

EXPERIMENTAL ANALYSIS OF BEST PRACTICES IN ENGINEERING EDUCATION IMPLEMENTED TO ELECTRICAL AND ELECTRONICS ENGINEERING STUDENTS

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ABSTRACT

This paper presents the experimental approach for the Best Practices in Engineering Education implemented to Engineering of Electrical and Electronics Engineering students as a case study. Due to continuous dynamic growth of various technologies in engineering education, the proposed best practices including teaching, learning, faculty feedback methods, Student result comparison, student's research, Flipped class room, Yoga and Meditation concepts are implemented. One of the premier Technical institute of Electrical and Electronics engineering branch student class has been selected from India and implemented the proposed Best practice techniques and compared the performance of the students with before and after implementation of Best Practices. Thus it is aimed this experimental analysis will set up an example of best practices in Engineering Education to other institutions with all Engineering branch students of India. From the investigations and implementation analysis it is found that the proposed Best Practice strategies has given best results when compared with conventional techniques.

Index Terms - Technical Education, Art of Teaching and Learning, Examination, Best Practices.

I. INTRODUCTION

The backbone of educational system is the faculty members who have been chosen to offer their awareness in critical components such as standard of courses and its up gradation, training for updating knowledge, examination, evaluation and others. Best Practices Techniques of the engineering students and teaching styles of most engineering Faculty are incompatible in numerous dimensions. It was discussed in department meeting that what are the best practices for Electrical students to improve the Students results in their subjects, Student's attendance, student's paper publication, student Patent Ideas, and Faculty feedback which plays a vital role in the development of Engineering Education [1-3]. It was conducted research on Best Practice strategies for Electrical engineering students with dedicated faculty in this country. Certain strategies that are being proposed and adopted to overcome these problems and analyzed in this paper. One of the premier Technical institute in Electrical and Electronics

engineering branch student class has been selected from India and implemented the proposed Best practice strategies and compared the performance of the students with conventional techniques

II. IMPLIMENTATION OF BEST PRACTICES

The Proposed and implemented the following BestPractices strategiesto selected Electrical engineering student class room:

A. Flipped class room

This is a pedagogical model in which the typical lecture and homework elements of a course are reversed.Short video lectures are viewed by students at home before the **class** session, while in-**class** time is devoted to exercises, projects, or discussions. In this new strategy the students learn initial course concepts outside of the classroom, while class time is reserved for more active learning.

B. Art of teaching

In general few faculty say that teaching is a science. These faculty stress the scientific features of teaching and focus on ways to regulate the communication between teacher and student and believe that it is possible, through careful selection and pacing of materials, to regulate interactions among the student, the teacher, and materials to be learned, thus reducing the possibility that learning occurs by chance. Few faculty opinion is that teaching is an art and believe that "scientific" teaching ends up in formalized, cookbook approaches that force students to perform and bureaucratizes learning. But the best way to think about teaching not an art, not a science, in fact it is profession[4]. Teaching involves professional judgment. Teaching calls for the skilled eye to see what is really happening and the skilled mind to decide.The selected class room faculty are recommended and sponsored to attend the Three weeks Faculty development program (FDP) and four weeks Intensiveteaching workshop (ITW) for the benefit of improving the student performance.

C. Best Class Room Environment

The Class Room should be with good light and ventilation,neat and sufficiently furnished to accommodate full strength of students along with space for their independent movement with centrally located Black glass board of 4' x 12' size with top end tube light fittings.The roof, walls, flooring should be fairly good. No disturbance due to wind, rain, dust and unwanted sounds etc.,Class rooms should be furnished suitably to use OHP or LCD projections. This type of best class room environment has been provided to students.

D. Best Teaching Aids

Good writing Boards, supported with extra lighting facility.Additional fittings to use OHP or Power Point Presentations and Internet facility etc.,Provision for presenting charts or maps, and cut - models. With audio supported class rooms are provided.

E. Best Teacher

Effective teaching requires thorough planning and implementation of the teaching plan with full dedicationThe teachers are selected such that they are highly qualified as per AICTE norms with Good communication skills,



depth of knowledge on concepts of subjects , pleasing body language with proper eye contact good enthusiasm, Positive attitude towards students with presence of mind to keep the class always in active condition, firmness while controlling the class room discipline, attraction in voice modulation, and having good skills in using teaching aids like Black Board, OHP, LCD, Charts etc[5].,

F. Interactive Method of Teaching and Group Discussion

This is a method of learning through open discussion of topics in a small group which are encouraged. Interaction with teachers as well as their classmates through Questions and answers Discussions, Exchange of thoughts, Interactive Method of Teaching Students and teachers get opportunities to know each other, develop cooperative spirit and solve problems by working together. It is also advised to students to participate in group discussions while travelling in College Bus journey time and from self assessment of student it is found that the group discussions are more effective to understand the academics effectively and thoroughly. Students are encouraged to contact with faculty and also active learning.

G. Tutorial Method

This is one to one interaction between a faculty and a student to discuss work prepared and submitted by the student. Total class strength divided by 10 groups and faculty met the individual groups to assess the work done by students.

H. Seminar Method

Interested students are selected and encouraged to give Seminar on academic topics which will develop the communication skills and confidence.

I. Mentor counseling the students

In the class for every group of ten students one mentor has been allotted to counseling the students and this mentor take care of the students. This counselor will contact their parents after counseling and inform them about attendance and academic performance for reducing the absentees and increase the performance.

