

**Problem-Based Learning :
Bringing Higher Order
Thinking to Business Schools**

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Abstract/Résumé

Nowadays, both executives and academics agree that, to be successful, modern firms need people who not only possess a widespread knowledge, but who also keep that knowledge up-to-date, put it into operation to solve problems, and work in group as a team. These abilities demand that teaching and learning methods grant students the chance to build up higher level thinking skills. This paper suggests that Problem-Based Learning (PBL), a constructivist pedagogical learning approach, might be a valuable tool to achieve higher level thinking skills. Today, various fields, such as medicine, biology, pharmacy, architecture, law, geography, engineering, and education, have implemented PBL methods to a greater or lesser extent. However, it is very surprising to notice that PBL, at least in its “authentic or pure” form, has rarely been introduced into business schools. Accordingly, the main objective of this paper is to identify principal hurdles to PBL implementation in business schools. To do so, this paper is structured into five sections. The first section provides a brief review of PBL history. Next, the central objectives of PBL, as well as the main reasons that explain PBL proliferation, particularly in medical education, are outlined. Then, the principal features of the PBL process are described. In the fourth section, a review of literature on PBL outcomes is presented. Finally, principal barriers to PBL implementation are suggested.

Les appels, de la part des différents acteurs du système éducatif et corporatif, pour un saut qualitatif dans l'éducation supérieure sont de plus en plus fréquents et insistants. Ce saut qualitatif vise, notamment, à préparer les étudiants au monde du travail en leur donnant les outils nécessaires pour (1) maintenir leurs connaissances à jour, (2) mettre en pratique leur savoir en vue de résoudre les problèmes et (3) développer leurs capacités à travailler en équipe. Cet article suggère que la méthode d'Apprentissage Par Problème (A.P.P.), une conception pédagogique constructiviste qui met l'apprenant au centre de son apprentissage, pourrait être un outil très précieux qui faciliterait la réalisation de ce saut qualitatif. Bien que largement utilisée dans les facultés de médecine, biologie, pharmacie, et architecture, l'A.P.P a rarement été introduit dans les facultés de commerce. Par conséquent, l'objectif principal de cet article est d'identifier les barrières qui empêchent la mise en place de cette méthode dans les écoles de commerce. Cet article est organisé en cinq sections. La première section présente un bref aperçu historique de la méthode d'A.P.P. Ensuite, les objectifs principaux de cette méthode, les raisons expliquant son développement ainsi que les grandes lignes de sa mise en œuvre sont décrits. La quatrième section, résume les résultats obtenus, notamment dans les facultés de médecine, suite à la mise en place de la méthode d'A.P.P. En conclusion, les principales barrières qui empêchent l'introduction de cette méthode d'apprentissage dans les écoles de commerce sont suggérées.

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"Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves".

Arthur W. Chickering & Zelda F. Gamson
"Seven Principles for Good Practice" 1987

North American business schools have been frequently criticized by both executives and academics for the poor results they attain in providing relevant training and skills for their students (Watson & Temkin, 2000; Raelin, 2000; Morrison, 1998; Samuelson, 1993; Linder & Smith, 1992). It is estimated that corporations spend about \$15 billion for their management education and training in the US alone (Financial Times, 2000; Reingold, 1997). Some \$4 billion goes to universities and \$11 billion is spent on in-house programs and consultants (Financial Times, 2000). For business schools, this market is growing by 20 to 25 per cent a year (Financial Times, 2000). However, there is strong evidence that firms are not getting a sufficient return on this considerable investment (Raelin, 2000). Indeed, Tannenbaum & Yulk (1992) found that, in some cases, less than 5 percent of workers perceive that they have applied their training to their job. Furthermore, Sveiby (1997) found that, after five days, the majority of people recall less than 10 percent of what they have been taught during a lecture. This proportion climbs to only 20 percent when the pedagogical method used involved seeing and hearing. Additionally, business students often reported their frustration with several features of traditional business education (Financial Times, 2001). This is not surprising given the fact that students are often passive and exposed to too much information, little of which appears relevant to them.

