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EVALUATION STRATEGIES FOR COURSE OUTCOMES (CO) AND PROGRAM OUTCOMES (PO)

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ABSTRACT

Outcomes Based Education (OBE) assessment strategies are the most important aspect required to improve the quality of education. COs for each course are based on the program outcome (PO), performance instruments, and other requirements. There are different interpretations of the OBE concept, resulting in different CO-based PO realizations. In it, a document describes the OBE schema and a detailed description of the CO-PO mapping and its realization model. These documents are based on the achievement of course outcomes and program outcomes, as well as student performance and learning.

KEYWORDS: *Course Outcomes, CO-PO Mapping, Program Outcomes, Outcome Based Education*

INTRODUCTION

The implementation of OBE is mandatory to obtain the authentication of the National Accreditation Board [1]. An OBE statement can be processed as "an outcome is a visual and visual representation of knowledge, competence, and orientation at the end of a learning experience." [4]. Therefore, it is imperative in the implementation of OBE to first identify or determine the desired or identified outcomes, program curriculum, teaching and learning methodology, and support facilities. Various measurement methods are used throughout the program to obtain the results of the course.

These outcomes are typically information, abilities, or attitudes that equip students for professional practise [3]. In general, outcomes are examined at three levels: course level (course outcomes), programme level (programme educational objectives), and professional level (professional outcomes) (Program Outcomes). The methods used to analyse or evaluate the performance of certain teaching outcomes for the Course Outcomes (CO) of the curriculum are described in this paper. Students anticipate CO to have the major they expect after graduation. To measure the student's achievement in a particular course, it is required to assess whether or not the CO has been met. The CO receipt result is also used to assess whether or not programme results have been received (PO). The analysis' findings are put to good use.

This is Based on Student Performance and Learning Outcomes

- The department is focused on conceptualising and distributing the most recent findings in the discipline. Practical exposure, communication skills, ethics ideals, and social responsibility are all used to achieve this. Presentations, case studies, group discussions, class assessments, and tutorials are all built into departments.

- Group discussions and presentations on general and theory-based subjects are held on regular basis in class to help students improve their communication abilities.

- The results of the course are designed for which the corresponding evaluation is carried out in order to determine the qualities of the graduate.

- The course outcomes are established not just for the subjects, but also for the individual laboratories. The outcomes of the course are then compared to the outcomes of the programme. This activity demonstrates that the learning outcome has been met.

- The exam's evaluation is also based on the study's accomplishments, which ensure the performance's outcome. This is a 60 percent compliance criterion as a general rule.

- Using CO analysis, create tasks for weak students.

LITERATURE REVIEW

The engineering program is regarded as a rewarding issue for graduates who first chose the profession as registered engineers and later become professional engineers in this paper by Javed et al. (2009) [6]. Develop your skills at the appropriate level. The curriculum, teaching and learning methods, and support facilities for the program are all designed. To get course results, many measurement methods are used throughout the programmed. To receive such recognition, the institute must adhere to the Technical Accreditation Council of the particular country's criteria. As everyone should know, "universities and other educational institutions provide a well-defined peer review procedure in which acceptance is based on widely acknowledged parameters and standards" (JAnd et al. 2009).As the program's outcomes are implemented; an assessment and measuring system must be developed. Chomsky (1965) [9] made a similar and as fundamental difference between capacity and achievement. "The program's outcomes are positive." Use it to express the level of achievement or completion that students are expected to accomplish. They relate to the skills, knowledge, and behaviors that students acquire through the program. (EAC Handbook 2007). [7] From the EAC Manual, engineering students should receive.

- Ability to acquire and apply basic scientific and technical knowledge;

- Ability to acquire comprehensive technical skills, including the ability to identify, formulate, and solve problems;

- Ability to use a systems approach to design and assess operational performance;

- Understanding of design principles for sustainable development;

- Ability to use a systems approach for the design and evaluation of operability;

- Understanding of design principles for sustainable development;

- understanding of the professional and ethical responsibilities and obligations of a professional engineer, understanding of social, cultural, global and environmental responsibilities;

- Recognize the necessity and need for lifelong learning.

