

# An Empirical Analysis of Outcome: Based Education Research

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## Abstract

Outcome-based education (OBE) is an educational approach that focuses on what students should know and be able to do at the end of a learning process, rather than focusing solely on what content is taught or how it is delivered. OBE emphasizes clearly defined learning outcomes or competencies that students are expected to demonstrate. These outcomes are often referred to as "Competency Outcomes, Performance Outcomes" (COPO).

COPO attainment refers to the achievement of these competency outcomes by students. In an outcome-based education framework, educators design curriculum, instruction, and assessment around these desired outcomes. This means that the curriculum is structured to ensure that students acquire the necessary knowledge, skills, and attitudes to achieve the specified outcomes.

This paper describes improvement in CO-PO attainment and is successfully implemented for one of the core subject "BBA105- Financial Accounting and Analysis " for BBA students at Maharaja Agrasen Institute of Management Studies, Rohini, Delhi. One of the best ways to present any course in easy manner for students is achieved by Outcome –Based Education (OBE).OBE definitely builds complete knowledge by simplifying complex topics into small steps by applying OBE Methodologies. The attainment of the skills by the students are measured based on the Program Outcomes (PO's) specified by the accreditation bodies. Defining the Course Outcomes (CO's), CO-PO attainment, will modify the traditional teaching methodology to a well planned self- learning and scored good results too that is explained in this paper.

**Index terms:** Implementation of Outcome-Based Education (OBE), Course Outcomes (CO's), Program Outcomes (PO's) and Attainment results.

## Introduction:

Outcome-based education (OBE) is an educational approach that focuses on what students should know and be able to do at the end of a learning process, rather than focusing solely on what content is taught or how it is delivered. OBE emphasizes clearly defined learning outcomes or competencies that students are expected to demonstrate. These outcomes are often referred to as "Competency Outcomes, Performance Outcomes" (COPO).

COPO attainment refers to the achievement of these competency outcomes by students. In an outcome-based education framework, educators design curriculum, instruction, and assessment around these desired outcomes. This means that the curriculum is structured to ensure that students acquire the necessary knowledge, skills, and attitudes to achieve the specified outcomes.

The process of COPO attainment typically involves several key steps:

- 1. Defining Competency Outcomes:** Educators and curriculum developers work together to clearly define the competencies or learning outcomes that students are expected to achieve. These outcomes should be specific, measurable, achievable, relevant, and time-bound (SMART).
- 2. Designing Curriculum and Instruction:** Once the outcomes are defined, educators design the curriculum and instructional strategies to help students attain these outcomes. This may involve developing learning activities, selecting appropriate resources, and creating assessments aligned with the desired outcomes.
- 3. Assessment:** Assessment in outcome-based education focuses on evaluating whether students have achieved the specified competencies. Assessments may include various methods such as exams, projects, presentations, portfolios, and performance assessments. These assessments are designed to directly measure students' ability to demonstrate the desired outcomes.
- 4. Feedback and Improvement:** Continuous feedback is provided to students on their progress toward achieving the competency outcomes. Additionally, educators use assessment data to identify areas for improvement in both instruction and curriculum design.
- 5. Documentation and Reporting:** Student attainment of competency outcomes is documented and reported in various ways, such as grades, transcripts, or competency profiles. This information provides stakeholders with a clear understanding of what students have achieved.
- 6. Reflection and Revision:** Educators regularly reflect on the effectiveness of the OBE implementation and make revisions as necessary to improve student learning outcomes.

Overall, COPO attainment in outcome-based education emphasizes the acquisition of specific competencies or learning outcomes, with curriculum, instruction, and assessment designed to support students in reaching these goals.

