

Problem Based Learning a Shift from Teaching Paradigm to the Learning Paradigm

Poornima R.*, Ashok L.**

Abstract

The past decade has seen an increasing demand for reforms of dental education that would produce a graduate better equipped to work in the rapidly changing world of the 21st century. Among the most notable curriculum changes implemented in dental schools is a move towards Problem-Based Learning (PBL). PBL, in some form, has been a feature of medical education for several decades, but has only recently been introduced into dental schools.

Keywords: Problem-Based Learning (PBL); Teaching and Learning Methods; Dental Education; Curriculum.

Introduction

PBL is a teaching method based on the principle of using problems as the starting point for the acquisition of new knowledge. The fundamental principle being the use of problems that create learning through new experience, new content acquisition, and the reinforcement of existing knowledge.

Howard Barrows, the one who was involved in the early stages of the development of PBL in medical education at McMaster University in Canada, defines the concept as being student-centered, taking place in small groups with the teacher acting as a facilitator, and being organized around problems [1].

Students are exposed to situations or problems that are in real world or that they can recognize as part of their relevant future and stimulate the need to seek out new information and synthesize it in the context of the problem scenario.

To highlight the real nature of the problem, students are given a specific role in the problem scenario that enhances their ownership with working towards its solution. It is important to remember that for PBL

problems to be most effective, students should be able to engage or identify with the role they have been assigned.

Based on Kolbs experiential learning principles it is observed that the learning process and average retention rates improve with involving the student and practically doing it than the traditional teaching methods like lectures and reading (Figure 1).

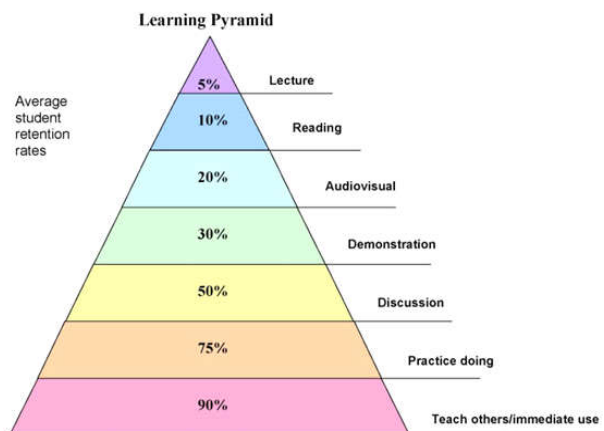


Fig. 1:

Here is a simple and familiar illustration of PBL. Consider the last time you required driving directions to some place you had never been. You begin the process with what you already know, where you will start driving and where you intend to arrive. You then identify what you need to know to effectively and efficiently reach your destination: names of streets and highways, distinguishing landmarks to look for, and the mileage you should anticipate.

Author's Affiliation: *Reader **Professor and Head, Department of Oral Medicine and Radiology, Bapuji Dental College and Hospital, Davangere-577004 Karnataka.

Reprints Requests: Poornima R., Reader, Department of Oral Medicine and Radiology, Bapuji Dental College and Hospital, Davangere-577004 Karnataka.
E-mail; drpoornima_omr@yahoo.co.in

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You then integrate this information with your existing knowledge; for example, the amount of time it typically takes you to travel the number of miles and the type of road conditions you can expect. Often, after creating the experience of using the new information to travel a new route and successful arrival at the desired destination, you can later retrieve this new information and apply it to similar situations. It is also likely that you will retain much of the new information and be able to successfully travel the same route again when the need arises [2].

It is essential that the learners determine their own learning needs, or learning issues, based on the problem they encounter. This is the student-centered element of PBL. In the earlier driving example, imagine that someone else determined the directions you needed without taking into account your own existing knowledge. The information they decided to provide you could discount your starting point, your familiarity with some of the route, or your own travel preferences. In essence, they would be telling you what they think you need to know, with little regard for what you think you need to know. As the learner, you are the one who should frame these questions and then seek out the information. It is this part of the process that creates higher retention of new content and better recall at a later date [2].