D. Andrich gave the overview that in OBEs the focus is on outputs rather than inputs. But that doesn't mean inputs aren't important; On the other hand, acquisition is a means to get results. It was. That doesn't mean inputs aren't important; on the other hand, achievements are a means to achieve results. Students were advised to choose other ways to find the exit and reach the goal with different paths (D. Andrich, 2002)[8].

METHODOLOGY

To measure the outcome (achievement) of course outcomes and program outcomes, OBE has indicated that course outcomes should be associated with program outcome. The attribution method is left to the owner of each program until it can be shown that the achievement of course outcomes contribute to the achievement of program outcomes. For each course, there should be many outcomes at the end of the course. Course outcomes contribute to the achievement of program outcomes. Many result for each course. It must be received at the end of the course. This output is usually a combination of core course material and there may be more than one subject. To reduce input controls, it may be useful to combine multiple combinations so that the course results cover the combined material.

PROGRAM OUTCOMES

- Engineering Knowledge: Apply math, science, engineering fundamentals and computer engineering specialization to solving complex computer engineering problems.

- Problem Analysis: Identify, formulate, research the literature and analyze complex computer engineering problems to reach informed conclusions using fundamental mathematical, scientific and engineering principles.

- Solution Design / Development: Design solutions to complex computing problems and design system components or processes that meet specified requirements, with due regard to public health and safety, cultural, social and environmental considerations.

- Conducting investigations of complex problems: Using research-based knowledge and research methods, including the design of computational experiments, the analysis and interpretation of data, and the synthesis of information to draw valid conclusions.

- Use of Modern Tools: Create, select and apply appropriate modern IT and computer engineering techniques, resources and tools, including prediction and modelling, to complex computer engineering activities with an understanding of the constraints.

- The Engineer and Society: Apply reasoning based on contextual knowledge to assess social, health, safety, legal, and cultural issues and resulting responsibilities relevant to the professional practice of computer engineering.

- Environment and sustainability: understand the impact of professional computer engineering solutions in social and environmental contexts and demonstrate the knowledge and need for sustainable development.

- Ethics: Apply ethical principles and commit to professional ethics and the responsibilities and standards of the exercise of computer engineering.

- Individual and Teamwork: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.

- Communication: Communicate effectively about complex computer engineering activities with the engineering community and society at large, such as: B. being able to understand and write effective reports and design documentation, make effective presentations, and give and take Clear instructions.

- Project Management and Finance: Demonstrate knowledge and understanding of computer engineering and management principles and apply them to their own work, as a member and leader of a team, to manage projects and in multidisciplinary environments.

- Lifelong Learning: Recognize the need for and be ready for and able to engage in independent and lifelong learning in the broader context of computer engineering change.

In Figure 1 Evaluation process of the outcome criterion of the course to provide tasks to students.

PO evaluation processes

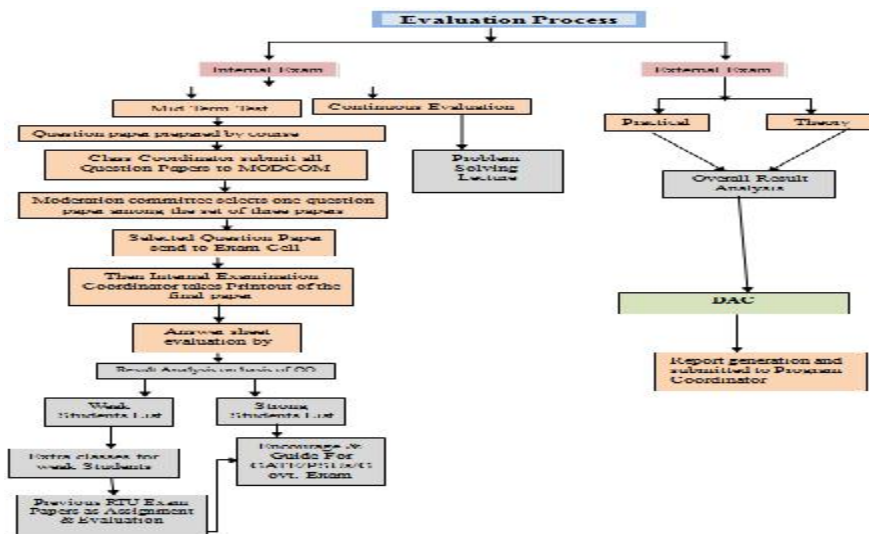The evaluation tools are divided into two methods to evaluate the results of the course:

Figure 1: Course Outcome Evolution Process.

