



RESEARCH ARTICLE

STUDENT PERCEPTION OF EFFECTIVE TEACHING METHODOLOGIES FOR UNDERGRADUATE DEGREE COURSES - CASE STUDY FROM INDIA

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ABSTRACT

Many researchers are stressing on the need to change the teaching methodologies to make learning more effective. Various new modes of teaching are suggested especially in the field of medical sciences. The studies mostly focus on the need to adopt Problem-based learning in medical field. The present study was undertaken to see the effectiveness of various teaching methodologies in undergraduate degree college in India. Effectiveness was measured from the students perspective as this study was focused on the response of the students to the questionnaire prepared to evaluate the effectiveness of different modes of teaching. The modes evaluated were 'Lecture-based learning' (LBL), ICT supplemented lectures (ISL), Interactive Classroom method (ICM), Problem-Based Learning (PBL) and Multiple Teaching Mode (MTM). The present study indicated that LBL, ISL and ICM was not very effective method of teaching as it only fostered gaining of knowledge and comprehension. PBL method is good as it enabled triggering higher order thinking of blooms taxonomy in the students. But PBL, if adopted as the only method of teaching did not cater to the diversity of learners in a classroom. Therefore, we recommend MTM as the new effective method of teaching as it has a combination of LBL, ISL, ICM and PBL. On a Five-point-Lickert-scale, MTM was indicated to enable students to learn the correct method of data collection and investigation (4.45 ± 0.75), transform data and develop logical argument (4.04 ± 0.79), be more creative (4.33 ± 0.90) and thus helped to improve proactive learning abilities. The present study thus demonstrates that PBL can be used as component of MTM for effective learning even for the undergraduate nonprofessional degree courses of Bachelor of Science or Bachelor of Arts.

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INTRODUCTION

In this era of multiple sources of knowledge gathering, the role of a teacher in undergraduate and postgraduate colleges should reflect a paradigm shift towards making classroom teaching learner centric. The role of a teacher should not merely involve a simple transfer of knowledge to students. What is required is a transformation of teaching methodologies which will facilitate and influence the process of active learning. Different teaching tools and methodologies are suggested by various authors to meet this demand. However, no single method can be considered as the aptest method for bringing about effective learning, as the classroom consists of different categories of learners. If students in a classroom can be categorized as per Felder and Silverman (1998) categories based on their preferred modes for receiving information, we propose that the teaching methodologies should be a combination of multiple modes which can enhance the learning process of different types of learners.

It is accepted that the feedback from students serves as an effective tool in developing teaching methodology and evaluation methods in undergraduate teaching (Chavda et al., 2011; Bhosale UA et al., 2013) and so the study was focused on the response of the students to the questionnaire. Thus, the present study was undertaken to assess the student's attitude, perception and feedback on the effectiveness of different teaching methodologies in the classroom consisting of different types of learners.

MATERIALS AND METHODS

The present study was conducted to assess the student's attitude, perception and feedback on teaching-learning methodology to finally judge the most effective teaching methodology. The subjects of the present study were undergraduate degree students from Parvatibai Chowgule College in Goa, India. This cross-sectional study involved 62 second year and 30 third year degree students. These 92 students were subjected to the different modes of teaching in different subjects. The teaching methods assessed were 'Lecture-based learning' (LBL), ICT supplemented lectures

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(ISL), Interactive Classroom method (ICM), Problem-Based Learning (PBL) and Multiple Teaching Mode (MTM). At the end of the two semesters, they were evaluated for the effectiveness of different teaching methods. The students were surveyed with a pre-validated questionnaire designed for them. The questionnaire was specially designed to assess the teaching-learning methodology adopted for the science degree programme. The questionnaire included questions on the four modes of teaching and their understanding of the subject and achievement of learning objectives and attaining thinking and analytical skills based on the teaching modes used. Questionnaire validation was done by a pilot study on 10 students to review the questionnaire to determine whether the questionnaire measured what it was designed to measure. The validation criteria included appropriateness of questionnaire for collecting data, logical order of questions and easy and meaningful instructions. The effectiveness of learning was also judged based on their assessment grade performance. Descriptive statistics was used for analysis of data and results were expressed as percentage. The response to the questions related to the effectiveness of the teaching methods, were analyzed on Five-Point-Lickert-scale(FPLS) ranging from disagree to strongly agree and depicted as mean value of the scale.

RESULTS

The students' responses received on the teaching methodologies were assessed to find out the effective method which enhanced learning in the students. The students' response on effectiveness of four modes of teaching is given in Table 1.