As a result, there has been an increasing appeal, particularly from executives, for pedagogical techniques that emphasize less on lengthy theoretical lectures and case studies and focus more on organisational problem-solving that are closely aligned to the corporate strategy (Raelin, 2000; Financial Times, 2000; Wines, 1996). For example, business speakers at the International Association for Management Education (AACSB) symposium challenged business schools to "be more proactive and partner with business leaders in their communities... and to make their curricula more relevant" (AACSB, 1999, p. 12).

Nowadays, both executives and academics agree that, to be successful, firms need people who not only have a widespread knowledge. Modern firms need people who also keep that knowledge up-to-date, put it into operation to solve problems, and work in group as a team (Hmelo & Evensen, 2000). Business schools must target much more than the traditional goals of infusing morality and knowledge. They must offer teachers opportunities to promote students' higher order thinking by giving them abilities to develop critical

judgment and to synthesize and evaluate the problems they face. These abilities require that teaching and learning reflect the chance for students to build up higher level thinking skills. To reach such a result, teachers have considered constructivist pedagogical designs that are built on the assumption that learning is a product of both cognitive and social interactions in problem-centred environments (Savery & Duffy, 1994; Hmelo & Evensen, 2000). Problem-based learning (PBL) is an illustration of such a design (Hmelo & Evensen, 2000).

From its beginning at McMaster University in the mid-1960s, PBL has caused a small revolution in the medical education community (Norman & Schmidt, 1992). Today, most North American medical schools are implementing PBL in their curricula. Additionally, PBL has been introduced into schools of health sciences, nursing, dentistry, biology, pharmacy, veterinary medicine, and public health (Hmelo & Evensen, 2000; Harland, 1998; Van Berkel, 1990, O'Neil, 1998). Further fields, such as architecture, law, geography, engineering forestry, police science, social work, and education have also implemented this instructional method to a greater or lesser extent (Maitland, 1991; Griffiths, 1992; Dimmock & Edwards, 1996; Bradbeer, 1996; Harland, 1998). However, it is very surprising to notice that Problem-based learning, at least in its "authentic or pure" form, has been rarely introduced into business schools. This fact IS worth a close look, given the level of faculty interest in PBL all through higher education.

There must be some valuable features that make PBL influential. After all, PBL is not easy to implement and it is more expensive than other traditional methods (Rhem, 1998; Albanese & Mitchell, 1993). Why then, has the Pew Charitable Trusts granted over \$600,000 to the University of Delaware and a similar donation to Samford University in Alabama to examine restructuring conventional instruction along problem-based lines? (Rhem, 1998). Why, have medical schools adopted PBL so passionately but not business schools? Against this backdrop, the main objective of this paper is to answer these striking questions. To do so, this paper will be structured into five sections. The first section provides a brief review of PBL history. Next, the central objectives of PBL, as well as the main reasons that explain PBL proliferation, particularly in medical education, are outlined. Then, the principal features of the PBL process are described. In the fourth section, a review of literature on PBL outcomes is presented. Finally, principal barriers to PBL implementation are suggested.

History of PBL

Problem-based learning (PBL) began at the Faculty of Medicine at McMaster University in Canada in the mid 1960's (Norman & Schmidt, 1992). Subsequently, three other medical schools - the University of Limburg at Maastricht in the Netherlands, the University of Newcastle in Australia, and the University of New Mexico in the United States followed (Camp, 1996). In 1968, four years before the establishment of the new medical school at McMaster University, its education committee began the conception of the medical school's curriculum (Hmelo & Evensen, 2000). The education committee

noticed that students often reported their frustration with several features of traditional medical education (Spaulding, 1991, Hmelo & Evensen, 2000). In particular, they were passive and exposed to too much information, little of which appeared relevant to them. Interestingly, the committee noticed that “medical education did not become exciting for students until residency training, when they were working with patients trying to solve their problems” (Hmelo & Evensen, 2000). Therefore, the education committee agreed that, from the establishment of medical school, learning would be problem-centered, student-centered and presented in small groups of students with the teachers functioning as “tutors”. Hmelo & Evensen, (2000) suggest that “no background in educational psychology or cognitive science guided them, just the expressed hope that students would be stimulated by this experience, would see the relevance of what they are learning to their future responsibilities, would maintain a high degree of motivation for learning, and would begin to understand the importance of responsible professional attitudes” (Hmelo & Evensen, 2000, pp vii).