Direct Assessment Methods

Shows the knowledge and skills of the student based on their performance through the following tools:

- Internal Examination.

- External Examination.

These process help to scale that what students know and do and define his and her knowledge of student learning.

Indirect Assessment Methods

Methods such as surveys and interviews ask stakeholders to reflect on student biases. They assess opinions or thoughts about the knowledge or skills of the graduate and their assessment by the different stakeholders.

- Placement

- Co-curricular

- Course Exit

- Program Exit

- Alumni Survey

The flowchart above (Figure 2) outlines the steps before Program Outcome attainment can be measured and calculated. The level of attainment also needs to be outlined and agreed among the master members of the program so that Is the same standard for all has the same standard to refer to.
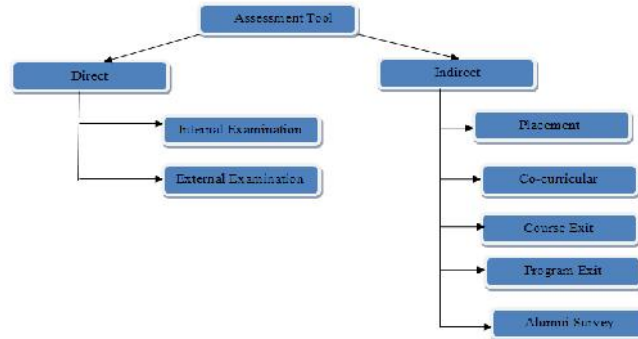

Figure 2: Assessment Process of Program Outcomes.

Assessment Process

Program results map to course results.

- Academic achievement is assessed using direct and indirect assessment tools.

- This evaluation is carried out periodically and covers all the results of the course.

- Questions are formulated according to the results of the course and the result is analysed. Students' knowledge, skills, and values are assessed through this process.

- The graduation survey is considered an indirect evaluation tool to evaluate the results of the study.

- The analysis is interpreted to determine the level of achievement of CO and is compared to predefined goals.

- If the performance criterion is not met, the faculty proposes the improvement to achieve the performance criterion.

- The average CO achievement results of all courses in a semester that are assigned to a specific PO are compared to the PO's predefined goal.

- The scores of each course are used at the program level to assess the program outcomes

Table 1: Assessment Process for Attaining POs

PO	Tool	Tools
PO1-PO1 2	Academic Assessment	MTT Result
		Final RTU Result
		Project
		Lab / Experiments
		Industrial training
	Placement	Final Placed Strength
		Mentoring
		Soft skill
		Higher Studies
	Feedback	Course Exit
		Student Exit/Program exit
		Alumni

RESULTS AND DISCUSSIONS

Course Outcomes from Software engineering are taken to be analyzed. There are four associated course outcomes as decided by the instructor. They are as follows:

CO1: Understand the purpose of designing a system and evaluate the various models suitable as per its requirement analysis.

CO2: Understand and apply requirements specification into an implementable design using structured process and UML

CO3: Formulate a testing strategy for the system design and implement the concept of OOD & OOA.

CO4: Understand & Implement the various technologies in software development

The software engineering course results are analyzed. Four Affiliate Course Results Decided.

Table 2

S. No		SEM			Subject code			Subject			
1		3			**3CS4-07**			**Software Engineering**			
Pos Cos	1	2	3	4	5	6	7	8	9	10	11	12

They are as Follows

All outcomes in this course will be linked to program outcomes in such a way that the value of the strongest relation is 3 while the evaluation of the lowest relation is 1. In the Outcome Based Education (OBE), assessment is done through one or more than one processes, carried out by the institution, that identify, collect, and prepare data to evaluate the achievement of course outcomes (CO's).

