Empirical Relations of Course Outcomes, Program Outcomes, Program Educational Objectives, Vision and Mission as per Accreditation Norms by Various Organizations

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Abstract

Analyzing the outcomes, objectives, vision and mission gives a better picture about the course. The attainment process starts with writing course outcomes (COs). Then we map the course outcomes to the program outcomes as defined by various accreditation organizations. This process does not stop here and move forward by measuring the program educational objectives (PEOs) which is mapped to the program outcomes (POs). Further the mission of the institute and department can be evaluated by looking at the correlation with program educational objectives. The interrelation between these entities helps us to analyze and interpret the quality of the program. We can also conclude on achieving the vision and mission of the institute by respective courses.

Keywords

National Board Of Accreditation (NBA), Course Outcome(CO), Program Outcome(PO), Program Educational Objective(PEO)

Introduction

The National Board of Accreditation (NBA) is an organization which ensures quality education in institutions. This discussion will be taking into account the self-assessment report-Tire II June 2015 as a reference.

The key terms are

1. Course Outcome(CO)

Course outcomes are defined in terms of the knowledge, skills, and abilities that students have attained as a result of their involvement in a particular set of educational experiences. An outcome should describe what students should know or be able to do at the end of the course that they couldn't do before[5].

Well-defined learning taxonomies can be used to create course outcomes for their course. Learning taxonomies, the most well-known of which is Bloom's *Taxonomy of Objectives for the Cognitive Domain* (1956), categorize cognitive tasks, usually in increasingly sophisticated order.

2. Program Outcomes (POs)

Program outcomes represent broad statements that incorporate many areas of inter-related knowledge and skills developed over the duration of the program through a wide range of courses and experiences. They represent the big picture, describe broad aspects of behaviour, and encompass multiple learning experiences. Ideally, it represents a point of transition from education into the students' chosen profession. [5]

3. Program Educational Objectives (PEOs)

The educational objectives of an engineering degree program are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation[6].

4. Vision statement

A vision statement is a declaration of an organization's objectives, ideally based on economic foresight, intended to guide its internal decision-making. The definition of a vision statement according to Business Dictionary is "An aspirational description of what an organisation would like to achieve or accomplish in the mid-term or long-term future". It is intended to serve as a clear guide for choosing current and future courses of action [7].

5. Mission Statement

A mission statement is a short statement of an organization's purpose, identifying the scope of its operations: It may include a short statement of such fundamental matters as the organization's values or philosophies, a business's main competitive advantages, or a desired future state—the "vision"[7].

The purpose of a mission statement is to focus and direct the organization itself. It communicates primarily to the people who make up the organization—its members or employees—giving them a shared understanding of the organization's intended direction. A mission statement is not simply a description of an organization by an external party, but an expression, made by its leaders, of their desires and intent for the organization[7].

Around six course outcomes must be defined by the faculty teaching the course. They have provided a set of twelve program outcomes (POs) as a guideline to map the course outcomes. This mapping of course outcomes to program outcomes (POs) for all courses taught to a graduate will in turn reflect his ability at various program outcomes levels. Program educational objectives (PEOs) are the qualities that are expected out of the graduates after four to five years of graduation. These set of PEOs can be mapped to mission of the program which by virtue satisfies the vision of the program. The mission of the program is always aligned with the mission and vision of the institute. So the program achievement of vision and mission implies that the institute vision and mission are also achieved.

Relation between CO, PO, PEO, Mission and Vision

Table 1: Relation between CO, PO, PEO, Mission and Vision

CO	PO	PEO	Vision & Mission of Department	Vision & Mission of Institution
Cxxx.1	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO11, PO12	PEO1, PEO2, PEO3, PEO4	Dept-Mission1 Dept-Mission2 Dept-Mission3	Inst-Mission1 Inst-Mission2 Inst-Mission3
Cxxx.2	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO11, PO12	PEO1, PEO2, PEO3, PEO4	Dept-Mission1 Dept-Mission2 Dept-Mission3	Inst-Mission1 Inst-Mission2 Inst-Mission3
Cxxx.3	PO1, PO2, PO3, PO4, PO6, PO7, PO8, PO10, PO11, PO12	PEO1, PEO2, PEO3, PEO4	Dept-Mission1 Dept-Mission2 Dept-Mission3	Inst-Mission1 Inst-Mission2 Inst-Mission3
Cxxx.4	PO1, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO11, PO12	PEO1, PEO2, PEO3, PEO4	Dept-Mission1 Dept-Mission2 Dept-Mission3	Inst-Mission1 Inst-Mission2 Inst-Mission3
Cxxx.5	PO1, PO3, PO4, PO5, PO6, PO7, PO8, PO10, PO11, PO12	PEO1, PEO2, PEO3, PEO4	Dept-Mission1 Dept-Mission2 Dept-Mission3	Inst-Mission1 Inst-Mission2 Inst-Mission3

Correlation between Course Outcomes and Program Outcomes

Course outcomes must be mapped to program outcomes with levels 1, 2 or 3. The average across the program outcomes shows the correlation between the course and the program outcome under consideration.