Objectives of PBL

According to Barrows, who is considered as the “father” of PBL, this instructional method targets five objectives that are not well addressed by other traditional educational methods (Barrows,1986) :

1. *Construction of useful knowledge*: indeed, problems produce “epistemic curiosity” or “intrinsic interest” (Schmidt, 1993, pp.422) which, sequentially, initiate the cognitive processes of retrieving prior knowledge, determining a problem space, seeking out new information, and reconstructing information into knowledge (Norman & Schmidt, 1992; Schmidt, 1993; Barrows, 1986, Barrows, 1998).
2. *Development of reasoning strategies*: indeed, through constant contact with real life problems, students will develop abilities to perceive a problem and appreciate its features, formulate and analyze critically possible hypotheses and finally make decisions about appropriate actions to solve the problem (Norman & Schmidt, 1992; Schmidt, 1993; Barrows, 1986; Barrows, 1998).
3. *Development of effective self-directed learning strategies*: self-directed learning makes the student aware of the importance of personal learning needs. Additionally, it allows him to find and to utilize accurately all kinds of information resources (Norman & Schmidt, 1992; Schmidt, 1993; Barrows, 1986, Barrows, 1998).
4. *Increased motivation for learning*: since students will perceive the problems studied as relevant and given that sessions are structured as open-ended discussions, “epistemic curiosity” is fostered. (Norman & Schmidt, 1992; Schmidt, 1993; Barrows, 1986, Barrows, 1998).
5. *Becoming effective collaborators*: indeed, the PBL process pushes students to work together and to help each other to get an understanding of what they are learning and its relevance to the problem. It is this collaboration that permits the students to build up the abilities necessary to be responsible for their own learning. Collaboration is an

indispensable ability the students should have, as they will be regularly working as members of teams (Barrows, 1998, PBLI, 2000).

From the objectives highlighted above, it is clear that the principal goal of the PBL approach (curriculum design, learning approach, student assessment and program evaluation) is the development of higher order thinking. PBL main objective is to stimulate students to learn at the higher levels, where students analyze, synthesize and evaluate instead of to simply know, comprehend and apply (table 1).

Table1: PBL objectives

| Bloom's Level | Cognitive | Student Activity |
|----------------------|------------------|---------------------------------------------------------------------------------------------------------------------|
| Evaluation | | Making a judgment based on a pre-established set of criteria. |
| Synthesis | | Putting together elements and parts so as to form a whole. |
| Analysis | | Breaking down communication into its constituting elements or parts such that the hierarchy of ideas is made clear. |
| Application | | Using abstractions in particular and concrete situations. |
| Comprehension | | Translating, interpreting and extrapolating communications. |
| Knowledge | | Recalling methods, processes, patterns, concepts, and definitions. |

Source: Bloom, B. (1956) : *Taxonomy of Educational Objectives*

The development of higher order thinking explains why there has been a boost in the use of PBL, principally in medical schools. Other reasons suggested by Camp (1996) include:

- Research findings indicate that important principles of learning such as motivation, relevance, practice, active learning, and contextual learning operate much more extensively in a PBL environment than in traditional curricula (Camp, 1996, Hmelo & Evensen, 2000, Albanese & Mitchell, 1993).
- Conventional educational methods have failed to provide relevant training and skills for their students. Indeed, research suggests that students fail to recall what they learned, and what is retained cannot be applied to the problems they later face in their job (Sveiby, 1997; Tannenbaum & Yulk, 1992). In addition, research shows that students fail to develop effective long-life self-directed learning strategies and that they have serious difficulties in being effective collaborators (Camp, 1996). Many of these problems appear to be resolvable with a shift to a PBL method (Camp, 1996).
- Where it was put into practice, PBL has been positively perceived by faculty and students (Albanese & Mitchell, 1993). This success encouraged other schools to implement it (Camp, 1996). In addition, faculty or administrators at schools which have not yet implemented PBL were afraid to be perceived as outdated (Camp, 1996).