Table 1. Effectiveness of different modes of teaching

Teaching mode	Less effective (%)	More effective (%)	Mean Five-point-Lickert-scale (FPLS)
1 Lecture based learning (LBL):			
a) Lectures only with board and chalk/pen	77.27	22.73	2.28 ± 0.91
b) ICT Supplemented Lectures (ISL)	43.48	56.52	3.65 ± 1.06
2 Interactive Classroom method (ICM)	28.26	71.74	4.07 ± 0.80
3 Problem Based Learning (PBL)	13.05	86.95	4.24 ± 0.82
4 Multiple Teaching Modes (MTM)	04.35	95.65	4.74 ± 0.53

Lecture-based learning (LBL)

Of the 92 students, only 22.73% of the students agreed that lecture method alone enabled learning. However, 77.27% felt that the traditional method of teaching only by lecture method supplemented with chalk and board was ineffective teaching method as today's students do not look at the teacher as information giver since they have multiple sources for knowledge gathering (2.28 ± 0.91 on FPLS). However, when lectures were supplemented with ICT, the students responded that it was more effective than mere explanation with chalk and board. 56.52% of the students responded that ICT supplemented Lecture (ISL), was more effective. Analysis of response obtained a mean of 3.65 ± 1.06 on FPLS. ISL method helped the students to understand concepts more clearly as they could see the visuals along with the lectures. But, 43.48% of the students felt that ISL method alone was also not a very effective method of teaching as it only fostered gaining of knowledge and comprehension.

Interactive Classroom Method (ICM)

Of the 92 students, 71.74% of them strongly felt that effective learning took place when the class was interactive. Brainstorming sessions and group discussion during lectures, helped students to clear concepts in their minds, and also helped them to understand a topic from different perspectives. However, ICM alone was not sufficient for triggering higher order thinking of blooms taxonomy. The students only obtained clear knowledge of concepts, thus this method enabled them to remember and understand the subject being taught (4.07 ± 0.80).

Problem Based learning (PBL)

To evaluate the effectiveness of PBL the same set of students were subjected to two modes of conducting problem-based learning activities. In *case 1*, students were given a summary lecture on the topic and then told to solve a set of questions as per Bloom's Taxonomy and Anderson's revised taxonomy. Faculty intervention was kept minimum. In *case 2*, the students were explained the topic through ISL method and then told to solve a set of questions of Higher order as per Blooms taxonomy. The teacher was constantly available to the students for the experimental set of case 2. When the performance of written answers to the set of questions was compared in case 1 and case 2, the students in case 2 fared comparatively well. It was interesting to note that 86.95 % of the students said that case 1 was ineffective as compared to case 2 (Table 2). Also, the students responded that when teachers intervention was

minimum, they felt disoriented with the data collected (1.98 ± 0.86 on FPLS). However, in Case 2, where teacher explained concepts clearly and then resorted to giving PBL and also offered continuous intervention, then they could understand, evaluate and apply the knowledge more effectively as the teacher could channelize them in the right direction (4.63 ± 0.57 on FPLS). 86.95% of the students agreed that PBL activities helped them to develop their thinking skills and analyzing abilities. They found that PBL activities involved the team in a constructive investigation (4.30 ± 0.75), helped them to strengthen their work habits & understand team spirit (4.28 ± 0.86), and manage complexities and time (4.09 ± 0.86). Though PBL method showed significantly higher effectiveness (4.24 ± 0.82 on FPLS) as teaching methodology, 91.3% of the students responded that if PBL method was the only teaching mode adopted, then learning was less effective (2.17 ± 1.04 on FPLS).

Table 2. Effectiveness of 'pbl' mode of teaching

PBL mode	Less effective	More effective	Mean Five-point-Lickert-scale
Case 1	86.95	13.05	1.98 ± 0.86
Case 2	13.05	86.95	4.63±0.57

Multiple Teaching Modes (MTM)

Combination of multiple methods of teaching (25%Problem-Based Learning + 65% ISL+ 10% ICM) was found to be more effective of all the four modes of teaching discussed (4.74 ± 0.53). This new idea of Multiple Teaching Modes (MTM) suggested as an outcome of this study, involves teaching of a topic by lectures supplement by ICT, having interactive sessions and including PBL activities (Table 3) According to 95.65% of the students, MTM is inferred as the most effective method of teaching as teaching involving lectures with ICT, group discussions, brainstorming, videos, problem-based learning activities and presentation, ensured that learning was more effectively brought about. Wider varieties of activities were found to be more beneficial than only answering set of questions of higher order (4.13 ± 0.78 on FPLS). Besides, the students greatly benefited when LBL, ISL and ICM also included PBL as this enabled them to learn correct method of data collection and investigation(4.45 ± 0.75), transform data and develop a logical argument (4.04±0.79), be more creative (4.33±0.90) and improve proactive learning abilities in the students. Thus PBL if included as an important component of MTM, serves as the most effective method of teaching.