J. Student chapters & student research activities

IEEE student chapter and ISTE student chapter were introduced in the campus. Students are encouraged to publish Paper on latest topics and student Idea patent publications. Many students are published their papers and very few students filed their patent ideas.

K. Human Values and Professional Ethics

To place correct approach of the students, it is important to study the subject of Human Values and Professional Ethics, proposed and implemented in the academic Syllabus and many expert lectures are arranged.

L. Yoga and Meditation

It was proposed and advised to class Students for practicing Guided Yoga and meditation. They are also advised to continue the practice at home daily and study the subjects related to academics regularly with best focus and best concentration. From the feedback and self appraisal report of information which confirm that there is definite change in their approach and attention towards the studies, Increase in IQ levels, decrease in academic stress,

improve in efficiency, decrease in negative addiction like , alcohol, reduce in the absenteeism, improve joyful manners and also self confidence with balanced mind and emotional competence.

M. Punctual Feedback

Students are advised to give their opinion on the faculty which will help the administration to improve and also maintain the quality of teaching and student response will be kept confidential. The required information about the faculty about Subject Knowledge, communication Skills, commitment, regularity and punctuality, motivation provided content of Lecture, explanation of the subject with real time examples, clarification of doubts, Usage of modern aids and professional behavior. After implementing the best practices Faculty feedback increased considerably[6-7]. After the feedback collected from the students it is observed that definite change in faculty approach and attention towards the students and faculty got better feedback after implementation of Best practices. These feedback information collected both record method and interactive method.

III. RESULT ANALYSIS

The proposed best practices of teaching learning, Art of Teaching, Class room teaching , Class room environment, Teaching Aids concepts ,Flipped class room including Guided Yoga and meditation are implemented to 4th year Electrical students and compared the performance of the students with before and after implementation of Best practices

Table-1 Comparison of various parameters before and after implementation of Best practices

Parameter (%)	Before implementation of Best practice	After implementation of Best practice
Result	70	84
Student Attendance	63	82
Faculty Feed Back	65	89
Student Paper Publications	18	35

From the Table-1 of the comparison of various parameters before and after implementation of Best practices to selected students it was found that average student result increased by 20%, Average Student Attendance increased 30%, Faculty Feedback increased by 37% and Average Student Paper Publications increased by 94%.

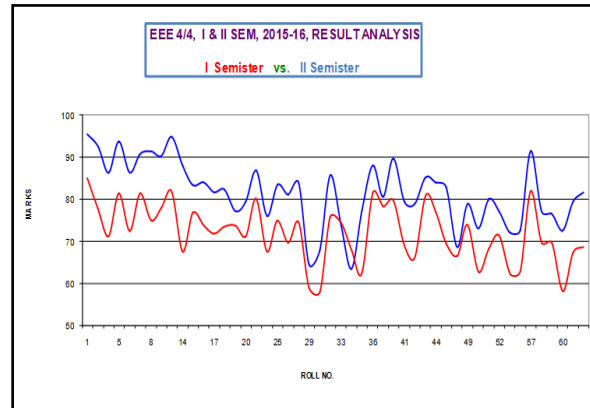


Figure 1: Individual Students Marks comparison of I semester (Before implementation of Best practices) and II semester (After implementation of Best practices)

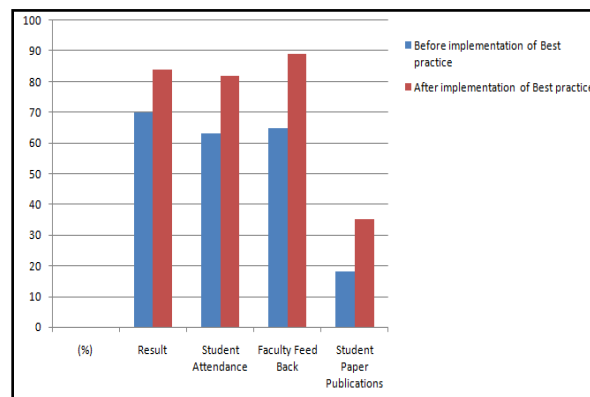


Figure 2: comparison of Students Result, Student Attendance, Faculty Feed Back, Student Paper Publications before and after implementation of Best practices.

Figure-1 shows the Individual Student Marks comparison of I semester (Before implementation of Best practices) and II semester (After implementation of Best practices). The student rollnumbers mentioned on X axes and their percentage of obtained marks are shown in Y-Axes. From this diagram the average individual student performance has increased to 15% after implementing the Best practices. Figure-2 shows the graphical representation of comparison of Students Result, Student Attendance, Faculty Feed Back, and Student Paper Publications before and after implementation of Best practices. From the Interaction with students it was found that in addition to the proposed Best Practices, Practicing the Guided Yoga and Meditation leads to a deeper level of physical relaxation, anxiety reduction mind balanced condition.

IV.CONCLUSION

This paper presents the experimental approach for the several Best Practices in Engineering Education. One of the premier institute of Electrical and Electronics Engineering branch student class has been selected and adopted the proposed Best practice techniques and compared the student performance with results analysis, faculty feedback, Student research paper publications and student attendance after implementing the proposed Best practice techniques. From the investigations and analysis it was found that the proposed Best Practice techniques have given best results when compared with before and after implementation of Best Practices strategies. Hence from this experimental analysis these Best practices may be recommended to other Engineering colleges and other branch students also in India.

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