- PBL is in accordance with the principles of adult learning theory. Knowles (1980) suggested that adults are more motivated to learn when one of four conditions exists:
 1. Their individual learning needs and experience supply the starting point for learning.
 2. The emphasis for learning is on direct application to relevant situations.
 3. Their personal experience is relevant and;
 4. They guide and evaluate their own learning.

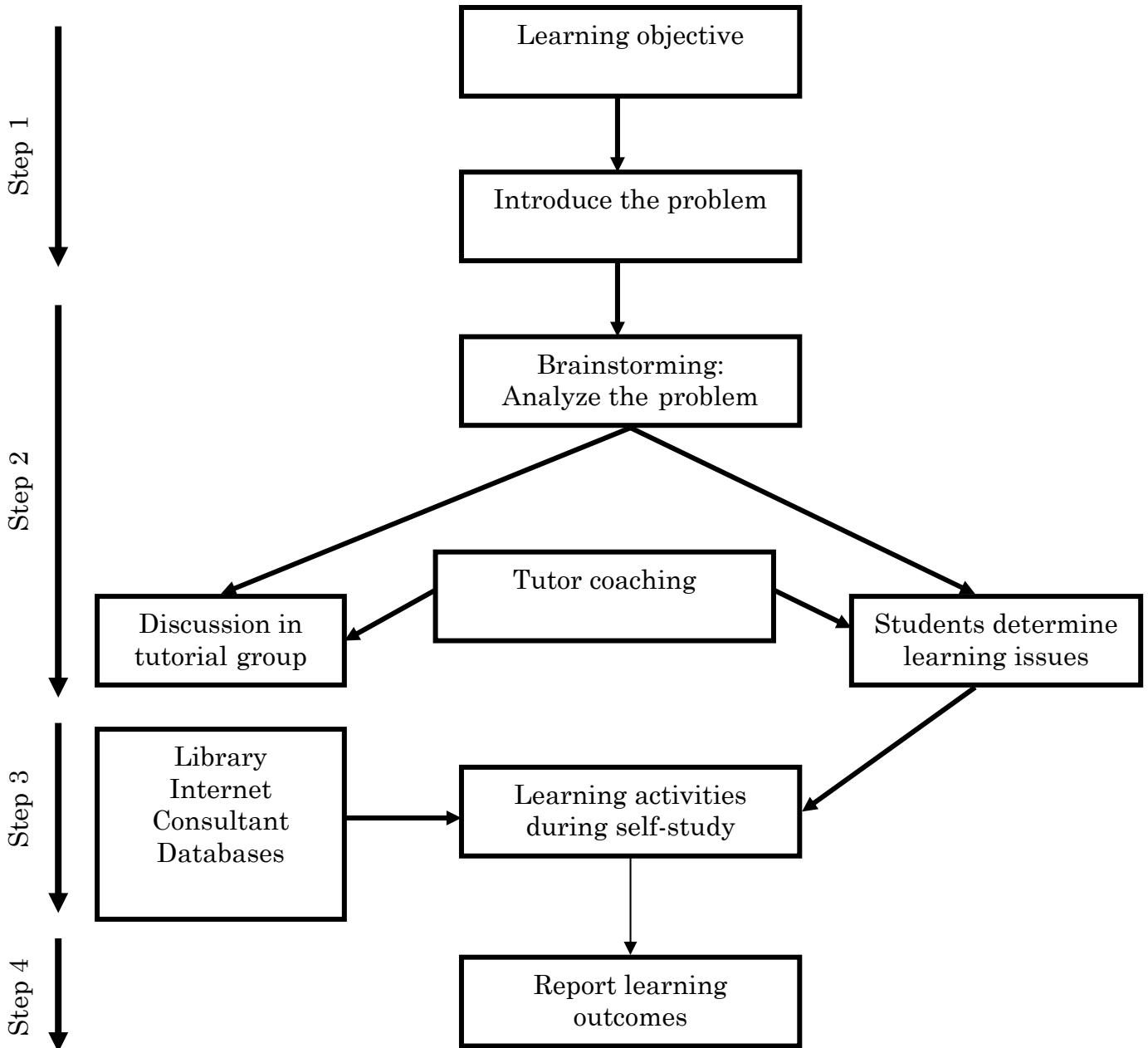
All these conditions that facilitate learning exist in PBL (Camp, 1996).

