RESEARCH PAPER

Towards Sustainable Learning: Assessing the Effectiveness of Assessment Methods in Higher Education.

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ABSTRACT

Assessment techniques are integral in shaping the higher education system and have a direct relation to the quality of teaching, the learning techniques adopted by students and their academic outcomes. The past few years have witnessed a major shift in diversity of assessment methods- transforming the evaluation techniques from the traditional exams to digital tools, portfolios, group projects, peer-to-peer learning, flipped classroom, blended learning, collaborative learning and to the most modern techniques of gamification, project-based learning, and inquiry-based learning. These techniques aim to make the education more sustainable and tailored to the needs of individual students and thereby increase student engagement. Despite the extensive use of these assessment tools, there remains a gap in understanding which method is more effective from both the student and faculty point of view. Additionally, the alignment between assessment practices and the desired learning outcomes across various higher institutions remains highly inconsistent. The study aims to evaluate the effectiveness of the assessment techniques used in higher education and their extent of impact on student engagement, and whether they help in their overall academic performance. The study also aims to suggest strategies for bridging the gap between the effectiveness of assessment techniques and sustainability in higher education. The study uses a mixed-method approach to capture quantitative data from both students and faculty, along with qualitative data collected using focus groups and interviews to assess the current assessment practices and their effectiveness in sustainable learning. The findings of the study would support the policy makers, educators and higher education institutions in adopting assessment techniques which foster meaningful learning.

Keywords: Higher education, Sustainability, Assessment techniques, learning outcome

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INTRODUCTION

Assessment techniques have now become a very powerful tool in evaluating the learning outcomes and the students' engagement, but also in driving the teaching strategies. (Wimpenny, 2014) The assessment techniques have made a great transition from the traditional written examinations to a more of learner centered approach, which assesses the students' capacity in facing the real-world challenges effectively, which contributes to his/hers long-term and life-long learning.

There has been a shift from traditional assessment techniques like written examinations and quizzes to alternative assessment techniques like projects, presentations and portfolios, and to the latest technology-driven techniques like online tests and digital presentations was accelerated with the rapid advancements in technology. The present study focuses on evaluating the various assessment methods used in higher education institutions in India and evaluating how far they are able to assess the students' learning and prepare the students for lifelong learning.

2.STATEMENT OF THE PROBLEM

The various assessment techniques are used by the teachers not only as a mechanism to drive the learning but also for assessing the effectiveness of teaching- learning. Recently, the term sustainable assessment has gained popularity. An effective and sustainable assessment would ensure achieving the learning outcomes, promote skill development, minimise wastages in resource consumption and promote lifelong learning.

Further, assessment techniques may be perceived differently by both teachers and students. The teachers may emphasise the convenience, value and reliability with which the techniques operate, while the students may give emphasis on clarity, unbiased nature and relevance of the techniques. Despite the availability of so many assessment techniques, the question remains whether they are effective in assessing the extent to which a student has acquired the learning objectives and whether they really contribute to the sustainable learning of the student from both the teacher and student points of view. Further, many research studies found that the impact of clarity in presentation of techniques (Quaye & Harper, 2015), the quality with which the feedback is given to the students, along with the timeliness of feedback reports, active participation of the student in assessments, the fairness of the evaluator, and stress and anxiety levels of the students have an impact on the assessment techniques used. Additionally, there are significant differences among various disciplines and higher education institutions in the alignment between the

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various assessment techniques and their desired learning outcomes (Mishra & Koehler, 2006).

Although many studies have examined the effectiveness of the assessment techniques but still there exists natable gap in the literature. The study focuses on bridging the gap in evaluating the effectiveness of the assessment techniques used in various higher education institutions in light of various factors that influence their adoption in achieving the learning outcomes.

The integrated model proposed in the present study would contribute the policymakers, teachers, students and academic administrators in improving the assessment practices followed and provide actionable insights for the improvements in academic success and help in deeper lifelong learning across various institutions.

3.LITERATURE REVIEW

3.1 Assessment Techniques used in Higher Education.

A student assessment involves a routine and a structured collection of information regarding his/her learning, which involves experience, time and knowledge, to inform the student regarding the progress of his/her learning (Walvoord & Banta, 2010).Evaluating the student performance is essentially a two way process invoving the extent of how well the student has learnt the topics covered and on the other hand the assessment techniques essentially point out the effectiveness of teaching as well. (Jumisree & Shiuli, 2024).

(Walvoord & Banta, 2010) points out three steps for the assessment of a student- a) the student must be able to articulate the course objectives b) How well the student is achieving the course objectives, and c) how far the student can use the information for improving his/her learning. As pointed out by (Soliman, 1999) An effective assessment is designed for assessing a students leaning capability on a broader perspective, covering his/her critical thinking, problem-solving abilities, communication skills, and ability to work in groups and is designed to provide continuous feedback. Assessments may be summative or formative. The summative assessments, as end-semester examinations or test papers, assess the students' learning at the end of the learning period while formative assessments follow a student's progress throughout his learning period in the form of reviews, student interactions, observation regarding his performance and discussions, which gives the learner an opportunity to improve before he reaches the end of the semester.

