

# Course Attainment and Program Attainment in Education Systems with the Average and Threshold Aspect.

<sup>1</sup>Ansar A. Mulla, <sup>2</sup>Abhijeet P. Shah, <sup>3</sup>Nilesh C. Gaikwad, <sup>4</sup>Vinay B. Choudhari, <sup>5</sup>Jayant J. Pharne

<sup>1-5</sup>Mechanical Engineering Department, Rajarambapu Institute of Technology Rajaramnagar. Sakharale, Shivaji University Kolhapur, M.S. INDIA

<sup>1</sup>ansarmulla212@gmail.com, <sup>2</sup>abhijeet.shah@ritindia.edu, <sup>3</sup>nilesh.gaikwad@ritindia.edu, <sup>4</sup>vinay.choudhari@ritindia.edu,

<sup>5</sup>jayant.pharne@ritindia.edu

**Abstract—** This article offers a comprehensive exploration of Outcome-Based Education (OBE) with a specific focus on assessing course attainment and program attainment through average-based and threshold-based methods. Utilizing a sample dataset, the study showcases the practical application of these methods to evaluate student achievements. The findings presented as average and threshold course outcome (CO) attainment calculation with sample data for a course, provide insights into student performance for course outcomes, elucidating the strengths and limitations of each approach. The study extends its analysis to program attainment, emphasizing the crucial link between CO and PO through mapping. Attainment calculation of a course with threshold and average CO attainment values displays program outcome (PO) attainment values calculated using both average and threshold methods, offering nuanced insights into student achievements within an academic program. An essential takeaway is the significance of interpreting attainment values. Establishing correlations between these values and course content equips educators to enhance cognitive, psychomotor, and affective development through targeted course delivery improvements. In conclusion, this study underscores the synergy between course and program attainment, offering informed insights to educators and institutions. It recognizes the strengths and weaknesses of average and threshold methods and emphasizes the importance of selecting the appropriate method based on specific learning objectives and educational contexts. This research informs assessment strategies for optimizing educational experiences in attainment methods.

**Keywords —** Course Outcome (CO); Program Outcome (PO); Average Attainment; Threshold Attainment; Course Attainment; Program Attainment.

**JEET Category—**Research

## I. INTRODUCTION

In the realm of education, the pursuit of learning is not only about attending classes and completing assignments; it's about achieving specific goals and outcomes. In any field of education two things are at understanding one is teaching to

students that is transferring knowledge, building psychomotor and attitude skills is at the focus however the other is at what level the skills have incorporated in learner. The second one, learner build up skills are measured by various assessment practices. But for the point of interest to teacher, to transfer maximum and 100% to the learner should be at par. Here question arises on which content more focus and attention are required? Which method of content delivery should be used to transfer the desired skills at par level? Where & what teacher has to work? Need to be identified and for this only final result analysis will not be sufficient. This could be made CO attainment and PO attainment calculation. Two key concepts that play a pivotal role in this process are "course attainment of CO of course" and "program attainment of PO of program." (Spaddy, 1994) These terms hold significance in higher education institutions, where assessing student progress and evaluating the effectiveness of educational programs are paramount. This article delves into the depths of course attainment and program attainment, their significance, assessment methods, and their collective impact on education quality (Palomba & Banta, 1999).

Outcome-Based Education (OBE) centers on attainment calculations, where learners' progress aligns with predefined outcomes (Qadir, 2020). This data-driven approach enables tailored interventions by quantifying achievement, enhancing the precision of the educational process for both educators and students.

### 1) Course Attainment - Navigating the Learning Journey

Course attainment revolves around the mastery of learning objectives within a particular course. It is a granular assessment of a student's comprehension and skill acquisition. (S. Amirtharaj, 2022) As educators design courses with well-defined objectives, the assessment of course attainment becomes a compass guiding student through their learning journey.

### 2) Assessment Method/Tools

Various methods contribute to measuring course attainment. And various Assessment tools are used to calculate course

<sup>1</sup> This paper was submitted for review on August 31, 2023. It was accepted on November, 15, 2023.

