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ABSTRACT

Students learning and assessment towards applying outcome-based education from a productive point of view has become an important issue for ABET accreditation process in King Saudi Arabia. This paper focuses on assessment process with undergraduate students in Electrical engineering at Qassim University. It highlights education strains for communication engineering principles to improve learning practice and introduce more solutions to achieve the outcomes challenge by students. It introduces industrial visit to STC Company to help students to produce conceptual frameworks for learning to be familiar with the new technologies and everyday experience. The concept also has been used to measure the outcomes and discusses the assessment results significantly. The results achieve that soft-skills among most of the students were lacking and this problem needs to be addressed effectively. Finally, it achieves that the impression of the lessons learned depends on the, observations and recommendations that should be made to improve the existing assessments by engineering educators.

Keywords- Course Learning outcomes (CLOs), The Accreditation Board for Engineering and Technology (ABET), Outcome-based education

INTRODUCTION

Although the efforts spent on educational process and learning outcome measurement for accreditation purpose in most countries were a great deal, the expenditure on education has a large amount of money that certainly been spent on successful educational, and yet the impact is very hard to define. The failure of any program educational objectives has real influence on teaching instructive way in general and the expected learning outcome for the course is derived from designing the program learning outcome from the expected learning procedure.
Learning outcomes (LOs) in most of universities reflected in their educational systems and drives in the direction of outcomes based learning (OBL) throughout learning process. This migration is an opportunity, to ensure a better liability and reliability within educational systems especially those accredited by ABET accreditation board. Through the significant learning outcomes made in professional statements, and the evaluation of student performance in relative to those statements, it resulted that more educational system will be accountable.

This research specifies that students involvements in motivated activities related their academic developments can significantly affect students’ awareness, which will create an opportunities to increase their performance and achievement [8, 12].

COURSE LEARNING OUTCOMES

Course learning outcomes are designate for essential learning that students must be able to achieve and demonstrate significantly at the end of a course. It is subsidize the attainment of the program learning outcomes. In accomplish, with the course outcome from all the subjects in the program prime to achieve the program outcomes due to course contain and objectives. In order to revise any course it is essential to identify how this course will contribute with the further courses in the program to assist students to fulfill the program education outcomes. Curriculum design is frequently used to assist the suitable course and provide the anchor objectives for the program of study. Furthermore, Assessments must use directly via the assessment activities which are aligned with the Course outcomes to measure course’s demonstration and their attainment in the Course learning outcomes. Assessments of learning outcomes describes the evaluation of the effectiveness of the teaching and learning attributes, which will be able to demonstrate the effectiveness of knowledge and skills after the student completed the course contexts.

In 1994, Spady [1] developed research indicates the outcomes based education. He suggested that the ability of learning prove is a performance of some kind to demonstrate significant learning. The study shows that the prerogatives that significant content is essential, nevertheless that content only is insufficient as an outcome achievement. Relatively, information of content must be demonstrated through a multi process of some kind of steps.

COURSE LEARNING OUTCOME BASED ABET REQUIREMENTS

The Accreditation Board for Engineering and Technology (ABET) is a non-governmental body that endorses education programs in engineering, applied science, computing and engineering technology.[2, 3, 4, 5] The certification is provided to all qualified programs mainly in the United States but similarly provided to international institution in the related field.

ABET also offers good leadership internationally through training, memorandum of understanding (MOU), consultancies, and mutual recognition agreements. It is a voluntary job; the demand for accreditation is
started by the organization looking for accreditation.[6] Accreditation is specified to specific programs within an organization more willingly than the institution as entire programs. Accredited programs is necessity to appeal for reassessment in the sake of accreditation every six years to hold a recognition, if the criteria are not fulfilled, ABET may hold the accreditation and request for additional evaluations within the six-year.[6]

EFFECTIVE INDUSTRIAL VISIT

The Effective Industrial visit to the related field help students to develop their thinking strategies understudies and create aptitudes and qualities identified with the outcomes measurement. From these massive knowledge via development of understudy understandings, which link their industrial experience with the theoretical learning results that shows how understudies will utilize the course content. The concept of this visit will encourage students to have a capacity to do something with the information they are learning in the applicable courses. The students who join the communication principles (EE320) have the capacity to apply standards of confirmation based theory focused on course objectives and conclusions. At the end of the course the students will have the capacity to utilize innovation viably in the conveyance of guideline, evaluation, and expert improvement.