### **Traditional Teaching Approach and Literature Review:**

The traditional teaching-learning methodology is in the way of classroom teaching with chalk, board, OHP sheets and revisions. With Outcome Based Teaching-Learning, each subject specified by a course outcome (CO's), each of the CO's will address one or more program outcomes (PO's). Lizzie D'cruz Lecturer (Selection Grade), Department of Electronics and Communication Engineering, Dr. B. R. Ambedkar Institute of Technology, Port Blair, Andaman and Nicobar Islands, India presents CO, PO attainment for VLSI Course for internal & Board Exam results [1]. Course outcomes for digital switching systems will be defined and described by

Mark Ovinis proposed and described a Comparative Analysis of Attainment of Program Outcomes for Courses with and without the Use of Modern Tools and the usage of modern tools has led to slightly better attainment [2]. M.Rajendra Prasad developed project based teaching methodology for embedded engineering education to execute projects for better attainment [3]. Joni e. Spurlin presented a procedure to design better engineering education through assessment [4]; this book is written for engineering faculty and department chairs as a practical guide to improving the assessment processes for undergraduate and graduate engineering education in the service of improved student learning. M.Vasantha Lakshmi has defined outcome-based teaching process for microwave and radar [6]. This paper presents an Outcome Based Education and it is compared with traditional approach and attainment of the Course Outcomes (CO's) with Program Outcomes (PO'S).

**CO-PO Mapping in MAIM:**

**Course: Financial Accounting & Analysis Course Code: BBA 105**

Course Outcome Statements indicating what a student can do after the successful completion of a course. At the end of the course the student should be able to get below points.

**CO1:** Comprehension about concepts of accounting and relevance of GAAP and accounting standards.

**CO2:** Preparation of company final accounts with adjustments.

**CO3:** Appreciate contemporary issues and challenges in accounting.

**CO4:** Examine the concept and the methods of depreciation. **CO5:** Comprehension about accounting for shares and debentures

The program outcomes can be described what students are expected to know and would be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire as they progress through the program and those were shown in below table.1.

**Table.1 The Program Outcomes (PO’s) & Program Specific Outcomes(PSO’s)**

Program Outcome			
PO1	Critical Thinking	PO 7	Environment and sustainability
PO2	Effective Communication	PSO1	Develop value -based thinking for developing socially responsible mindset
PO3	Social Interaction	PSO2	Analyse and develop a global approach
PO4	Effective Citizenship	PSO3	Develop research -oriented thinking
PO5	Ethics	PSO4	Demonstrate the culture of entrepreneurial spirit, leadership and creative thinking.
PO6	Environment and Sustainability		

**CO-PO Mapping for the course control system engineering:**

A sample CO-PO matrix for control systems engineering are given in below Table.2. Based on CO statements given. The CO-PO mapping has been done with correlation levels of 3, 2, and 1. The notation of 3, 2 and 1 denotes substantially (high), moderately (medium) and slightly (low).

**Table.2. CO-PO Mapping: BBA 105**

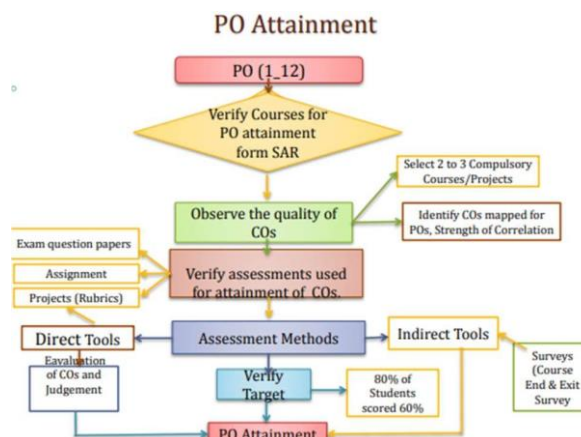
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
COBBA 105.1	2	2	-	2	3	-	3
COBBA 105.2	3	-	-	2	2	-	3
COBBA 105.3	3	2	-	2	-	2	-
COBBA 105.4	-	-	2	2	2	-	2
COBBA 105.5	-	2	-	2	3	-	2