Corresponding author: Ansar Allauddin Mulla, Mechanical Engineering Department, Rajarambapu Institute of Technology Rajaramnagar, Shivaji University Kolhapur, Maharashtra, INDIA.

Address: K.E. Society's Rajarambapu Institute of Technology Rajaramnagar, Islampur, PIN - 415414. (e-mail: ansarmulla212@gmail.com, ansar.mulla@ritindia.edu).

Copyright © 2024 JEET

attainment and program attainments. (Parde, 2023) Various traditional assessment tools and methods include, exams in written and oral forms, quizzes assignments, and class participation, etc. These methods assess both knowledge retention and application, providing insights into a student's grasp of the subject matter. Modern pedagogical approaches have introduced project-based assessments, presentations, and practical demonstrations, rubrics-based evaluation, etc. These methods not only measure knowledge but also emphasize critical thinking, creativity, and collaboration. There are numerous assessment tools innovated in COVID 19 duration, where the Teaching Learning methods transformed from traditional to modern way using ICT tools, new experiments with active learning methods as well as various pedagogical innovative teaching learning methods. However, these tools all can provide students' performance but cannot assure the exam and learner's learning style match. So, the Course exit survey ensures students acknowledgement of knowledge gain in course by survey questionnaires with respective weightage in complete course attainment

### 3) Educator's Role

Educators play a crucial role in facilitating course attainment. They design assessments aligned with learning objectives, create engaging learning materials, and provide constructive feedback. By analyzing individual student performance, educators can identify learning gaps and adapt their teaching strategies to meet diverse student needs.

The Attainment methods in the view of average method and threshold method, need to be understood to get the micro level investigation of knowledge, skill and attitude transferred to the learner/student from the course. Here the attainment method either average or threshold to be used takes part of clarity for

implementation in the program of Institute and at Institute level. Not all institute with only average or only threshold will serve better conclusion from this attainment calculations. So, Institute can choose the better suite of average method or threshold method of course attainment method with its examination schemes and structures and educational context.

## II. ATTAINMENT CALCULATION OF AVERAGE AND THRESHOLD METHOD

For understanding the average method and threshold method a sample data is considered and calculation is done to come to attainment values and levels.

For calculation consider a course Mechanical Engineering Materials of Second Year Class of Polytechnic level in a Mechanical Engineering Program. After teaching two units of a six-unit course having six CO statements, course in charge intend to check learning happened and a test of 100 marks is conducted. The course is theory and Lab performance with core content in the Mechanical program. The various assessments used for the courses were class test, microprojects, assignments theory paper, practical progressive assessments, etc. here consider data of Class test taken for 100 marks all as sample data.

### 1) Calculation with sample data for understanding Average and Threshold Attainment method

Sample Assessment of five students' data is taken in below table, Assessment tool Class Test taken here to write answers for four questions 1-4, and respective Questions mapped with course outcome statement number a, a, b, c respectively, with each 25 marks. The total marks for the test are 100 marks.

TABLE I AVERAGE AND THRESHOLD CO ATTAINMENT CALCULATION WITH SAMPLE DATA FOR A COURSE

SAMPLE DATA FOR THE ASSESSMENT					
Question No.	1	2	3	4	Exam Test for Total Marks
Max Marks	25	25	25	25	100
CO Mapped	a	a	b	c	
Student Full Name 1	21	15	19	22	77
Student Full Name 2	18	19	17	22	76
Student Full Name 3	23	-	22	23	68
Student Full Name 4	15	16	21	23	75
Student Full Name 5	19	15	20	21	75
AVERAGE ATTAINMENT METHOD					
Total students those who attempt Questions	5	4	5	5	
Average of Marks obtained	19.20	16.25	19.80	22.20	
Percentage of Marks Obtained by students those who attempt Questions	76.8	65	79.2	88.8	
CO No. \ Question No.	1	2	3	4	CO Average Attainment in %
CO-a Statement	76.8	65			70.90
CO-b Statement			79.2		79.20