Table 3. Effectiveness of 'mtm' modes of teaching with 'pbl' as an important component

MTM mode with PBL	Mean Five-point-Lickert-scale
Most effective mode in terms of learning	4.74 ± 0.53
Enabled correct method of data collection and investigation	4.45 ± 0.75
involved students in constructive investigation	4.30 ± 0.75
strengthened work habits & understand team spirit	4.28 ± 0.86
Helped to transform data and develop logical argument	4.04±0.79
Helped to be more creative	4.33±0.90
Multiple activities had greater benefits for all type of learners	4.13 ±0.78

DISCUSSION

The present study summarizes that, it is important academic need, to relook into the teaching methodologies adopted by the teachers in higher education institutions, to make classrooms more educative and ensure effective learning. The transformation of undergraduate classroom experiences requires a fundamental shift in how instructors approach teaching and learning, moving from an information-transfer, teacher-centered model to one that is concept-focused, learner-centered, and collaborative. This has been emphasized in the studies of Weimer, 2002. We identified that multiple teaching modes (MTM) is the most effective method of teaching as it caters to the needs of all learners. If students in a classroom can be categorized as per *Felder and Silverman (1988)* categories based on their preferred modes for receiving

information, we propose that the teaching methodologies should be a combination of multiple modes which can enhance the learning process of different types of learners. *Felder and Silverman (Felder, 1993 ;Felder and Silverman, 1988)* proposed four dimensions of student learning styles, each of which relates to students' preferred modes for receiving information, including 1) the type of information they receive (sensory or intuitive), 2) the modality in which they receive it (visual or verbal), 3) the process by which they receive it (actively or reflectively), and 4) the order in which they receive it (sequentially or globally). In their model, *Felder and Silverman* propose that students can differ substantially in the types of information they prefer to receive during learning. At one extreme are sensory students—those who prefer to receive facts, are adept at memorization and details, and prefer clear expectations and well-established routines in learning. Dichotomous to them are intuitive learners, who prefer to receive concepts, see relationships among ideas, explore complexities and exceptions, and welcome innovative and varied approaches to problems. *Study of Tanner K et al.,(2004)* stressed that it is important to keep in mind that all of these frameworks and research literature on understanding learning styles are attempts to simplify what is fundamentally a complex issue; namely, who we are and how we learn. Therefore, we suggest that teachers should consider adopting MTM in classrooms to provide access to learning for these different types of students.

Visual learners learn through seeing and prefer to learn through drawings, pictures, and other image-rich teaching tools. Hence the ISL lectures as component of MTM, helps visual learners to learn effectively. Auditory learners learn preferentially through hearing and are adept at listening to lectures and exploring material through discussions and might need to talk through ideas. Thus, interactive sessions during lectures form an essential route of learning for auditory learners and Reading/writing learners. Kinesthetic learners learn through touching and prefer learning experiences that emphasize doing, physical involvement, and manipulation of objects. Such learners will be benefitted when the teaching has a component of PBL activities.

Research of *Eisenstaedt et al.,(1990)* showed that graduates of PBL curricula retain their knowledge over a longer period of time and may be better prepared for life-long learning. *Studies of Zhang et al., 2015,* revealed that the PBL+ LBL model produces higher course examination excellence rates than the traditional teaching model. Since MTM, has component of ISL, ICM and PBL, it will ensure longer knowledge retention ability, enable students to learn correct method of data collection and constructive investigation, transform data and develop logical argument, be more creative, strengthen their work habits & understand team spirit, manage complexities and time and improve proactive learning abilities. Though most of the research is focused on the importance of PBL in medical field (*McParland et al., 2004; Jones RW, 2006; Fischer CN, 2011; Schmidt HG et al., 2009; Iputo JE et al., 2005*), the present study demonstrates that PBL can be used as component of MTM for effective learning even for the undergraduate nonprofessional degree courses of Bachelor of Science or Bachelor of Arts.

Conclusion

MTM consisting of 65% ISL, 10% ICL and 25% PBL can be considered as an effective teaching tool for medical and nonmedical undergraduate degree courses, as it caters to the needs of different types of learners (VARK) and satisfies multiple intelligence schemas of Gardner. PBL is a powerful tool when teachers teach students steps of problem-solving skills and make them understand the process of Problem solving, especially in those countries where degree students are not exposed to PBL in the lower classes of their education. We conclude that since MTM, has component of ISL, ICM and PBL, it improves proactive learning abilities and teaches them life skills for constructive investigation, building their team spirit and giving them opportunity to draw on their own expertise and experiences to enrich the learning process.

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