- Finally, PBL is consistent with *constructivism*. Constructivism is a philosophy built on the primary assumption that knowledge cannot exist outside our minds (Hendry, Frommer & Walker, 1999). Knowledge cannot be transported from one brain to another. Innovative knowledge is '*constructed*' from within people through experience (Savery & Duffy, 1994; Hendry, Frommer & Walker, 1999). Accordingly, the opportunity to construct information for oneself, to compare one's perception of that knowledge with others' perception, and to reorganize knowledge as more relevant experience is acquired (all of which are done by students in PBL curricula), appears to improve learning (Hendry, Frommer & Walker, 1999). The constructivist view of learning makes possible the implementation of PBL from pre-school to post-graduate training, and open up its application far beyond medical schools (Camp, 1996).

Defining the PBL process

PBL has at least five key features: it is (1) problem-centered, (2) student-centered, (3) collaborative, (4) active and (5) utilizes small groups (Camp, 1996). Therefore, any program that does not comply with these features is not "pure" PBL. In particular, if the program is "teacher-centered" rather than "student-centered," the essence of "pure" PBL has been lost (Camp, 1996). Generally, the PBL process involves four iterative steps

Figure 1
The Iterative PBL Process



Step 1: introduction of the problem

The problem-based learning usually starts by presenting a group of students (usually 5 to 10) with ill-structured information about a particular open-ended problem. A crucial variable in the success of PBL is the problem itself. It is very important that the problem brings up relevant learning issues and that students get involved in the discussion of these issues (Wilkerson & Feletti, 1989). In particular, Duch (1996) suggests that:

1. It is important that the problem attracts students' interest, and motivates them to investigate the underlying concepts being presented (Duch, 1996).
2. The problem should allow students to make decisions based on facts, information, logic and/or rationalization (Duch, 1996).
3. The problem should induce students to determine what assumptions are required (and why), what information is relevant, and/or what procedures are needed in order to solve the problem (Duch, 1996).
4. It is important that the problem encourages students' cooperation. The problem must be formulated in a way that discourages students to work individually. For instance, a problem that includes a sequence of simple "end of chapter" questions will be divided by the group and assigned to students and then put together for the assignment submission. In this situation, PBL fails to attain its objectives (Duch, 1996).
5. The problem should fit with students' capabilities and represent a real challenge for them. If the problem is very difficult for students, it can trigger feelings of frustration, self-doubt, and failure. In contrast, if the problem is very easy, the students may become frustrated, bored, and alienated
6. Finally, the problem must clearly integrate the different objectives of the course.

Step 2: Brainstorming

After reading the problem, students have to (1) extract important aspects of the problem, (2) find out what information is on hand and what is still required to solve the problem, (3) formulate and analyzing possible hypotheses, and (4) identify learning issues (Hmelo & Evensen, 2000). Learning issues are relevant questions that require further investigation and clarification. It is important to note that this process is reiterated several times.

During the whole iterative process, one student generally assumes the role of scribe. The scribe reports the group's problem solving on whiteboards, which remains visible during the entire process. The scribe keeps a record of the main aspects of the problem, students' suggestions or hypotheses, supplementary questions related to the problem, and the learning issues brought up throughout the discussions (Hmelo & Evensen, 2000). It is important to stress that the teacher's responsibility in problem solving is essential. Indeed, it is the responsibility of the teacher to provide an environment of freedom, democracy and respect. It is also the teacher's role to assist students' to acquire

a spirit of tolerance and critical enquiry. Finally, the teacher should promote reflective thinking by inviting students to justify why they believe that a particular solution is good or bad, or why they need a particular piece of information about the problem. (Hmelo & Evensen, 2000).