CO-c Statement					88.8	88.80
THRESHOLD ATTAINMENT METHOD						
Total Questions Attempted Students	5	4	5	5		
Threshold Set %	80%	80%	80%	80%		
Threshold Set % of Maximum Marks (=25*80/100)	20.00	20.00	20.00	20.00		
Attempt Students gained More than or Equal to Threshold marks	2	0	3	5		
Percentage of Students Obtained more than Threshold Set by the Question Attempted Students	40	0	60	100		
CO No. \ Question No.	1	2	3	4	CO Threshold Attainment in %	
CO-a Statement	40	0			20.00	
CO-b Statement			60		60.00	
CO-c Statement				100	100.00	

Above Table I is sectioned in three, the first section contains the sample data of five students gained marks in a test of four questions each asked for 25 marks and total assessment for 100 marks.

Question 1 & 2 is mapped to CO-a while Question 3 and 4 to CO-b and CO-c respectively.

Students 1,2,4,5 have attempted All four Questions 1,2,3,4 while Student No 3 has attempted 1,3,4 and not attempted Question 2.

The Second section shows the calculation of average CO attainment method,

Percentage of Marks Obtained by Question Attempted Students have gained cumulatively 76.8%, 65%, 79.20% and 88.80% Average marks.

CO attainment with average attainment calculation for CO-a, CO-b & CO-c is 70.90%, 79.20% & 88.80% respectively.

The Third section shows calculation of threshold CO attainment method with threshold set to 80%.

CO attainment with threshold attainment calculation for CO-a, CO-b & CO-c is 20.00%, 60.00% & 100.00% respectively.

Percentage of Students Obtained more than Threshold Set by the Question Attempted Students is 40%, 0%, 60%, and 100% respectively.

## 2) Interpretation of Course Outcome Attainment

The more important part in any of attainment calculation is interpretation of attainment values. Without getting the correlation of attainment values calculated from student

performance with the course content delivered, the work done will be zero. Interpretation of attainment values will lead course in charge to do the micro level investigation to trace out the content delivered from the course where the student is underperforming. With this faculty can work on the respective course content to improve his course delivery method to transform maximum cognitive, psychomotor & affective domain in students or learners.

Average attainment - CO attainment CO-a tells that attempted students have gained 70.90% knowledge. While CO attainment CO-b & CO-c tells that attempted students have gained 79.20% & 88.80% knowledge respectively.

Threshold attainment with threshold set to 80% - CO-a tells that from the attempted students 20.00%, students have gained more than 80% knowledge. While CO attainment CO-b & CO-c tells that from the attempted students 60.00% & 100.00% students have gained more than 80% knowledge respectively.

Above all explanation gives detail explanation of calculation of Course attainment in Average based and Threshold Based Attainment calculations mention in Table I.

## 3) PO Attainment Calculations for a course with its Average and Threshold CO Attainment values

From the Table I we get CO Attainment of a Course with Average based and threshold-based calculations. These CO Attainment Values will be used with CO- PO Mapping values of same course to calculate PO Attainment.

TABLE II PO ATTAINMENT CALCULATION OF A COURSE WITH THRESHOLD AND AVERAGE CO ATTAINMENT VALUES

<b>CO - PO Mapping for Calculation of PO Attainment from the CO Attainment of a Course</b>					
Program Outcome (PO)	PO1	PO2	PO3	PO4	
Mapping Levels	1-Low (0-33.33%); 2-Medium (33.34-66.66%); 3-High (66.67-100%) Mapping				
CO-a Statement	1	3	2	3	Mapping levels 1,2,3 is done on the basis of Competencies and Performance Indicators
CO-b Statement	1	-	2	3	
CO-c Statement	2	2	2	-	
Course Cumulative CO Mapping to PO in Levels	1.3	2.5	2.0	3.0	Cumulative Course to PO Mapping in terms of Levels and Percentage
Course Cumulative CO Mapping to PO in %	44.44	83.33	66.67	100.00	
Course Cumulative CO Mapping to PO in Levels (roundup)	2.00	3.00	2.00	3.00	

