

Investigating the ways through evaluation practice in higher Education: the value of a learner's need

Jasleen Kaur¹, Anjali Bishnoi²

¹Assistant Professor, Shroff S.R. Rotary Institute of Chemical Technology,
Vataria, Ankleshwar, Gujarat-393002, India
sidhurukku@yahoo.com

²Associate Professor, Shroff S.R. Rotary Institute of Chemical Technology,
Vataria, Ankleshwar, Gujarat-393002, India
anjali_bishnoi@yahoo.com

Abstract: The purpose of this study was to achieve new directions towards engineering education. Our survey states that although Traditional Methods (TM) are considered to be good teaching methods but students rated Team Based Methods (TBM) as the most interesting ones. The result of this study indicates that the students are more inclined towards newer methods of teaching like Computer Aided Method (CAM) or Team Based Methods (TBM). For instance, 70% of students from Chemical Engineering and Environmental Science and Technology voted 'excellent' for Industrial visit. We can say that they wanted to learn more by practice or by going through the real.

Keywords: evaluation, teaching methods, student rating, industrial visit, group project.

1. Introduction

Teaching is about substance and treating students as consumers of knowledge. To learn is to get knowledge or skill. Learning also involves a change in attitude and the behavioral skills. Learning is a lifelong process, for example a child learns to identify things and after becoming teenager it learns for the improvement of their study habits. So everybody needs to acquire the higher levels of knowledge and skill to get into the problem and of course to solve it. [1] In this context different learning aims such as disseminate knowledge, develop the capability, develop the student's ability, facilitate the personal development of students etc were also reported by Bourner & Flowers (1997) [2].

As teaching and learning occurs together so we should evaluate these at many points during an instructional period to compare the opinion of the teacher with students and to identify gaps between what has been taught and what students have learned [3]. Six strategies that can be used to evaluate the quality of teaching methods and its impact on student learning are: teaching dossiers, student ratings, peer observations, letters and individual interviews, course portfolios, and classroom assessment [3]. In past years, a number of researchers have also used fuzzy approach for evaluating teaching [4-6]. Recently Chen & Chen (2010) developed fuzzy analytic network process for performance appraisal system for three universities in Taiwan [7]. Together with such advanced methods various research groups used student's ratings for evaluation of teaching and learning [8-11]. Cohen (1981) has nicely correlated the student ratings of instruction and student achievement, also his research provide strong support for the validity of student ratings as measures of teaching effectiveness [8]. Theall & Franklin (2001) have considered

the students as most qualified sources who can review the extent to which the learning experience was productive, informative, satisfying, or worthwhile [9]. The reliability of the student's feedback is very significant to identify the effectiveness of teaching, infrastructure, equipment, laboratory and the teaching achievements of the lecturers [10].

2. Evaluation methodology

We have used student ratings for measuring the effectiveness of various teaching methodologies being used. Ratings can be considered as reliable and valid measures that bring scientific accuracy for the evaluation of teaching [11]. We divided various teaching methodologies into three sub categories: Traditional Methods [includes Lecture, Lab work, Assignment, Seminar], Computer Aided Methods [includes Presentation, Simulation, and Video Conferencing] and Team based Methods [includes Group Discussion, Quiz, Industrial Visit, and Group Project].

Information obtained by means of student ratings can be used to identify, the areas of strength and weakness of teaching methodologies and about the interest of students.

2.1 Test Data

Four departments from Shroff S R Rotary Institute of Chemical Technology, Vataria (Gujarat, India) were selected for conducting this survey. These Departments includes Mechanical Engineering (ME), Chemical Engineering (CE), Chemical Technology (CT) and Environment Science and Technology (EST). Ratings of students for various teaching methods are given below in Table I.

Table I: Ratings (%) of students for Teaching Methods

| Branch | Method | Ratings |
|--------|--------|---------|
|--------|--------|---------|

