



Problem based learning –an alternative pedagogic approach

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Abstract:

Background: Problem-based learning curricula have been introduced in many medical schools around the world. This approach to teaching brings prior knowledge into play more rapidly and ends up fostering learning that adapts to new situations and related domains as quickly [1,2]. However, their adoption was met with some concern, primarily because of the substantial manpower and money involved [3]. Given the limited resources available, evidence-based evaluations of the effects of problem-based learning on improving physician competency strengthens any justification for the adoption of such programs [4, 5-9]. **Method:** The I MBBS students of 2011-2012 Batch who had enrolled in RG KAR Medical College and Hospital were subjects. The class was divided into groups of approximately five students each. The groups' membership remained constant throughout the term. The section on Vitamins was divided into two sections with one section being taught by traditional method and the other by Problem-based learning. A total of one hundred fifty students were assessed in six days. At the end of the term, assessment of students was done by multiple choice questions and student's response towards traditional method versus Problem-based learning was gauged. **Results:** Out of 150 students, 90 students participated in the PBL exercise. 72 students voted for PBL, 10 were against and 8 were neutral. Students' performances in the multiple choice question tests when taught by PBL were marginally better in comparison to traditional method. **Conclusion:** In Problem-based learning students learn to be self directed, independent and interdependent learners motivated to solve a problem. Problem-based learning during medical school has positive effects on physician competencies, especially in the social and cognitive dimensions.

Key words: cognitive; curriculum; feedback; input; instructor; lecture; traditional method

Introduction

Traditional instruction, such as the typical lecture based session, often involves delivering as much information as possible as quickly as possible. The lecture method was one of the most effective and efficient ways to disseminate information and has often been used for this end. Because many faculty members are poor lecturers, and because students are often poor participants in the lecture, this type of instruction has often allowed students to be passive in the classroom. Students, not knowing how to be active participants in the lecture, have relied on transcription, memorization, and repetition for learning.

In recent decades, however, we have learned a great deal from cognitive science research about the nature of learning. Students construct knowledge; they benefit from working together, and they learn best from teaching each other [10, 11]. Research also suggests that students learn best in the context of a compelling problem [12]. In short, students learn through making cognitive connections, social connections, and experiential connections [10-12]. Because they make these connections differently, students do not learn in the same way. This new understanding has given rise to the notion of a paradigm shift in higher education, one from a focus on teaching to a focus on learning [13].

PBL is an educational approach in which complex problems serve as the context and the stimulus for learning. One of the main defining characteristics of Problem-based Learning is that the problem is presented to the students first at the start of the learning process, before other curriculum inputs. Another defining characteristic of PBL is that in PBL tutorials students define their own learning issues, what they need to research and learn to work on the problem and are responsible themselves for searching appropriate sources of information.

In the process they develop skills in collecting, evaluating, and synthesizing resources as they first define and then propose a solution to a multi faceted problem. The instructor in a PBL class facilitates the learning process by monitoring the progress of the learners and asking questions to move students forward in the problem solving process. Unlike traditional classrooms, the faculty member is not the sole resource for content or process information, but instead guides students as they search out appropriate resources.

Biochemistry is one of the important basic science subjects in medical curriculum. Being expansive, volatile, and dry it remains an Achilles

heel for most medical students. Furthermore, it is a formidable task to teach Biochemistry in an undergraduate level without making it appear too forbidding. In an attempt to circumvent these difficulties and create a genuine fondness for the subject we experimented with PBL as an alternative to current lecture based teaching. Our second objective was to compare this novel educational tool with traditional method in an attempt to find out which of the two is a better teaching method.