AVERAGE ATTAINMENT METHOD					
CO No. \ Question No.	PO1	PO2	PO3	PO4	CO Average Attainment in %
CO-a Statement	0.71	2.13	1.42	2.13	70.90
CO-b Statement	0.79	-	1.58	2.38	79.2
CO-c Statement	1.78	1.78	1.78	-	88.80
PO Average based attainment in Levels	1.1	2.0	1.6	2.3	Above Values we get from Average
PO Average based attainment in %	36.41	65.05	53.09	75.05	CO Attainment Calculations of a
PO Average based attainment in Levels (roundup)	2.00	2.00	2.00	3.00	Course

  

THRESHOLD ATTAINMENT METHOD					
CO No. \ Question No	PO1	PO2	PO3	PO4	CO Threshold Attainment in %
CO-a Statement	0.20	0.60	0.40	0.60	20.00
CO-b Statement	0.60	-	1.20	1.80	60.00
CO-c Statement	2.00	2.00	2.00	-	100.00
PO Threshold Based attainment in Levels	0.9	1.3	1.2	1.2	Above Values we get from Threshold
PO Threshold Based attainment in %	31.11	43.33	40.00	40.00	CO Attainment Calculations of a
PO Threshold Based attainment in Levels (roundup)	1.00	2.00	2.00	2.00	Course

Table II contains three sections,

Section one gives the information on Course Outcome mapping to the Program as of a course contribution to Program Statement number on the basis of competencies and performance Indicators (Mulla, Jadhav, & Shah, 2023) in the levels of Level-1 as Slow mapping, Level-2 as Medium mapping, Level-3 as High mapping, the same levels are ranged in percentage as 1-Low (0-33.33%); 2-Medium (33.34-66.66%); 3-High (66.67-100%) Mapping respectively. These CO-PO mapping is done on the basis of competencies and Performance Indicators the two-step method to give clarity to PO attainment as guideline in AICTE exam reform policy (AICTE, 2018). The round up mapping level are mentioned to showcase in articulation matrix for a program.

Section two is Average PO attainment calculation,

Now, for PO Attainment of CO-a statement, CO-a is mapped to PO1 with mapping level-1, and the CO-a Average Attainment value is 70.90%. Therefore,

$$PO \text{ Attainment for CO} - a = \frac{\text{Mapping Level} * \text{Average CO Attainment}}{100}$$

$$PO1 \text{ Attainment for CO} - a = \frac{1 * 70.9}{100} = 0.71 = 71\%$$

Similarly, for PO3 Attainment for CO-b mapping level-2 and Average Attainment value is 84.00%. Therefore,

$$PO3 \text{ Attainment for CO} - b = \frac{2 * 79.20}{100} = 1.58 = 158\%$$

In the Section three same calculation methodology is performed for PO attainment calculation however the CO attainment Values used are of Threshold based.

#### 4) Interpretation of Program Outcome Attainment

At the end of the Program, the student batch that successfully graduates with percentage of knowledge gained is noted with Program Outcome Attainment values. The PO1 attainment values with Average attainment value tells that, **all the students** in the Batch successfully graduated have gain **36.41%** Level-2 of knowledge Skill and Attitude with respect to the CO-PO mapping of all the courses contributing in the program. While, The PO1 attainment values with threshold attainment value tells that, **31.11%** Level-1 students from the batch have gained more than 80% (threshold set) of knowledge Skill and Attitude with respect to the CO-PO mapping of all the courses contributing in

the program. The average and threshold have pros and cons in either side with various parameters those have been elaborated in next sections.

#### B. Attainment values correlating with course content and performance

Course attainment value of any CO, say CO-a tells that, what quantum of knowledge skill & attitude is incorporated to the students. With CO-a average attainment 70.90%, interpretation is that from the expected 100% knowledge to be gained all students have gained 70.90% and there is yet work to be done by teacher to raise learning transfer to students to 100%. In this context faculty should add to delivery methods, use different teaching aid, pedagogical teaching methods so that learning can be raised from 70.90 to 100%.

Similarly, With CO-a threshold attainment 20% with threshold set 80%, interpretation is that from the total number of students 20% students have gained more than 80% of knowledge skill & attitude. And yet 80% students have gained less than 80% threshold. So faculty has to add/change the delivery method to raise remaining 80% students learning to cross the threshold set 80%.