At MAIMS, the students were assessed through the continuous internal exams and the end semester exams. The internal assessment includes descriptive tests and assignments. The continuous assessment include the assessment of assignment, case study followed by midterm examination. The students may have a chance to write betterment exam to reduce absenteeism to improve their internal

percentage. The final internal performance of the student will be based on the performance of Internal test, assignment, class participation and attendance. If some components, to attain CO's/ PO's are not included in the curriculum provided by the GGSIP university, then the institution makes additional efforts to impart such knowledge by covering aspects through "contents beyond syllabus" and "Gap Analysis". In Maharaja Agrasen Institute of Management Studies, the gap analysis is processed by taking feedback from the stake holders such as Employers, Alumni, Industry, Senior students, Faculty, Professional Bodies and Departmental meetings conducted on a routine based for the scope of improvement in terms of any event or activity. Based on the plan of action decided, the department arranges seminars, technical talks, workshops, training session for the students to have better understanding of concept and its implementation in the business world through routine industrial visits. Based on the student's performance, the CO-PO attainments were calculated.

**Assessment of Course Outcomes:**

As per university guidelines 25% weight age is given to internal assessment and 75% weight age is given to external exam assessment. In MAIMS the overall attainment is calculated for every course by using direct method and indirect attainment as shown in the diagram below:



**Figure1: PO attainment process**

**Direct Assessment Evaluation:**

**Step1: Internal Examinations & Assignments**

The First midterm examination shall be conducted for 1-2.5 units of syllabus and second midterm examination shall be conducted for 2.5-5 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) –first Assignment should be submitted before the conduction of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the student in each midterm examination are evaluated for 25 marks.

**Step 2: External Examinations**

Total Duration: 3 Hours Total Marks: 75

Internal and external exam attainment levels refer to the levels of achievement or performance attained by students in both internal assessments conducted by their educational institution and external examinations administered by external bodies or organizations. Internal exam attainment level focuses on performance within the institution's academic framework, external exam attainment level provides an external benchmark and broader context for assessing students' academic

achievements. Both internal and external assessments play important roles in evaluating students' learning outcomes and academic progress.

After completion of course by using defined Course Outcomes (CO's), attainment levels, the direct attainment will give the information about CO attainment. For the academic year (2015-2019) the CO attainment is calculated is shown in Table.4.

Table 4: Attainment Level					
S.No	Assessment		Threshold level (%)	Attainment level Criteria	Attainment level
1	INTERNAL (Mid Exams + Assignments) + END TERM EXAMINATION	15+10 (25) + INTERNAL + 75 (EXTERNAL)	60%	At least 50%-59% of attempted students exceed the threshold level (60%) marks	1
				At least 70% of attempted students exceed threshold level (60%) marks	3
				At least 60%-69% of attempted students exceed	2

The course outcomes attainment computed at the end of the course using defined formulas for the course Financial Accounting and analysis.

**PO Attainment through indirect Method:**

The PO Attainment of individual student through direct and indirect method can be evaluated after the completing their program. All these works have to be done under the guidance of IQAC at MAIMS. In this regard, Course Exit Survey (CES) is conducted in google form for assessing their knowledge on likert scale questionnaire.

Q1. Are you able to describe the double entry system with concept, conventions and standards of financial accounting?

287 responses

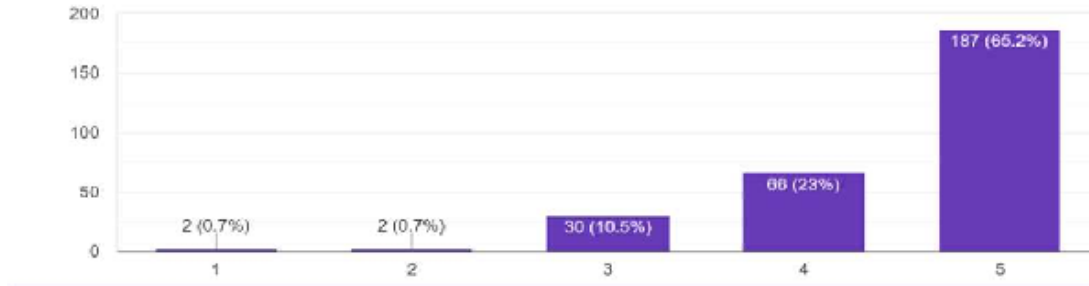


Figure2: CES

**COPO ATTAINMENT**

**Step 1:  $0.6 \times ET + 0.12 \times INT + 0.08 \times AS + 0.2 \times CES$**

ET= External Marks, INT = Internal Marks, AS=Assignment Marks , CES = Course Exit Survey

