

A case study : Improved learning through course assessment

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Abstract: *The type of assessment tools used to evaluate the learning reflects effective teaching. So teachers and many educators have begun to think innovative assessment methods to promote student learning. It is indeed a great challenge for teachers and educators to create a workplace with new ways to solve problems, new ways to gain various skills. The assessments of students in a course enable to find whether they are able to transfer the course knowledge to problem solving with good analytical skills and draw conclusions to real world problems. The outcome based education is making this possible through course assessment .*

Keywords—course assessment ; analytical skills; performance ; learning ;Graduate attributes; outcome based education

I. INTRODUCTION

The measurement of learning outcomes is an important tool which provides a yardstick to measure teaching – learning skills. This paper discuss the importance of course assessment to improve student learning using various tools of internal evaluation and is one of the teaching - learning practices followed in the department of Electronics and Communication Engineering to improve student learning outcomes. The Outcome Based Education (OBE) system is motivating teachers to improve the quality of teaching by adopting new innovative teaching – learning tools.

OBE, an educational process involve the restructuring of curriculum, innovative assessment methods and reporting practices in education to reflect a better learning and improving the skills with additional supporting qualities of an engineering graduate instead of accumulating the credits[1]. The outcome based education has brought transformations in teaching – learning methods followed in engineering education and to improve the quality of engineering graduates.

Creative effective teaching is very important to meet various challenges in engineering education. Teachers are thinking new innovative ideas to make teaching processes more interesting and scientific. This transformation has improved the transition rate of students at various levels. Teaching and course assessment followed will result in the generation of skill sets among students. Effectiveness of teaching reflects on student acquiring various skill sets which are called as „Graduate Attributes’, a term used in OBE system [1]. The teaching commitment plays a very important role in contributing towards the development of the program and the institute.

In this paper authors discuss how a course assessment leads to the improvement in the performance of students taking a fourth semester course and its assessment as a case study. The section 2 presents a CO-PO model of the course under discussion. Section 3 explains the various assessment tools used to improve teaching – learning level and section 4 discuss the scope for further improvement with conclusion.

II. CO-PO MODEL

A. Course outcomes

Course outcomes are the skill sets transferred to students learning the course. The learning levels are determined by assessment and evaluation.

B. Program outcomes

The Program outcomes (POs) are the indicators of the skills and knowledge gained by graduates moving out of the program. Each program has its own Program outcomes defined using suitable process and must be aligned with the graduate attributes. The 12 Graduate attributes (GAs) prescribed by NBA, are as listed in the figure.2.1

The course outcomes of all the courses prescribed in the curriculum of the program must contribute to all these program outcomes. The usefulness of various courses in the curriculum is measured in terms of PO attainment level which is further used to improve the curriculum content of the program.



Figure2.1. Graduate attributes and POs

As mentioned each course of the program is designed with a set of course outcomes (COs). Each of these course outcome maps to few of the program outcomes. For example, a course like basic engineering mathematics normally maps to PO1 and PO2. However with suitable changes in the content and the assessment tools mathematics can also be mapped to higher POs say PO3 or PO4. Similarly an integrated course like „Digital Electronics’ can be mapped to PO1, PO2 and PO4 through its COs. However, by introducing a modern tool for simulation of the circuits, one can map this course to PO5 which is related to modern tool usage. Similarly, by introducing different assessment tools for assessing the course performance other POs can be mapped. Outcome based education system has motivated teachers to bring a lot of creativity in teaching and assessments as a result of which students turn out as a quality engineers for a better world.

The course under discussion in this paper is „Fundamentals of HDL’, an integrated course of fourth semester of Electronics and communication engineering program. It has three COs mapped to the four program outcomes namely, PO1, PO2, PO4 and PO5 of the program. The CO-PO model of the course is as shown in figure 2.2.

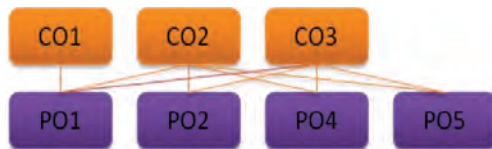


Figure 2.2: CO-PO of the course „Fundamentals of HDL’

III. COURSE ASSESSMENT TOOLS

The course under discussion is an integrated course meaning that a lab component is attached to it. The assessment tools used for the course „Fundamentals of HDL’ are:

1. Internal test performance
2. Quiz performance
3. Practical class performance

The above course assessment tools are used to assess the student performance. The assessment is verified by the department Academic Audit Committee in order to identify academically weak students.

A. Internal tests

Monthly internal tests are conducted in limited topics of the course in order to encourage students to perform better in the course. In the department three internal tests are conducted and the internal marks is calculated from the best 2 out of 3 test performance. This will help students to study and prepare for the test without any stress.

The test questions are prepared keeping all types of students in mind. Blooms taxonomy is used to fix the different degree of difficulty questions [2,3]. This will help the course instructor to identify and group students at different levels. Also, Blooms levels in the test questions help to analyze the skill sets of students.

B. Quiz

Quiz questions are either multiple choice questions or analysis type. The degree of difficulty is decided using Blooms levels.

C. Practicals

Practical classes held once in a week and students conduct predefined experiments in the form of basic experiments and design problems. Continuous evaluation of students for the entire semester with one lab test at the end of semester is used to calculate their practical performance.