Above average and threshold course attainment let us know changes in academic delivery methods to focus the bifurcated students with common knowledge level and knowledge gained below or above threshold.

It comes to faculty to choose academic teaching method to increase students learning to desired 100% and assessed with suitable assessment tools.

PO attainment for respective PO number lets us know a batch of student with quantum of respective PO knowledge skill & attitude gained and deficient. This lets a program to identify respective PO to work on. The courses mapping the same PO needs to be focused and academic delivery to be planned for them so that deficient in respective PO attainment can be achieved.

In this way which CO of course to focused and which course to be focused in academic delivery can be identified by CO & PO attainment respectively.



### C. Difference between Average-Based Attainment Method & Threshold-Based Attainment Method

In Outcome-Based Education (OBE), both average-based and threshold-based attainment methods are used to assess students' achievement of learning outcomes.

However, they differ in how they determine whether students have successfully attained the outcomes. Let's explore the differences between these two methods

TABLE III DIFFERENCE BETWEEN AVERAGE-BASED ATTAINMENT & THRESHOLD-BASED ATTAINMENT METHOD

Average-Based Attainment Method	Threshold-Based Attainment Method
<p><b>Definition:</b> In the average-based attainment method, the focus is on the overall average performance of students in a specific course or assessment. It calculates the mean score or average of all individual student scores for a particular learning outcome.</p> <p><b>Calculation:</b> The individual scores of all students for a particular outcome are added together, and then the sum is divided by the total number of students to find the average.</p> <p><b>Interpretation:</b> If the average score of all students meets or exceeds a predetermined threshold or target, it is considered that the learning outcome has been attained for that course or assessment.</p> <p><b>Application:</b> This method is useful when there is a continuous scale of measurement for the learning outcomes, such as numerical scores or ratings.</p>	<p><b>Definition:</b> In the threshold-based attainment method, the focus is on whether individual students achieve a specified minimum level of proficiency or competency in a particular learning outcome.</p> <p><b>Calculation:</b> For each learning outcome, a predetermined threshold or minimum level of proficiency is established. Individual student performance is compared against this threshold to determine if the outcome has been attained.</p> <p><b>Interpretation:</b> If a student's performance meets or exceeds the established threshold, they are considered to have achieved the learning outcome. Conversely, if their performance falls below the threshold, the outcome is considered not attained for that student.</p> <p><b>Application:</b> This method is particularly useful when learning outcomes are measured categorically (e.g., pass/fail or competent/not competent) or when certain skills or competencies must be demonstrated to achieve the outcome.</p>

In summary, the main difference between average-based and threshold-based attainment methods in OBE lies in their approach to determining attainment. The average-based method looks at the overall performance of students on a continuous scale, while the threshold-based method focuses on whether individual students reach a specific predefined level of proficiency or competency.

Both methods have their strengths and weaknesses, and the choice between them depends on the nature of the learning outcomes, the type of assessment, and the educational context.

#### D. Strengths and Weaknesses of using average based attainment and threshold-based attainment in OBE

##### 1) Strengths of Average-Based Attainment in OBE:

**Comprehensive View:** Average-based attainment provides a comprehensive view of overall student performance for a particular learning outcome. It considers the collective achievement of all students, giving a sense of the group's progress.

**Flexibility:** This method allows for variations in individual performance while still capturing the general trend of attainment. It accommodates a wide range of scores and can be applied to different types of assessments.

**Continuous Scale:** Since average-based attainment uses continuous scales of measurement, it can provide more nuanced information about students' progress and proficiency levels.

##### 2) Weaknesses of Average-Based Attainment in OBE:

**Hides Individual Variations:** The average may conceal (hide) individual variations in student performance. Some students

might perform significantly better or worse than the average, and this information might be lost in the calculation.

**Insensitive to Outliers:** Extreme scores (outliers) can disproportionately influence the average, leading to potentially skewed interpretations of overall attainment.