**Step 2: Setting a Target**

60% Achieve >80% - Level 3; 60% Achieve >70% -

Level 2; 60% Achieve >60% - Level 1;

**Table 5: Attainment level with the set target**

SET TARGET	80.00%					
	CO 1	CO 2	CO 3	CO 4	CO 5	CO 6
Avg Attainment	82.62%	81.04%	81.74%	80.53%	84.58%	81.26%
Total Number of Student	170	170	170	170	170	170
No. of Student who achieved Target	129	109	124	106	153	118
%Age No of Students who achieved target	76%	64%	73%	62%	90%	69%
Attainment Level (scale of 1 to 3)	2	1	2	1	3	1

**Step 3: COPO Mapping**

COPO mapping can be used from the lesson plan of course BBA105: Financial Accounting and Analysis

Table 6: CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6
COBBA 105.1	2	2	-	2	3	-
COBBA 105.2	3	-	-	2	2	-
COBBA 105.3	3	2	-	2	-	2
COBBA 105.4	-	-	6	6	6	-
COBBA 105.5	-	2	-	2	3	-



**Step 4: CO-PO-PSO Attainment Calculation**

COPO-PSO\_Matrix Element = Lesson\_plan\_value\*Attainment\_level\_CO's

	PO1	PO2	PO3	PO4	PO5	PO6
COBBA 105.1	4	4	-	4	6	-
COBBA 105.2	6	-	-	4	4	-
COBBA 105.3	3	2	-	2	-	2
COBBA 105.4	-	-	2	2	2	-
COBBA 105.5	-	2	-	2	3	-

**Step 5: Output Values of CO**

CO MATRIX CAL-AUTO!'B10/'LESSON PLAN MATRIX- YOUR!'B10

CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4
Result	1.67	0.33	1.77	0.17	1.60	0.33	2.00	0.17	0.50

**Step 6: Submission of Course Attainment sheets as Responses into Google sheet – For finding the Average attainment of All Courses as illustrated in the figure**

Subject Title	Target	PO1	PO2	PO3	PO4	PO5
MPOB	50	1.6	2.0	2.0	2.0	2.0
Business Mathematics	40	2.2	2.7	2.0	2.0	3.0
FINANCIAL ACCOUNTING	46	2.8	2.7	3.0	2.8	2.7
Business Economics	40	2.6	2.7	2.6	2.6	2.6
COMPUTER APPLICATIONS	45	2.4	2.5	0.0	0.0	0.0