The three assessment tools are used to analyze the student learning behavior in the course and final marks are based on the collective assessment from all the assessment tools. The three components of the final internal assessment marks is as shown in the figure 3.1

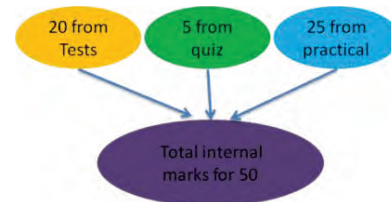


Figure 3.1: Components of Internal assessment marks

IV. COURSE ASSESSMENT REPORT

After each monthly test the course instructor analyze the test performance of the students and a report of analysis is prepared. The report submitted to the department office by the course coordinator is viewed by the department Academic Audit committee giving suggestions for further improvements.

The course under discussion and its report is presented below.

A. Test scores

After each test the course instructor evaluates and prepares a worksheet in the format shown below.

Blooms level	L1	L1	L2	L4
Q. No	1	2	3	4
Marks				
Student-1				
Student-2				
.....				

The marks scored by each student is entered in the above format in an excel sheet and is analyzed. The data required for the analysis is as shown below.

1. Details of attendance

Class strength	Total No of students attended	No of students absent	% of students attended
63	52	11	82.5%

2. Details of scores sorted in intervals.

The test has maximum marks of 40 and the scores are divided into intervals shown in the table in order to group the students at different learning levels.

Total present	No of Absents	<15	15-20	20-25	25-30	30-35	35-40
52	11	7	5	5	6	14	15

3. Marks distribution curve.

The marks distribution curve using the marks of test-1 in the course is plotted as shown in the figure 4.1.

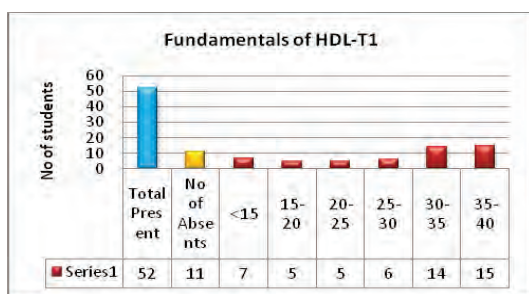


Figure 4.1 Marks distribution curve of test-1

The number of weak students (<15, 15-20), average students 20-25), good students (25-30) and excellent students (30-35 and 35-40) are identified from the distribution curve.

The excel sheet is used to further analyze at micro level by studying the scores of students at various Blooms levels assigned to each question. This will give more information about the skill sets of the students. The course instructor prepares a report on test-1.

This report is used to take corrective measures to improve the learning of students. The degree of difficulty of the questions are increased if many students are able to score 35-40 as it indicates that the learning levels of the students of the course is high. This will help the teachers to introduce this corrective step in the next test. If the number of students scoring 35-40 is again more then it implies the following.

- Learning level of students: Students are bright which implies that they can answer more challenging questions. Teachers should modify the teaching methods to meet the challenges.

- Quality of questions: Questions are simple and it needs immediate correction. Students must be trained to answer at higher degree of difficulty to improve the skills.
- Quality of evaluation: Evaluation method followed by teachers need verification. Spreading of marks is expected as there will be a mixture of all types of students in a class.
- Teachers find innovative ways to reduce the number of weak learners and to meet the high learning levels of bright students.

The test performance given to the students immediately after the test and well before the next test will help students to revise and correct their learning [4, 5]. Weak students are advised and motivated to perform better in the next tests. The report so prepared is submitted to the department office for documentation. The same procedure is repeated for all the three tests, quiz and practical performance.

The report is monitored by the department academic committee with timely suggestions to encourage all teachers to correct their teaching and evaluation methods as these are very important to improve the learning levels of the students.

The department academic committee monitors the following.

- The test questions are of the required difficulty levels.
- The evaluation method followed by the course instructor.
- Marks distribution curve.
- Timely feedback on the performance of students in each test, quiz and practicals.
- Corrective measures taken by the course instructors to reduce the number of weak learners.
- Overall improvement in the learning of the course.

Using Bloom's taxonomy in designing the test and quiz question papers is an excellent way to understand the level of knowledge, analytical and other skills of the learners. It can be easily integrated into the curriculum design process and will definitely help students to improve their learning.

Blooms levels are useful to identify,

- Analytical strength of students in a given class.
- Students with multiple skill sets.
- Students inclined to particular skill
- The teaching method to meet students of all skill sets.
- Number of academically weak students in the course. Academically weak students can then be trained to overcome their weakness. This will improve the transition rate.

The final end semester report consists of overall improvements in the form of COs attainment and its contribution to the attainment of POs in addition to the

suggestions to alternate assessment tools to improve learning are given to the course instructors.

Authors of this paper are encouraged by the college management, Principal, Vice principal and Dean academic to follow various innovative methods to achieve transformation to outcome based education system from the conventional teaching methods.

Regular analysis report by course instructors of the course is a good teaching practice. It definitely helps teachers to identify their weakness and overcome it by following new teaching and evaluation aids. This will also help students to overcome their learning weakness in order to perform better in the semester end exams. This will close the generation and technology gap between students and teachers.

V. CONCLUSION

This paper explains procedure followed to understand and to improve the learning levels of the students. This has helped the teachers to identify learning behavior of the students of the program.

The authors are motivating other teachers and students to understand the goals of education and its contribution to the societal needs by good practices. This has resulted in creative teaching among all the teachers contributing to the overall learning improvement of the students in the department.

Innovative teaching - learning methods are designed to meet the students of all learning levels. Academically weak students are counseled to overcome their weakness using various measures taken in the department. Outcome based education has made faculty to develop creative ways of teaching -learning methods to analyze the student performance in different learning environments. The teachers are motivated to exhibit good teaching practices for continuous improvement of the program.

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VII. REFERENCES

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