Unfortunately, as educators we typically spend quite a lot of time telling our learners what they need to know without first determining what they already know or what they think they need to know. Rarely do we ask students to frame the questions that align with the type of information we think is important for them to have. Rather, we provide students with information we have already deemed relevant through lectures, presentations, seminars, handouts, worksheets, or assigned readings.

In PBL, the process is somewhat reversed. Through the problem, students determine what is relevant, make that declaration, and then seek out the information they need. As the teacher using PBL problems, you will be able to accurately anticipate the students learning needs based on the problem you have selected.

Well-constructed problems coupled with effective facilitation will prompt students into the intended learning areas. As the students work in their small groups, they learn to be in functional relationships with each other to accomplish the group's goals. Students develop communication skills and more sophisticated interpersonal skills. They develop respect for one another's contributions and find ways to acknowledge and encourage each other.

Students learn the skills of negotiation, mediation, and cooperation. They learn to organize themselves, to self-direct in their learning, and to determine which resources are credible and reliable. Interpersonal skills in the areas of communication, mutual respect, and mutual consideration are developed in the cooperative nature of the groups. Students learn the art of contribution, they learn how to assist others in contributing, and they learn to distinguish valuable contributions and to acknowledge others for making them.

Objectives of PBL (Figure 2)

The objectives behind PBL being learners are going to acquire knowledge both theoretical and clinical, they develop skills for scientific reasoning, critical appraisal, self-directed, lifelong learning and overall change in attitudes towards value of teamwork and interpersonal skills.



Fig. 2:

Vision of PBL (Figure 3)

The emphasis in PBL is on conceptual understanding rather than the memorization of facts. The intended learning is presented through the problem scenario in a way that compels students to

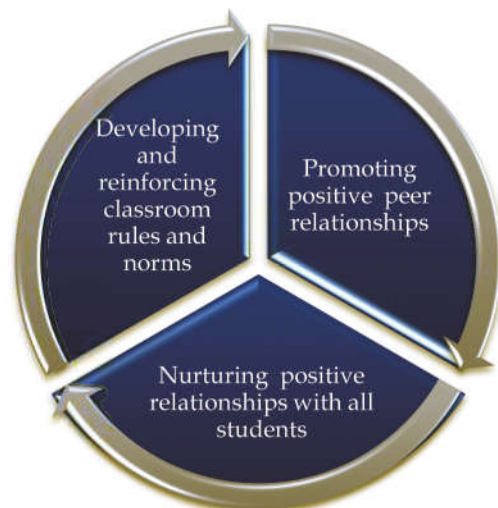


Fig. 3:

want to know and need to know the new information.

Focusing on multiple solutions rather than on correct answers allows students to be successful in ways that have not been available to them in conventional approaches. There are limited opportunities to be considered successful in most classrooms. Success tends to be defined by the highest scores, the most right answers, the neatest work, and, often, the most conventional work. While there is value in high scores, correct answers, and neatness, there is also value in creativity, discovery, contribution to a process, and contribution to the development of other people. Students not only are exposed to these opportunities in the PBL process but are positively acknowledged as they engage the opportunities. We all have the tendency to return to and continue the things that make us feel successful. Students return to PBL each time feeling more confident, motivated, and excited about what they are able to accomplish.

Problem Based Process (Figure 4)

The subject disciplines are integrated through relating the case to professional practice. For example, in the field of medical education, the starting point is often a description of the patient. In Maastricht, the ‘Seven Step’ method was developed to help students analyze the problem [3]:

1. Clarification of terms and concepts
2. Formulation of problem statement
3. Brainstorm
4. Categorizing and structuring of brainstorm
5. Formulation of learning objectives
6. Self-study consisting of individual processing of learning objectives and
7. Post-discussion and reflection on learning process.