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PERFORMANCE BASED METHODS

Courses learning outcomes assessed by learning that response to assignments, quizzes, midterms and final exam that incorporated into their instructive encounters, especially valuable for sorts of discovering that are integrative, intelligent, and generative [7, 8]. The methods used to measure Courses learning outcomes identified where the expected outcomes are achieved or not. The Methods of Measuring Learning Outcomes gives an approach to arrange the scope of teaching procedures that can be utilized to answer the wide question from both their industrial visit experience and curriculum exercises. Taken together, the
information gathered utilizing these techniques can help students for quality based learning. These methods of measurements and Value Added to develop a software tools for more accuracy was assembled by many institution, particularly to react to worries that ABET have surfaced about responsibility of instruction to Higher Education in the Future. Since the best quality level in evaluation process by incorporating industrial visit to triangulate the information, the framework was proposed to incorporate a scope of teaching and assessment. [9] These studies exhibit that brief student involvements that basically clarify how the mind learns can have an effect on content challenge and practices.

RESULTS AND DISCUSSION

After the course learning outcomes (CLOs) and related program Outcomes (PLOs) were established, the actual assessment outcomes have been identified. A well expressed set of CLO’s and PLOs that describes [10] what i hopes to successfully achieve the particular outcomes to prospective students in communication principles subject (EE320). The learning outcomes necessity to be brief descriptions of what learning is predictable to take place by the end of course completion. Conversely, students with development attributes are willing to distinguish the contents and concepts of the subject. Each objective had certain skills and knowledge associated with the course learning outcomes, according to specific assignments related to it. They students have confidence to say that knowledge and application achievements originated from the application that they consume in learning process, which will contribute more in their learning style and skills. Figure 1 shows the learning outcomes before the industrial visit to STC (Saudi Telecom Company) based on continuous assessments.

![Figure 1: CLOs percentage distribution before the industrial visit](image)

The course learning outcomes directly addressed the percentage value, contains data on the number and percent of achievement based on assessment that were done at the end of the semester. The success of the CLO is more about students’ performance at the course level and they gain industrial experiences and contribution of course content awareness. Figure 2 shows the average score of the learning outcomes and connecting to learners as reflected as achieved percentage in the stated outcomes.
Figure 2: Shows the percentage of CLO achievements

Figure 2 shows the Courses learning outcomes obtained after they completed the EE320 course. The outcomes that are assessable in the figure makes clear percentage distribution of their achievements, knowledge, and attribute that students were developed in the course. Compare the following figure of CLOs shows the average score for representing learning outcomes.

Figure 3: Related PLOs attainment

The data gathered deliberate entries of eight (8) tasks including quizzes, assignment, midterms and final exams about what understudies realized in the course on the most related outcomes including PLO of the course as shown in figure 3. Excel software were created to evaluate understudies of course achievement associated with specific assignments and exams in EE320 course.

CONCLUSION

Deep analysis and examination was used to investigate substance of allocated (CLO, PLO and taxonomy level) in each task given to students via excel software. Each learning objectives had specific outcomes and expected knowledge to identify learning strategies. This analysis of course learning outcomes (CLOs) used to maintain a strategic of continuous assessment to achieve the required outcomes from impact of the
information to support the program learning outcomes (PLOs). It is suggested that the instructors should support students to counteract their mindsets [11] by incorporating valid teaching materials with industrial visit to related industry focusing on main knowledge and skills rather than concentrating on the details of course contents. In conclusion, the students are willing to develop their learning attributes and knowledge via academic achievement that initiates from the learning contest and industrial visit. It will be attractive much as students willing to acknowledge their perceptions and increase a part of learning.

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