| | | 1 | 2 | 3 | 4 | 5 |
|----------------------|--------------------|----|----|----|----|----|
| CE | Lecture | 2 | 18 | 45 | 15 | 20 |
| | Lab Work | 4 | 33 | 23 | 32 | 8 |
| | Assignment | 60 | 17 | 8 | 8 | 7 |
| | Seminar | 5 | 22 | 37 | 21 | 15 |
| | Presentation | 3 | 28 | 30 | 25 | 14 |
| | Simulation | 8 | 15 | 32 | 23 | 22 |
| | Video Conferencing | 5 | 10 | 28 | 20 | 37 |
| | Group Discussion | 2 | 15 | 33 | 32 | 18 |
| | Quiz | 5 | 28 | 28 | 29 | 10 |
| | Industrial Visit | 2 | 3 | 5 | 20 | 70 |
| ME | Group Project | 2 | 10 | 30 | 20 | 38 |
| | Lecture | 5 | 31 | 36 | 21 | 7 |
| | Lab Work | 7 | 36 | 36 | 14 | 7 |
| | Assignment | 14 | 31 | 26 | 12 | 17 |
| | Seminar | 45 | 17 | 19 | 12 | 7 |
| | Presentation | 29 | 26 | 36 | 2 | 7 |
| | Simulation | 19 | 36 | 24 | 14 | 7 |
| | Video Conferencing | 43 | 17 | 19 | 10 | 11 |
| | Group Discussion | 24 | 24 | 17 | 14 | 21 |
| | Quiz | 19 | 33 | 26 | 12 | 10 |
| CT | Industrial Visit | 7 | 2 | 29 | 22 | 40 |
| | Group Project | 33 | 26 | 19 | 10 | 12 |
| | Lecture | 0 | 11 | 36 | 28 | 25 |
| | Lab Work | 0 | 11 | 25 | 39 | 25 |
| | Assignment | 30 | 25 | 17 | 22 | 6 |
| | Seminar | 0 | 14 | 47 | 22 | 17 |
| | Presentation | 6 | 14 | 33 | 22 | 25 |
| | Simulation | 3 | 17 | 39 | 22 | 19 |
| | Video Conferencing | 14 | 36 | 25 | 11 | 14 |
| | Group Discussion | 6 | 17 | 22 | 28 | 27 |
| EST | Quiz | 0 | 22 | 41 | 17 | 20 |
| | Industrial Visit | 8 | 3 | 12 | 25 | 52 |
| | Group Project | 3 | 8 | 25 | 36 | 28 |
| | Lecture | 0 | 18 | 18 | 58 | 6 |
| | Lab Work | 0 | 12 | 29 | 41 | 18 |
| | Assignment | 41 | 35 | 24 | 0 | 0 |
| | Seminar | 0 | 18 | 29 | 41 | 12 |
| | Presentation | 6 | 12 | 29 | 29 | 24 |
| | Simulation | 6 | 18 | 29 | 18 | 29 |
| | Video Conferencing | 0 | 12 | 35 | 18 | 35 |
| Chemical Engineering | Group Discussion | 6 | 6 | 24 | 29 | 35 |
| | Quiz | 6 | 12 | 41 | 35 | 6 |
| | Industrial Visit | 6 | 6 | 0 | 18 | 70 |
| | Group Project | 0 | 0 | 24 | 18 | 58 |

150 students studying at undergraduate level were asked for their opinion about various teaching methods. Student rating was done on a scale of 1-5, 1 – being the least interesting and 5 being the most interesting teaching method

2.1 Results and Discussion

Results of meta-analysis have been presented in form of graphs (Figure1-4).

