Continuous Improvement in the Assessment Process of Image Processing Course

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Abstract -A multifaceted assessment process has been developed for Image processing course offered by Electronics and Communication Engineering (ECE) program at BMS College of Engineering to meet the outcome based Education dealing with the Course outcomes (COs). Introduction of Image processing course at the cluster level as departmental elective for 6th semester cluster students since last four years has seen an assessment process change in every academic year, with the introduction of new assessment tool, to ensure students are introduced to current trends along with the curriculum. . These tools provided action plans for this continuous improvement process to be implemented during each academic year. Mechanism used for assessing student performance at the curriculum level includes the use of direct and indirect measures of assessment for the image processing course.

Keywords: Student Learning Outcomes, Student Course Evaluation, Course Level Outcomes.

I Introduction

Continuous improvement is the process of utilizing the assessment/evaluation results to continuously update and modify the program objectives, revise pedagogy, or even change curriculum. Continuous improvement is by far one of the toughest component to implement and sustain effectively in any Engineering program assessment framework [1]. To simplify the process, a closely related two-level plan must be developed [2]. The first addressing the continuous improvement at the course-level, while the second addressing the continuous improvement at the program-level. In Electronics and Communication Engineering program, we have developed a four year program assessment and evaluation framework that incorporates the first-level continuous improvement plan. Outcome based student learning course outcomes which were mapped to program outcomes. Based on the assessment results, continuous improvement actions are identified and then used to modify the program objectives, revise pedagogy, change curriculum program. or even revise the assessment process itself.

In this paper, we present an effective continuous improvement in assessment process that can be used by engineering programs to meet outcome based education by student learning outcomes. We focus on four main dimensions of this framework, 1) Course design, 2) integrating course with lab. 3) Integrating mini projects with lab and finally 4) introducing research assisted assessment tool for course.

II Impact of Course design

Course design plays an important role in the continuous improvement as it gives flexibility to the introduction and ideas to innovative assessment tools that can be used to improve students learning abilities. Initially when image processing course was introduced with L-T-P pattern as 4-0-0 only 4hrs of theory was taught without any scope for hands on. To improve the theory knowledge two written quiz were conducted as objective type for students. To make students understanding the course with hands on , experimental lab was introduced with a change in curriculum as 3-0-1 pattern .Assessment method was changed as one quiz for theory component and CIE with test for lab component in the course. Then onwards T-L-P pattern is maintained so that only assessment methods are changed to increase the learning ability of the students.

Course design	2010-11	2011-12	2012-13	2013-14
L-T-P	4-0-0	3-0-1	3-0-1	3-0-1

III Impact of integrating Lab with Course

Lab gives an experimental results of the theory application as Image processing course requires the visualization effects of theoretical application students were more interested in taking this course. Predefined set of experiments were conducted in order to make them familiar with the simulation tool. As students have learnt the tool in their previous semesters , and to introduce the self learning through projects , we introduced mini projects along with basic experiments prescribed by curriculum in the next academic year .we changed the assessment tool along with CIE and quiz to assessment of mini projects. Taking average of these two assessments final CIE marks was declared.

Course design	2010-11	2011-12	2012-13	2013-14
L-T-P	4-0-0	3-0-1	3-0-1	3-0-1
Assessment tool (theory)	2 quiz	1 quiz	1 quiz	--

IV Integrating mini projects with Lab

Students need to be taught beyond curriculum as far as experimental issues are concerned. They should be comfortable in applying algorithms they study in theory and to analyse the results using images. In order to promote self-learning and application ability of students, Lab was made integrated with mini projects and assessment method was changed. Mini project assessment included implementation and execution, analysis, oral presentation with PPT, and report writing.

Course design	2010-11	2011-12	2012-13	2013-14
L-T-P	4-0-0	3-0-1	3-0-1	3-0-1
Assessment tool (theory)	2 quiz	1 quiz	1 quiz	--
Assessment tool (lab)	--	Lab test	Lab test & Mini Projects	Lab test & Mini Projects

V On integrating research with course

As students are introduced to learn and implement beyond lab sessions, We tried to integrate some concepts of theory research into the minds of students to carryout written literature survey on published papers and develop a review paper based on 25-40 refereed papers as group activity. This yielded in 20 papers on different topics other than prescribed curriculum.

Course design	2010-11	2011-12	2012-13	2013-14
L-T-P	4-0-0	3-0-1	3-0-1	3-0-1
Assessment tool (theory)	2 quiz	1 quiz	1 quiz	--
Assessment tool (lab)	--	Lab test	Lab test & Mini Projects	Lab test & Mini Projects
Research Support (theory)	--	--	--	Written Literature review papers on latest trends

VI Continuous improvement analysis of course

The evaluation of improvement can be analysed by comparing the two consecutive years students performance with outcome

2010-11 and 2011-12

Course design	2010-11	2011-12
L-T-P	4-0-0	3-0-1
Assessment tool (theory)	2 quiz	1 quiz Lab test

The quiz was conducted for 10 marks and in the consecutive year quiz was conducted for only 5 marks .Therefore as the marks distributions are different .we can conclude by telling less emphasis has been given to theory and equal distribution was be given to lab sessions also.

Course design	2010-11	2011-12	2012-13
L-T-P	4-0-0	3-0-1	3-0-1
Assessment tool (theory)	2 quiz	1 quiz	1 quiz
Assessment tool (lab)	--	Lab test	Lab test & Mini Projects

Quiz was conducted for 5 marks and lab was given weightage of 25 marks and consequently in the next year lab marks and mini projects had equal distributions and average was taken for final.

Therefore as assessment changes comparisons cannot be done and only the benefit of students through self-learning can be analysed as they implemented, demonstrated and reported by the evidences

Course design	2010-11	2011-12	2012-13	2013-14
L-T-P	4-0-0	3-0-1	3-0-1	3-0-1
Assessment tool (theory)	2 quiz	1 quiz	1 quiz	--
Assessment tool (lab)	--	Lab test	Lab test & Mini Projects	Lab test & Mini Projects
Research Support (theory)	--	--	--	Written Literature review papers on latest trends

In the consecutive year quiz was removed as it emphasized only on curriculum and an effort was made to bring research knowledge in students minds . As a result 20 literature review papers were produced as a group activity by referring 25-40 published papers.

VII Conclusion

The journey from 2010-2014 shows, introduction of new assessment tool every year in the course study , which is helping students to increase their knowledge in image processing field with respect to theory, lab and research.