The goal can be stated in terms of the percentage of students who have scored more than the class average in each of the respective COs in the assessment, or as determined by the program.

Intermediate exam in software development of a maximum of 20 points for this test, 17 points are in software engineering.

Examples of Achievement Levels versus Goals

Attainment Level 1: More than 60% of students achieved 60% of the maximum number of points.

Attainment Level 2: 70% of students achieve more than 60% of the maximum number of points.

Attainment Level: 80% of students achieve more than 60% of the maximum number of points.

Performance is measured by the actual percentage of students receiving the percentage grades.

- If targets are met, C202.1 and C202.2 are achieved for that year. The program is expected to set higher goals for subsequent years as part of continuous improvement.

- If goals are met, programs C202.1 and C202.2 must be implemented. Establish an action plan to reach the goal in the following year

Table 3

1	H	M	H	L	M	L	-	-	M	-	L	L
2	H	H	H	L	H	L	-	-	H	M	H	M
3	H	M	H	M	H	L	-	-	H	M	H	M
4	H	H	H	M	H	L	L	-	H	M	M	M

Enter correlation levels 1, 2 or 3 as defined below:

- Slight (Low)

- Moderate (Medium)

- Substantial (High)

  C101, C102 are guide courses in the first year.

  Similarly, C409 is the last year. The first digit indicates the academic year and the remaining two digits indicate the course number in the respective academic year.

- The direct achievement level of a PO and PSO is determined by taking the average of all courses related to that PO.

- PO's indirect performance level is determined based on graduate surveys, employer surveys, extracurricular activities, extracurricular activities, etc.

Example

- Suppose a given PO has been assigned four courses C2O1, C3O2, C3O3 and C4O1

- The level of proficiency for each of the four courses.

- PO achievement level is based on direct and indirect assessment achievement levels

- For affiliated non-autonomous higher education institutions, it is assumed that when deciding on the overall level of performance, direct assessment can be weighted at 80% and indirect assessment at 20% through student surveys (in their majority), employers (partly).. Programs can have different weights with proper justification.

- Assuming the following actual performance levels:

Table 4

Actual / Ideal Value	54 (all mapped are assume of its highest point that is H)
Target Value	Calculated from all Mapping values of particular session
Target Value (in %)	(Target Value/ Ideal Value)*100
Attained Value	Calculated from rubrics(sum of attainment value)
Attained Value % wrt Ideal	(Attained Value / Ideal Value)*100
Gap(in %)	Target Value- Attained Value

CONCLUSIONS

The method for determining course outcomes and program outcomes was presented in this document. The biggest difficulty that program leaders face often relates to how to link course outcomes and program outcomes. It may be very easy to measure the course outcome, but relating it to the achievement of the program outcome is another matter. The rationale behind this established method is that students only receive program results if they only receive corresponding course results. Personalization for each program owner explains how they link course revenue to program outcome. It is advisable to discuss the weighting criteria in detail; the fact is that it is not necessary to rate the connection of 1 as the lowest thrust and 3 as the highest thrust. The emphasis or weight can be modified to give a new meaning to the mapping. The last reason is how to be "right" in relation to the result of the program of course results. The alternative could be to create a rubric so that everyone has the same idea or orientation when establishing the emphasis of the mapping. Another important step is to agree on what level, qualification or score will be formed to achieve the outcome of the course and program. In this document, the specified level is that 60% of students are asked to score 60% overall for achievement. For each individual student, you must achieve at least 60% or more than 60% of the grades associated with the study results to achieve them. The above value can be anything depending on the ability of the students, the mark scheme and the objectives of the programmer. After adopting the concept of results-based education, it may lose its meaning. Depending on the steps taken to monitor process and quality, program outcome measurements can ensure that the students produced are engaged in the process of continuous quality improvement, and therefore many engineering students from education based on in results (OBE) should improve from time to time..

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