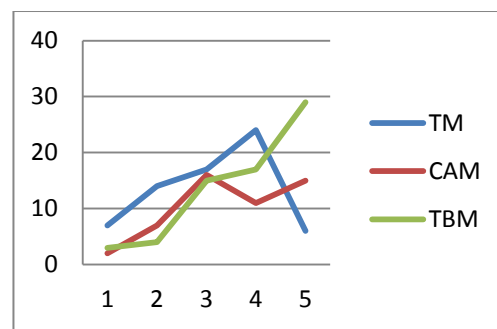


Figure 1. Environment Science and Technology

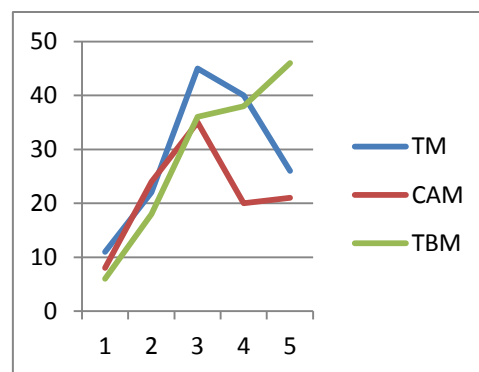


Figure 2. Chemical Technology

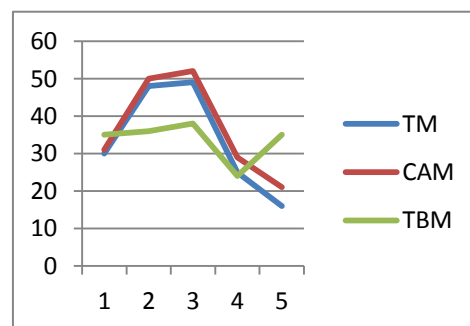


Figure 3. Mechanical Engineering

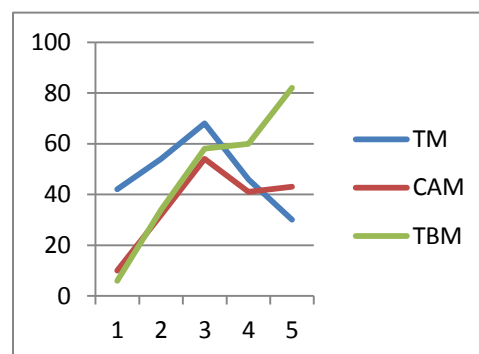


Figure 4. Chemical Engineering

Among the Traditional Methods, lecture method is the most convenient and traditional way to inculcate large groups of students. We are living in an e-world where the development of computer and other technologies is on peak, still the lecture method stands among most widely used method for teaching at higher level of education. Our findings also revealed that lecture was rated 'very good' by 58% and 'good' by 45% students of Environmental Science and Technology and Chemical Engineering respectively (Table I). Students really learn the time management through lectures as even a brief introductory lecture can give whole idea about the purpose and direction of

particular topic. Another thing what students learn from lectures is the attentive listening habits and taking notes, which is very much required for their work force [12]. Together with several good points about lectures there are some drawbacks also attached with lectures such as sometimes students become passive in nature and they become teacher dependent in nature, their reading habits decrease etc.

Writing is considered as a tool for communication and learning. Writing assignments help in enhancement of research ability of students as they search the topic through books, journals, websites etc. this method is considered as one of the best method that helps in teaching, learning and also in preparation for examinations. It also gives students a way to express their views about the subject and therefore it culminates into development of thinking process. Surprisingly 60% students of Chemical Engineering and 41 % of Environmental Science and Technology selected 'poor' for assignment and no student from Environmental Science and Technology and only 7-8% from Chemical Engineering voted 'very good' or 'excellent' for assignments (Table I). These figures show their reluctance towards overburden of writing assignments. Here we remember the words of Mary Simpson (2010) who discussed the value of using creativity in the classroom and we need to collectively work together to develop their critical thinking skills and their right brain functions do their best and explore new ideas [13]. Here again, we would suggest that we should motivate students by giving them enough time and freedom of doing assignment and not by imposing too many assignments. The overload of assignments always suppresses their creativity and hinders their thinking ability.

In present scenario practical learning is equally important as academic learning but unfortunately a large number of students are emerging from college with a lot of theoretical knowledge and without practical knowledge. Similar were the results of Lab work in our survey, 7-25% students from all branches voted excellent for this method (Table-1). Our recommendations for this situation are that we should plan our curricula in a way that the boundary between learning and putting knowledge into practices remains transparent. By this approach learning theoretical knowledge and acquiring practical skills are considered to be natural, intrinsically motivated processes of personal growth. We believe that lecture-based learning is essential because it helps students in grasping concepts of the engineering world. However, more of practical learning is required when an engineer enters into the work force.

It is revealed from Fig 1-4, that CAM comes out to be the second most interesting teaching method. Previous studies also suggested that the students are more satisfied, spend more time in studies and perform better while using computer aided programs and different learning methods [14]. According to the student's interest, together with various aided programs we can organize guest lecturers through video conferencing just to provide them a chance to become advanced, creative and well versed with modern trends. Many research groups have also emphasized that computer aided teaching is more successful than traditional teaching methods [15,16,17].

It can be seen from our survey that students are more motivated towards group based learning (Figure1-4). Industrial visits were considered 'excellent' by 70% of students from Chemical Engineering and Environmental science and Technology while 52% of Chemical Technology and 40% from Mechanical Engineering also voted 'excellent' for

industrial visit (Table I). Self management, task solving, working in big organization, team work, leadership etc are some of the main advantages of TBM. We can adopt the TBM as co-curricular activity, which may help students in developing their thinking skills, team building habits etc.

3. Conclusion and Recommendations

Our survey can help in setting up the guidelines for the development of new teaching patterns. It can be summarized that students are least interested in TM, interested in CAM and the most interested in TBM. What we suggest is that, we should incorporate all the methods into the teaching scheme, in some or other form so that students can be benefited by all means. In this direction, we can have co-curricular activities like industrial visits and group projects followed by student's presentations, explaining their experience. This may help students in developing subject knowledge, team work, behavioral skills and soft skills.

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