Step 3: Individual reading-research-preparation

During this phase, students collect information they need from a variety sources such as books, journals, the internet, on-line databases, consulting with experts etc... In this way, students will learn how to get current information.

Step 4: Return

During this last step, students return to classrooms to in order to (1) communicate what they have learned, (2) to re-evaluate their hypotheses, and / or to (3) formulate new hypotheses in light of their new learning (Hmelo & Evensen, 2000). This phase permits students to put into application their newly acquired knowledge to the problem. In other words, students reconstruct the problem through the lens of their newly accessed knowledge. In addition, students share information about how they obtained their data and criticize their resources. Accordingly, it is clear that all the process is designed in such a manner that helps students to become self-directed learners (Hmelo & Evensen, 2000).

Now that we defined the process of PBL, it is important to analyze how Problem-based learning differs from other forms of learning, in particular the case study method and the lecture method.

The case study method was pioneered at the Harvard Business School (Barnes, Christensen & Hansen, 1994). Usually, a case study is a description of a business situation in which students and teachers examine, discuss and recommend solutions to a realistic business problem situation. The case is generally used to assimilate previously learned knowledge.

In essence, what distinguishes PBL from the case-method is that, in PBL, the problem is introduced first, before students have learned theoretical concepts, not after. Thus, in PBL, the teacher does not initially present or synthesize all the information required to solve the problem. In this way, PBL provides greater realism and free inquiry, and more motivation and focus (Barows, 1986). Accordingly, the major problem with the case-method is that it attempts “to make neat an activity that is normally messy”.

Finally, what differentiates a PBL classroom from a conventional teacher-centered classroom (such as lectures) is the fact that students do all the work. They collect information, they propose hypotheses and conclusions, they work in teams, and they do library research outside the classroom. (Lrynock & Robb, 1998). Table 2 summarizes the major differences between the PBL and the case method along five dimensions: (1) the role of the teacher, (2) the

cognitive focus, (3) the meta-cognitive focus, (4) the role of the problem, and (5) the organization of information (IMSA, 2000).

Table 2: Major differences between the PBL and the case method

| | Case Method | Problem-Based Learning |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Role of The teacher | <ul style="list-style-type: none"> • Lectures pre/post. • Establish the environment. | <ul style="list-style-type: none"> • Introduce the problem. • Participate as co-investigator. |
| The Cognitive Focus | Students utilize prior knowledge and individual experience in case resolution. | Students synthesize and construct knowledge to find a solution to the problem. |
| Meta-cognitive Focus | Strategies previously learned are used to cases. | Students construct strategies to facilitate and guide their own learning. |
| Role of the Problem | <ul style="list-style-type: none"> • Well-structured. • Presented as a challenge to application and analysis. | <ul style="list-style-type: none"> • Ill-structured. • Presented as a situation within which a relevant problem is still to be defined. |
| Organization of information | Largely organized and presented by teacher. | Largely gathered, organized and presented by student. |

Source: *IMSA (2000)*

The review of the processes and the psychological principles of PBL suggested several theoretical reasons indicating the superiority of PBL curricula when compared with those in conventional instructional methods. In particular, there are reasons to believe that students might be more motivated, more advanced in problem solving and self-directed learning, and more comfortable with collaboration. The question that arises now is whether these predictions are actually supported by the literature investigating PBL outcomes.

Does PBL work?

In two separate meta-analytic reviews, Vernon & Blake (1993) and Albanese & Mitchell (1993) synthesized all available research from 1970 through 1992 that compared PBL with more traditional methods of education. Their results globally support the superiority of the PBL approach in several of the outcome domains examined.