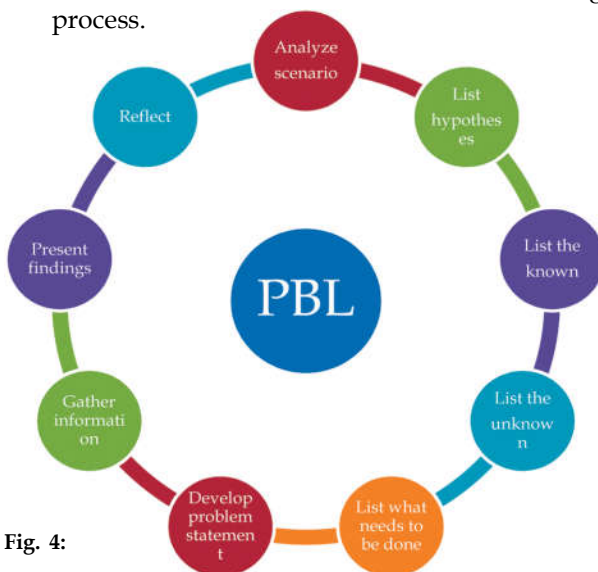


Fig. 4:

Advantages of PBL [4]

Student centered PBL – It fosters active learning, improved understanding, and retention and development of lifelong learning skills.

Generic competencies – PBL allows students to develop generic skills and attitudes desirable in their future practice.

Integration – PBL facilitates an integrated core curriculum.

Motivation – PBL is fun for students and tutors, and the process requires all students to be engaged in the learning process.

“Deep” learning – PBL fosters deep learning (students interact with learning materials, relate concepts to everyday activities, and improve their understanding).

Constructivist approach – Students activate prior knowledge and build on existing conceptual knowledge frameworks.

Disadvantages of PBL [4]

Tutors who can’t “teach” – Tutors enjoy passing on their own knowledge and understanding so may find PBL facilitation difficult and frustrating.

Human resources – More staff have to take part in the tutoring process.

Other resources – Large numbers of students need access to the same library and computer resources simultaneously.

Role models – Students may be deprived access to a particular inspirational teacher who in a traditional curriculum would deliver lectures to a large group.

Information overload – Students may be unsure how much self-directed study to do and what information is relevant and useful.

Reversal of Role from Teacher/Mentor to Facilitator (Figure 5)

In problem based learning, learning happens in small groups, teacher will assume a different and a unfamiliar role to a conventional mentor. Rather than being a sole authority in directing the learning process, he/she becomes the facilitator or coach of the group. The tutor is required to accompany, rather than control, the learning process. The role of the tutor may be described as conducive or facilitative. Facilitation requires understanding of the learning process, primarily involves monitoring of student

learning and promotion of effective group function.⁵ There is reversal of role from "Sage on the stage" to a "Guide on the side"

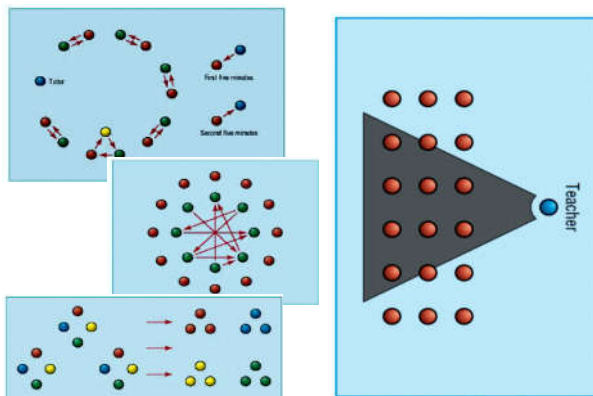


Fig. 5:

Experience with PBL

The report of study conducted on PBL in B P Koirala Institute of Health Science, Dharan, Nepal concludes that PBL [6].

- I. Useful and enjoyable (96%)
- II. Facilitate integration (100%)
- III. Help in development of self-directed learning (88%)
- IV. Help in problem solving skill (81%)
- V. Provide opportunity to learn from peers (73%)
- VI. Help in understanding a principle (96%)

In 1997, the National Taiwan University, School of Dentistry, decided to implement PBL into Oral and Maxillofacial Radiology (OMFR) course within a traditional, discipline-oriented dental curriculum. More commitment and less disruptive behavior and improved engagement, interpersonal relationships and self-presentation were found in the PBL course.⁷

Implementation of PBL in only Pedodontics in the School of Stomatology at Wuhan University (WHUSS), China, in 2000 led to a positive feedback among students and teachers. This included the ability of students to more effectively communicate ideas in a group setting, the enhancement of a practical approach in solving dental treatment-related problems, the development of critical thinking and problem-solving skills, and improved enthusiasm for learning [8].

