require intensive action sustained over many years. Substantial progress requires changing roles and organisations, and creating conditions for people to change how they deal with change. It takes a combination of the right factors to support and guide the process of re-learning, which respects the maintenance needs of individuals and groups and at the same time facilitates, stimulates and prods people to change through a process of incremental and decremental fits and starts on the way. Beyond achieving deep ownership of PBL in an institution, another important goal is the institution's capacity for change and continuous improvement.

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