Table 2: Correlation value and meaning

Correlation Value	Meaning
-	No Correlation
1	Slight Correlation
2	Moderate Correlation
3	High Correlation

A sample CO attainment and PO attainment calculated is shown below

Table 3: CO attainment and PO attainment sample

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	**PO10**	**PO11**	**PO12**
Cxxx.1	2	2	1	3	1	2	1	3	-	-	1	2
Cxxx.2	2	2	1	3	1	2	1	1	-	1	2	2
Cxxx.3	2	2	2	3	-	3	2	1	-	2	2	2
Cxxx.4	2	-	2	2	1	2	1	2	-	1	3	1
Cxxx.5	2	-	2	2	-	2	1	2	-	2	2	1
Avg	**2**	**2**	**1.6**	**2.6**	**1**	**2.2**	**1.2**	**1.8**	**-**	**1.5**	**2**	1.6
Avg%	66.67	66.67	53.33	86.67	33.33	73.33	40	60	0	50	66.67	53.33

The average across the columns in Table 3 gives the correlation of the course to the respective program outcome. This average value can also be expressed as a percentage as seen in last row of Table 3

Correlation between POs and PEOs

A program has around three to four PEOs. This mapping of POs to PEOs must be done by an expert committee and get approved in a department level committee

Table 4: Correlation between POs and PEOs

	PEO1	PEO2	PEO3	PEO4
PO1	R	R	R	R
PO2	R	-	R	-
PO3	R	R	R	R
PO4	-	R	R	R
PO5	R	R	R	-
PO6	R	-	R	R
PO7	R	R	R	R
PO8	-	R	-	R
PO9	R	R	R	R
PO10	R	R	R	-
PO11	R	-	R	R
PO12	-	R	-	R

The percentage value from Table 3 must be put across the row in Table 5. These values represent the percentage of relation between POs and PEOs. The average percentage as shown in the second last row of Table 5 represents the strength of correlation between POs and PEOs. The average percentage as in the last row denotes the strength of all POs and PEOs

Table 5: Correlation between POs and PEOs

	PEO1	PEO2	PEO3	PEO4
PO1	66.67	66.67	66.67	66.67
PO2	66.67	-	66.67	-
PO3	53.33	53.33	53.33	53.33
PO4	-	86.67	86.67	86.67
PO5	33.33	33.33	33.33	-
PO6	73.33	-	73.33	73.33
PO7	40	40	40	40
PO8	-	60	-	60
PO9	0	0	0	0
PO10	50	50	50	-
PO11	66.67	-	66.67	66.67
PO12	-	53.33	-	53.33
Avg	**50**	**49.26**	**53.67**	**55.56**
Avg %	**52.12**			

Correlation between PEOs and Mission of the Department

A program may have three to four department mission statements which in turn fulfill the vision statements. The average POs-PEOs from Table 5 is put across the row in Table 6. These values represent the percentage of relation between PEOs and Department Missions. The average percentage as shown in the second last row of Table 6 represents the strength of correlation between PEOs and Department Missions. The average percentage as in the last row denotes the strength of all PEOs and Department Missions.

Table 6: Correlation between PEOs and Department Mission statements

	Dept-Mission1	Dept-Mission2	Dept-Mission3
PEO1	50	-	50
PEO2	-	49.26	49.6
PEO3	53.67	53.67	53.67
PEO4	55.56	55.56	-
Avg	**5.08**	**52.83**	**51.09**
Avg %	**36.33**		

Correlation between Mission of the Department and Mission of the Institution

A program may have three to four institution mission statements which in turn fulfill the vision statements. The average PEOs-Department Mission from Table 6 is put across the row in Table 7. These values represent the percentage of relation between Institution Missions and Department Missions. The average percentage as shown in the second last row of Table 7 represents the strength of correlation between Department Mission Statements and Institution Mission Statements. The average percentage as in the last row denotes the strength of all Department Mission Statements and Institution Mission Statements.

Table 7: Correlation between Department Mission statements and Institute Mission statements

	Inst-Mission1	Inst-Mission2	Inst-Mission3
Dept-Mission1	-	5.08	5.08
Dept-Mission2	52.83	52.83	52.83
Dept-Mission3	51.09	51.09	-
Avg	**51.96**	**36.33**	**28.96**
Avg %	**39.08**		

Conclusion

A new analysis based on the relation of COs, POs, PEOs, Vision and Mission is proposed. A lot of work based on COs, POs, PEOs, Vision and Mission is done by NBA and other quality oriented organizations. The relation between these entities is well understood. But a new empirical based relation will help us to analyze how the course contributes towards achievement of vision and mission of the institute This quantitative analysis will help the faculty better understand the course contribution to the vision an mission of the institute.

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