With respect to PBL outcomes from a cognitive perspective, results suggest that PBL students tend to study differently than conventional students (Vernon & Blake, 1993; Albanese & Mitchell, 1993). Indeed, findings suggest that PBL students are less likely to study for short-term memorization and more likely to study for synthesis and analysis (Albanese & Mitchell, 1993). They also have more control on their learning efforts than conventional students have (Albanese & Mitchell, 1993). Finally, results indicate that PBL students

are more likely to use the library and library resources to study than are conventional students (Schmidt, Dauphinee, & Patel, 1987).

As regards student attitudes and moods, findings were consistently more positive for PBL than the traditional courses or curricula. Indeed, results indicate that, after taking PBL courses, students almost uniformly displayed high levels of satisfaction (Albanese & Mitchell, 1993). Moreover, students consistently reported that PBL confers a learning environment that is much more pleasant than lectures (Albanese & Mitchell, 1993). Furthermore, PBL has been very approvingly perceived by students, even when they engaged in PBL against their wishes. Albanese & Mitchell (1993) indicate that approximately 70% to 83% of students who initially do not wish to participate in PBL will change their minds once having experienced the PBL method.

Generally, data suggest that PBL graduates do not perceive themselves to be disadvantaged when compared to graduates from medical schools that use exclusively traditional instructional methods (Albanese & Mitchell, 1993).

With respect to faculty members' satisfaction, findings strongly indicate that faculty tends to take pleasure from teaching using PBL (Albanese & Mitchell, 1993). The personal contact created by the small-group design is one of the most often perceived advantages. Given the fact that teachers using PBL take more time to teach the same content, these results indicate that the pedagogical gains seem to overcome any discontent the method may create. Finally, results show that faculty members who had participated in both PBL and more traditional teaching were also relatively positive about PBL (Albanese & Mitchell, 1993).

As regards clinical functioning, the achievements of PBL students were better than those of traditional students (Albanese & Mitchell, 1993). On the other hand, there was no significant difference between the two groups of students on conventional measures of clinical knowledge. For instance, one relevant measure of the success of a curriculum is the degree to which its graduates obtain their first choices of residencies. Results indicate that the rate at which PBL graduates are chosen for their first choice residency positions is equivalent to the percentage of those who graduate from schools with traditional curricula (Albanese & Mitchell, 1993).

However, traditional curricula were correlated with better scores on tests of basic science knowledge, such as the NBME1 (Albanese & Mitchell, 1993).

Despite the extensive evidence supporting the superiority of the PBL approach in the fields where it has been introduced, PBL has not been adopted within higher business education. On the contrary, it is has been considered idealistic, if not "downright fanciful, aberration on the fringes of serious teaching and learning" (Margetson, 1991). Accordingly, the objective of the next section is to briefly review some of the most important barriers to PBL implementation.

The Barriers to PBL Implementation

Resistance to PBL in its pure form in business schools seems to revolve around eight factors:

1. ***PBL is more expensive than traditional methods:*** Indeed, the PBL curricula necessitates large number of well-equipped rooms for small-group meetings. In addition, it requires other important resources to support small group investigations, including instructional materials (both textbooks and multimedia), space, library, equipment, and support personnel. For instance, having several copies of resource material available in the library for large numbers of small groups implies substantial costs, particularly for schools in developing countries (Albanese & Mitchell, 1993).
2. ***The changing role of the teacher:*** As suggested earlier, the adoption of PBL curriculum involves a radical change for teachers used to traditional teaching methods. Teachers are not always ready for this radical change (CSUITI, 1996).
3. ***The changing role of the student:*** Similarly, the implementation of PBL curriculum implies a radical change for students used to traditional teaching methods. Given the fact that PBL is student-centred, and that students are expected to be independent learners, the transition from conventional curricula to PBL is sometimes difficult (CSUITI, 1996).
4. ***Creating relevant problems:*** Producing pertinent problems is the most important prerequisite of PBL. As suggested earlier, if the problem does not succeed in bringing up relevant learning issues and fails to involve students in the discussion of these issues, outcomes will be inevitably negative (Duch, 1996).
5. ***Fear of loss of prestige, power, or control:*** Abrahamson, (1998) suggests that this attitude might be a considerable barrier, specially, at the level of the department chair. Indeed, since PBL might reduce in some cases the power of the department chair, it is not surprising to find some resistance from some of them.
6. ***Ignorance about PBL:*** In some cases, faculty members do not discern the idea behind a recommendation for curriculum modification or the processes implied in making it work (Abrahamson, 1998). Given the tremendous pressures on faculty members to conduct research and to collect and manage funding, it is not surprising that faculty members do not allocate large amount of their time to the understanding of innovative pedagogical methods (Abrahamson, 1998).
7. ***Fear of extra work:*** Faculty members perceive PBL as more time consuming in terms of preparation and teaching the same content, and they are right. Relying upon self-reports of faculty members teaching in