Why the Conventional/Traditional Curriculum has to be Converted to PBL, Following are the Few Reasons for the Same [9]

- Traditional curricula tend to be directed towards

memorizing facts and gaining technical skills without sufficient concern for understanding or clinical reasoning.

- Traditional curricula tend to be "dense-packed," allowing insufficient time for reflection and self-directed learning.
- The traditional "pre-clinical/clinical" division of the curriculum inhibits integration and causes students to view the preclinical phase as simply a "hurdle to be overcome."
- In traditional dental curricula, the clinical experience is delayed as a result of the non-integrated course content.
- The scheduling of the subject matter frequently obscures its relevance to clinical situations.
- There may be insufficient emphasis on attributes such as patient/practitioner interactions, communication, and interpersonal and management skills.
- The traditional departmental structure inhibits content integration.
- Traditional curricula fail to emphasize student responsibility for learning. Rather the focus is on faculty responsibility to teach the students.
- Students have historically enjoyed the PBL experience.

There are no reports where PBL implementation has been stopped or withdrawn from any schools where this pedagogy is employed fully or partly. Though this gives an indirect sense that this method of learning works in dental education, it should not lead us to a state of overconfidence that this system will work in all situations. Customization, acceptance and perseverance can become key words for a successful PBL implementation [10].

Conclusion

Learning is a continuous process; we need to examine our teaching methods regularly to see if they continue to meet the needs of our students. Any modification in the curriculum needs to be based on sound reasoning and experimental evidence. PBL introduces a sense of confidence to the learner, and it makes the student an ever learner which is a need of the hour in this era of evidence based practice. For mentors PBL is part of the shift from the teaching paradigm to the learning paradigm. The PBL can be designed and included as hybrid curricula with the existing syllabus to complement other teaching methods.

References

1. H. S. Barrows, Problem-based learning in medicine and beyond: A brief overview, in L. Wilkerson and W. H. Gijselaers (eds.), *Bringing Problem-Based Learning to Higher Education: Theory and Practice*, Jossey-Bass, San Francisco (1996).
 2. Ann Lambros. Thousand Oaks, 2004 *Problem-Based Learning in Middle and High School Classrooms*, CA: Corwin Press. Corwin Press, Inc.
 3. Maurer H, Neuhold C. Problems Everywhere? Strengths and Challenges of a Problem-Based Learning Approach in European Studies. Paper prepared for the Higher Education Academy Social Science Conference "Ways of Knowing, Ways of Learning" 28 and 29 May 2012. Liverpool. Available from: http://www.mcegmaastricht.eu/pdf/MCEG_part%20PBL_link2_%20PBL%20implementation%20challenges.pdf.
 4. Wood DF. ABC of learning and teaching in medicine Problem based learning. *BMJ*. 2003; 326:328-330.
 5. Groves M, Régo P, O'Rourke P. Tutoring in problem-based learning medical curricula: the influence of tutor background and style on effectiveness. *BMC Med Educ*. 2005; 5:20.
 6. Chapagain ML, Bhattacharya N, Jain BK, Kaini KR, Koirala S, Jayawickramarajah PT. Introducing problem based learning in to an organ system programme. *Medical Teacher*; 1998; 20:6; Short communication.
 7. Chen SK, Chang HF, Chiang CP. Group learning factors in a problem-based course in oral radiology. *Dentomaxillofac Radiol*. 2001; 30:84-7.
 8. Wang G, Tai B, Huang C, Bian Z, Shang Z, Wang Q, *et al*. Establishing a Multidisciplinary PBL Curriculum in the School of Stomatology at Wuhan University. *J Dent Educ*. 2008; 72:610-5.
 9. Fincham AG, Shuler CF. The Changing Face of Dental Education: The Impact of PBL. *J Dent Educ*. 2001; 65(5):406-21.
 10. Jacob PS. Problem based learning in dental education. *J Educ Ethics Dent*. 2011; 1:7-11.
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