**Disregards Mastery Levels:** It does not explicitly account for whether individual students achieve a specific level of proficiency or mastery in the learning outcome. Students who barely meet the threshold and those who perform exceptionally well are treated the same in the average.

##### 3) Strengths of Threshold-Based Attainment in OBE:

**Clear Mastery Criteria:** Threshold-based attainment sets clear criteria for students to achieve the learning outcome. It ensures that students must meet a predetermined level of proficiency or competency to be considered successful.

**Individualized Assessment:** This method focuses on each student's performance relative to the threshold, allowing for personalized assessment and recognition of individual strengths and weaknesses.

**Simplified Interpretation:** Threshold-based attainment provides straightforward interpretations of whether a student has achieved the outcome or not. It is particularly useful when pass/fail decisions or competency-based assessments are needed.

##### 4) Weaknesses of Threshold-Based Attainment in OBE:

**Ignores Gradations of Performance:** The threshold approach does not consider the variations in students' performance above the minimum level. It treats all students who meet the threshold equally, regardless of how far above it they perform.

Less Comprehensive: Threshold-based attainment might overlook the overall distribution of students' performance and may not provide a complete picture of the group's progress.

Setting Appropriate Thresholds: Establishing appropriate threshold levels can be challenging and may require careful consideration and validation.

In summary, both average-based and threshold-based attainment methods have their strengths and weaknesses. The choice between these methods depends on the specific learning outcomes, the type of assessment, and the educational context. Let us understand how educators and institutions practically can use this information to enhance teaching and learning?

There are institutes whose students' performance has abrupt change or at lower success rate and attainment. For example, ABC institute have 60 students in a batch, all students average result is 55% that means all students i.e., all 60 students have gained 55% skills of the program and are deficient of 45% of program skills.

For the same student's batch and assessment consider threshold-based attainment, - Now 3 of 60 students have scored more than 80%, so with 80% threshold,  $3/60 \times 100 = 5\%$  will be threshold attainment, which ignore other 57 contribution.

This interprets that 5% students have scored more than threshold 80% marks and 95% students are deficient or underperforming from the batch. Which concludes that program provides almost underkilled and not meet the Minimum skills set with threshold value.

The other institute PQR, batch of 60 students, average attainment 85% i.e., all 60 students gained 85% marks.

Now with threshold attainment 95%, with threshold set 80%. Consider 3 students gets 45% and 57 gets more than 80% marks. So, the  $57/60 \times 100 = 95\%$  students are skilled with minimum of 80% skills of a program and three students are underkilled. This tells PQR provide 95% program skilled manpower and three students of under deficient shadowing their contribution.

Institute with higher result rate can go with threshold and with lower can go with average attainment method.

#### E. Program Attainment - Crafting Holistic Education

Program attainment extends beyond the confines of individual courses. It encompasses the overall learning experience and outcomes within an academic program or major. While course attainment focuses on micro-level achievements, program attainment paints a holistic picture of a student's academic journey.

##### 1) Assessment Methods:

Evaluating program attainment requires multifaceted assessment strategies. Capstone projects, comprehensive exams, portfolios, internships, and longitudinal studies contribute to the evaluation process. These methods measure higher-order skills such as critical thinking, problem-solving, and interdisciplinary integration. Program attainment assessments bridge the gap between theoretical knowledge and real-world application.

##### 2) Institutional Perspective:

From an institutional standpoint, program attainment assessment ensures that the curriculum aligns with the

institution's mission and goals. It facilitates continuous improvement by identifying strengths and weaknesses in the program. Accreditation bodies often require evidence of program attainment to ensure educational quality and accountability.

##### 3) Synergy and Impact

The synergy between course attainment and program attainment is integral to enhancing the quality of education.

##### 4) Educational Ecosystem:

Course attainment sets the foundation for program attainment. Strong individual course performances contribute to robust program outcomes. A sequence of well-attained courses creates a scaffold of knowledge, building competence that culminates in a successful program attainment.