Material and Methods

Our study was a case-control study. The study participants were I MBBS students of 2011-2012 batches of R G Kar Medical College and Hospital, Kolkata, West Bengal. PBL notification was announced one month in advance. The class was divided into groups of approximately five students each. The groups' membership remained constant throughout the term. The section on Vitamins was divided into two sections with one section being taught by traditional method and the other by Problem-based learning. In the section being taught by PBL, the individual chapters were broken down into topics. Time allotted for each topic was fixed beforehand. Each student was made to participate. As one group presented an allotted section, the remaining groups became the audience. Last five minutes of the time allotted to individual groups was reserved for cross questioning and interactions among students. The students dealt with the assigned topics, raised questions and debated the solutions. Each PBL class was presided by two teachers who acted as facilitators. For the sake of uniformity, the chosen teachers remained the same in all the presiding sessions. In the final class assigned for PBL, assessment of the students was done by undertaking a multiple choice question test, the key answers of which were prepared previously. In order to compare response of students to PBL as opposed to traditional method, a similar multiple choice question tests was undertaken for vitamins which were taught by conventional method. Scoring of students in both the multiple choice question tests served as an indicator of the classes' response towards the two methods. A feedback form was given to each student wherein the students were encouraged to write their views supporting or opposing PBL. They were also encouraged to comment on the teachers new role. A total of one hundred fifty students were assessed in six days. It is an educational study; informed consent has been taken from study participants.

Results

Out of 150 students, 90 students participated in the PBL exercise. 72 students voted for PBL as a better form of teaching, 10 were against adoption of PBL as a teaching method and 8 were neutral. On the basis of students' performance in the multiple choice question tests performance of the students when taught by PBL method was marginally better (p value) with scoring in PBL classes being 2-3 points more than classes taught by traditional method.

Discussion

We observed that students in PBL curriculum scored marginally higher than in the traditional programs (p value). However, students in PBL course reported greater satisfaction with their experiences than in conventional class. They reported their studies to be more engaging and useful when taught by PBL approach. Research studies document that students who experience PBL have substantially more positive attitudes toward the instructional environment than do students in more traditional programs. PBL students tend to give high ratings for their training whereas students in traditional programs are more likely to describe their training as boring and irrelevant [14,15]. In addition, these studies found that attendance was significantly higher in the PBL class than in the lecture version [16]. We, in our part did not find any increase in attendances in classes conducted by PBL but this could be due to an initial inhibition towards a novel educating method.

Research also shows changes in students' study behaviour. We found that in PBL, students. Used versatile and meaningful approaches to studying than when studying by traditional methods wherein they used reproduction. Moreover, PBL students used textbooks, reserve materials and other reference books and engaged in informal discussion with peers more than non PBL students, who relied on lecture notes [17-20].

Our students performed marginally better in the PBL classes'. However, we opine that traditional standardized multiple choice test may not be the best method to assess PBL.

Because the focus of this pedagogy is primarily on learning to learn and less on mastery of a particular body of knowledge, traditional methods of course assessment such as examinations may not be very effective [21]. If traditional assessment is a good measure of traditional pedagogy, it stands to reason that an alternative assessment may be necessarily a better

Measure for an alternative pedagogy such as PBL. An alternative assessment measure might include constructed response items, essays, writing samples, oral presentations, exhibitions,

experiments and/or portfolios [22]. In a PBL classroom, these measures might be much more relevant and authentic to a problem solving setting than a traditional standardized multiple choice test. Allowing students to engage in these kinds of measures can allow us to assess important learning by examining and judging the students actual or simulated performance on significant tasks [23].

A common criticism of this student-centred learning that we encountered was that students, as novices, did not know what might be important for them to learn, especially in a subject to which they appear to have no prior exposure. In our view, to account for these fallacy teachers, as facilitators, must be careful to assess and account for the prior knowledge that students bring to the classroom.

Another criticism is that a teacher adopting a PBL approach may not be able to cover as much material as a conventional lecture-based course. In defence of that we argue that PBL emphasises on depth rather than breadth of coverage. The point to be taken here, is that while content changes (especially in a rapidly changing technological world), the ability to problem-solve needs to be more portable. No one set of skills will suffice for all time, either; but the ability to generate problem-solving strategies is the skill "with legs." Information trans-friability is limited by the information available; how to find and create information is limited only by the learner's willingness to participate. PBL, by having students demonstrate for themselves their capabilities, can increase students' motivation to tackle problem.

Conclusions

PBL promotes students' confidence in their problem solving skills and strives to make them self-directed learners. These skills can put PBL students at an advantage in future courses and in their careers. While such confidence does not come immediately, it can be fostered by good instruction. Teachers who provide a good learning community in the classroom, with positive teacher-student and student-student relationships, give students a sense of ownership over their learning, develop relevant and meaningful problems and learning methods, and empower

students with valuable skills that will enhance students' motivation to learn and ability to achieve.

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