the two separate tracks at New Mexico, Mennin and Martinez-Burrola (1986) calculated that faculty in the conventional track spent 3.57 hours per week per student in preparation and teaching, as compared with 4.12 hours per week per student in the PBL track. Similarly, Shahabudin (1987) compared the amounts of time it would take to cover the same content by using lectures and by using problems in a PBL format. Shahabudin (1987) found that it necessitates about 22% more time to cover the same content in PBL (120 weeks by PBL versus 98 weeks by lecture). However, it is very important to stress that, even though results indicate that PBL students may cover less content per unit of time, research suggest that they do retain a larger proportion of what they learn (Coulson, 1983; Eisenstaedt et al. 1990; Albanese & Mitchell, 1993).

8. ***Faculty lacks extrinsic rewards for PBL teaching:*** Indeed professors get more compensation for research and publication than for teaching. Furthermore, given the fact that PBL is experimental, the compensation system may de facto produce disincentives (Abrahamson, 1998; Bridges, 1992).

Conclusion

The brief review of the relatively rich literature on problem-based learning reveals the superiority of PBL curricula when compared with those in conventional instructional methods. In particular, results show that PBL generates students that are more motivated, more advanced in problem solving and self-directed learning, and more comfortable with collaboration. It is, therefore, not surprising to encounter a considerable level of interest in PBL all through higher education. What is surprising, however, is that this level of interest did not reach business schools. This paper suggested that resistance to PBL, at least in its “pure” form, in business schools might be explained by eight factors (1) the increased costs related to PBL implementation, (2) the radical change in the teacher’s role (3) the changing role of the student (4) the difficulties related to creating relevant business problems (5) the fear of loss of prestige, power, or control, (6) the faculty and student ignorance about PBL processes, (7) the fear of extra work and, finally, (8) the lack of extrinsic rewards for PBL teaching. If we assume that there is a direct association between the proliferation of PBL curricula in a particular field and the severity of barriers blocking this proliferation (which seems to be a reasonable assumption), we can suggest that these mobility barriers seem more difficult to overcome in the business field compared to other fields that have largely adopted the PBL curricula.

However, no matter how high those mobility barriers are, business schools have no choice other than introducing innovative instructional methods such as problem-based learning, essentially for four reasons:

1. The major shifts in the way competition is evolving in the executive business education market with increased competition from corporate universities at one end of the spectrum and management consultancies at the other end (Financial Times, 2000).
2. The significant shift in demand with a real growth in the market for customized programmes, a market already worth \$1.5 billion in the US alone, and a stagnating demand for open enrolment programmes (Financial Times, 2000).
3. The poor performance that North American business schools are providing nowadays (Raelin, 2000), and;
4. The increasing pressure faced by schools, particularly from leading firms that provide considerable funding, to design and provide programmes that answer firms concerns.

In addition to these external forces emanating from the market, all stakeholders in the higher business education system should take serious actions in order to reduce mobility barriers that impede PBL implementation in business schools. In particular, there must be recognition for faculty members who will be allocating precious time to this new way of teaching and learning (Abrahamson, 1998). Furthermore, there must be clear and unequivocal political support from the dean, the chair of the department, and from all persons who are active in the PBL planning process. We must be careful, however, not to view PBL as the panacea that will eliminate failure in the schools. Using appropriate Education methods is often a necessary, but never sufficient, condition for effective Education.

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