##### 5) Informed Decision-Making:

Assessment data from both levels provide educators and institutions with valuable insights. Educators can refine their teaching methods, adjusting to the learning needs of students. Institutions can adapt their curricula, ensuring that they remain relevant and effective in a rapidly evolving educational landscape.

##### 6) Student Empowerment

Course attainment and program attainment empower students by offering clear milestones of progress. Students can track their growth and identify areas for improvement. Furthermore, the knowledge that their education is systematically designed and assessed fosters confidence in their academic pursuits.

### III. CONCLUSION:

In conclusion, this research article has provided a comprehensive exploration of Outcome-Based Education (OBE), focusing on course attainment and program attainment assessment methods. The average-based and threshold-based approaches are discussed with sample data set and its interpretation delves the average based more to program with less success rate while threshold suits good with tier I and high success rate programs. offering insights into their applications for evaluating student achievement.

Through the use of a sample dataset and detailed calculations, the article demonstrated how these methods are employed to assess course attainment. Table I presented findings on student performance concerning specific course outcomes, highlighting the strengths and limitations of each method.

The research extended its analysis to program attainment (PO), emphasizing the critical linkage between CO and PO through mapping processes. Table II showcased PO attainment values calculated using both average and threshold methods, providing valuable insights into students' achievements within a program context.

A crucial takeaway from this research was the significance of interpreting attainment values. It stressed the importance of correlating these values with course content and performance, enabling faculty to make targeted improvements in course delivery, ultimately fostering the development of cognitive, psychomotor, and affective domains in students.

This study recognized the strengths and weaknesses of average and threshold methods in assessing attainment, underlining the necessity of choosing the appropriate method based on specific learning outcomes and educational contexts.

In summary, It highlights the importance of selecting suitable attainment methods, whether average-based or threshold-based, to ensure meaningful and accurate evaluations of student learning for the type of program or Institute. This knowledge equips educators and institutions with the tools needed to enhance the educational experience and outcomes for all students.

The future scope of the work can be carried with study on relative and weighted attainment method in shadow of average and threshold attainment method.

#### ACKNOWLEDGMENT

This paper work is supported by the guidance of our colleagues and faculty mentors from our Institute. Authors would like to acknowledge the support and responses provide by the institutes and best practices in the Rajarambapu Institute of Technology.

#### REFERENCES

- AICTE. (2018). *AICTE Examination Reform Policy*. New Delhi: AICTE. Retrieved from <https://www.aicte-india.org/policies-reforms>
- Mulla, A. A., Jadhav, H. S., & Shah, A. P. (2023, January). A Case Study on Course Outcome & Program Outcome Mapping Levels Based A Case Study on Course Outcome & Program Outcome Mapping Levels Based. *Journal of Engineering Education Transformations*, 36. doi:10.16920/jeet/2023/v36is2/23048
- Palomba, C. A., & Banta, T. W. (1999). *Assessment Essentials: Planning, Implementing, and Improving Assessment in Higher Education*. Higher and Adult Education Series. Jossey-Bass, Inc., Publishers.
- Parde, S. K. (2023, January). Outcome Base Education: Calculating Attainment of Program Outcome through Course Outcome. *A Weekly Journal of Higher Education*, 61. doi:DOI: 10.13140/RG.2.2.30211.99362
- Qadir, P. J. (2020). Outcome Based (Engineering) Education (OBE): International Accreditation Practices. American Society for Engineering Education, 2020.
- S. Amirtharaj, G. C. (2022). A systematic Approach for Assessment of Attainment in Outcome Based Education. *Higher Education for the Future* , 9(1) 8–29. doi:DOI: 10.1177/23476311211017744
- Spaddy, W. G. (1994). *Outcome-Based Education: Critical Issues and Answers*. Arlington: American Association of School Administration.

OBE	Outcome Based Education
PI	Performance Indicators
CO-a	Course Outcome Statement with Serial Number as ‘a’ for a course having 6 CO Statements serial first and b, c, d, e, f, g. second, third, fourth, fifth, sixth respectively.

#### IV. ABBREVIATIONS

ABB	Full Form
CO	Course Outcome
PO	Program Outcome
CO-PO	Course Outcome - Program Outcome Mapping