**Figure2: CO attainment of All courses for PO attainment Step 7: Average Attainment & Calculation of Program**

Attainment= 80%.COPO attainment + 20% Program ExitSurvey

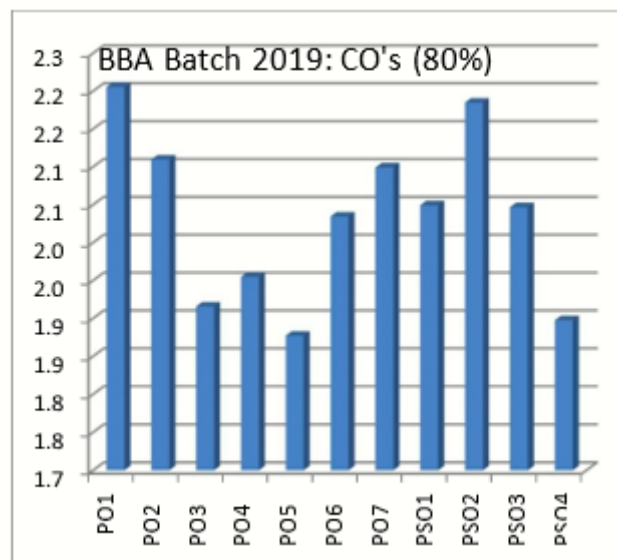
Prog: BBA		Batch : 2019				Assessment Year: 2019-20	
PROG	Shift	Target	PO1	PO2	PO3	PO4	PO5
BBA	1st	61.5	2.1	2.0	1.8	1.8	1.9
	2nd	60.5	2.1	2.0	1.8	1.9	1.8
<b>Average</b>		<b>61.0</b>	<b>2.1</b>	<b>2.0</b>	<b>1.8</b>	<b>1.8</b>	<b>1.9</b>
<b>CO's</b>	<b>80%</b>		<b>1.7</b>	<b>1.6</b>	<b>1.4</b>	<b>1.5</b>	<b>1.5</b>
PES	20%		0.5	0.5	0.5	0.5	0.4
			<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>
<b>FINAL</b>			<b>2.2</b>	<b>2.1</b>	<b>1.9</b>	<b>2.0</b>	<b>1.9</b>

**Table 7: PO attainment of Batch (BBA Batch 2019)**

PROG	Shift	Target	PSO1	PSO2	PSO3	PSO4
BBA	1st	61.5	1.9	2.1	2.0	1.8
	2nd	60.5	2.0	2.1	1.9	1.8
<b>Average</b>		<b>61.0</b>	<b>1.9</b>	<b>2.1</b>	<b>1.9</b>	<b>1.8</b>
<b>CO's</b>	<b>80%</b>		<b>1.6</b>	<b>1.7</b>	<b>1.6</b>	<b>1.4</b>
PES	20%		0.5	0.5	0.5	0.5
			<b>PSO1</b>	<b>PSO2</b>	<b>PSO3</b>	<b>PSO4</b>
<b>FINAL</b>			<b>2.0</b>	<b>2.2</b>	<b>2.0</b>	<b>1.9</b>

**Table 8: PSO attainment of Batch (BBA Batch 2019)**

standard and concepts of accounting – is one such area where the faculty need to emphasize new strategy for delivery, assessment and involvement of students through experiential learning and practical knowledge. At MAIMS, students can be able to access balancesheet through published articles in journal and magazines so as to understand accounting standards and understand the concept of accounting. Students are encouraged with Project based learning and internship for students that will help them getting placement or assisting them in higher education of good repute.



**Figure3: PO PSO attainment of Batch BBA 2019-22**

20% weightage allotted for indirect method (Program Exit Survey) with the help of Questionnaire prepared on likert scale for curriculum, infrastructure and course as against its correlation in the business world. The purpose of indirect method is to find the effectiveness of how much is the program has achieved the mission and vision of Program by the students admitted in MAIMS.

**Program Attainment Analysis and Action Taken Report**

- Faculty Team very much appreciated the OBE Frame Structure Designed for the Programme
- Individual Courses are designed to address the outcomes of the programme and vision of the department and university.
- Special Care has been taken to design each course modules and outcomes based on Bloom’s Taxonomy.
- Faculty members are recommended to organize Value Added Programmes to enrich the employability skills and to focus on specific industry requirements time to time.



- Many faculty members suggested enhancing the learning infrastructure facilities such as laboratory requirements (equipment and consumables), library and purchase procedures.
- Few faculty members have suggested encouraging students to participate in curricular and extracurricular programmes organized by the premier institution.
- Field oriented, case studies and assignments need to be provided within the course for internal evaluation.

### Conclusion:

This paper presents complete CO attainment and PO Attainment of the course Financial accounting and analysis for the students of BBA batch 2019-22 at Maharaja Agrasen Institute of Management Studies by using indirect and direct methods. Study reveals that although result was 97% for the course, the attainment was less for CO1 i.e. Accounting

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