In consonance with the NEP 2020 objectives, the higher education institutions have transformed from the traditional assessment techniques to the new, innovative assessment techniques, often referred to as capturing the students' progress throughout the academic year. As pointed by (McDowell, 2009) The innovative assessment techniques are more liked by the students, and they think that these techniques help them to learn better and are more interesting than the traditional techniques, but their effectiveness depends on how the students perceive it and the reasons why the students have opted for the course. Some of the modern assessment techniques are Role-playing and Simulations, Self and Peer-Assessments, Muddiest Point Technique, Gallery Walk, Round Robin Charts, 3-Way Summaries, Think-Pair-Share:, Write a Persuasive Letter, Rubrics, Concept Maps, Concept Tests, E-Portfolio, Quick projects (Jumisree & Shiuli, 2024).

Gamification is considered as one of the very effective techniques were game design elements are being used for a non-game context. Gamification is considered as a student-centred approach that motivates students to learn through games (Khoshnoodifar, Ashouri, & Taheri, 2023). Similarly, other modern techniques like Inquiry-based learning are considered as a student-centric approach where the learners ask questions, explore the topics that that are more real-world type, and solve problems rather than merely listening to the teachers. Flipped classrooms are another modern technique where students learn new concepts at home, and the teacher acts like a facilitator or guide in projects, exercises, and collaborative learning (Cabi, 2018)

For the purpose of the study, the assessment methods are classified under three broad categories: a) Traditional Assessments- Exams and Quizzes (Mishra & Koehler, 2006) b) Alternative Assessment – Projects, Presentations, Portfolios and c) Technology-based Assessments- Online tests and Digital/ video submissions. (Soliman, 1999), (Jumisree & Shiuli, 2024)

3.2 Clarity of assessment techniques and their alignment with course objectives

The clarity in assessment techniques is essential in improving a student's learning and for precision in the evaluation (Smith, 2017). The article emphasises the need for improvements in assessment techniques and stresses the need for making the assessment criteria, the instructions and the desired expectations from students clearer to make it effective. The article emphasises that better student performances are a result of clear assessments.

Many research papers highlight the need for matching the expected competencies with the assessment techniques (Serius & Mayxsie, 2024). The results often reveals that while some of the assessment techniques closely align with the expected competencies in students, some others suggest the need for a close monitoring to realign the assessment techniques. Many teachers felt the need for reviewing and updating the assessment techniques to maintain the relevance.

3.3 Timeliness and quality of feedback

(Fisher, Brotto, Lim, & Southam, 2025) studied the relevance of timeliness of formative feedback in assessment. The study found that when the feedback on the assessment is delayed for more than two weeks, it

significantly lowers the motivation of students. The study reveals that both quality and timeliness are closely interconnected for effective assessments. Quality feedback provided on time is very helpful for students in improving their performance and helps them achieve the desired results. Even though feedback of a very short span is very good (lessthan 5 days), the ideal feedback time is considered to be 10 days. (Hattie & Helen Timperley, 2007) emphasised that timeliness in feedback are powerful tool for greater learning achievement.

3.4 Assessments encourage the students to participate in active learning.

The assessment techniques must be so as to help in an active participation of the student, and the evaluation techniques must align with the course objectives (Nuez, Gil-Lacruz, & Jorge, 2020). Many research studies have focused on how evaluation techniques affect the students' study strategies. The traditional assessment techniques, like written examinations, help only in memorisation; the modern techniques are designed to assess the students' continuous improvement and checking his learning behaviour. (Molinillo, Aguilar, Anaya, & Vallespin, 2018) found that the students' active learning is influenced by active teacher-student interaction. The teacher, through the teaching and evaluation techniques act as a catalyst in shaping the student behaviour and increases active engagement.

3.5 Fairness in assessment techniques

The fairness in any assessment criteria is essential to make it more objective. Fairness in assessment essentially involves not being biased, transparency in evaluation, providing students with equal opportunities, being just, and primarily focusing on equality. Fairness involves transparently designing the assessment techniques, administering the evaluation in an unbiased manner (Baniasdi, Keyvan, Ebrahim , & Khosrow, 2023). Many research studies prove that fairness in assessment affects student performance on the other hand not being fair in assessment may encourage the students to copy in the assessment and may often lead to students being aggressive (Azizi, 2022) (Baniasdi, Keyvan, Ebrahim , & Khosrow, 2023) The present study involves finding whether the fairness in assessment has an impact on the relationship between assessment techniques and the overall student performance.

3.6 Stress and anxiety in assessment

The assessment of a student involves a complex procedure that has to be performed objectively. Objectivity is often ensured through many instruments and methods, such as testing their performance. Many important selection criteria involve testing the students. Consequently, students face a lot of stress and anxiety during the process of evaluation. Stress is referred to as a condition of tension and anxiety or being worried about a particular thing. Stress is considered a natural reaction of human beings to an incident. Even though some degree of stress pushes or motivates us to perform, some prevent or restrict our performances (Ruqaiya, Afra, & R, 2025). Many research studies have found that the anxiety levels of students have a significant impact on their performances (Trifoni & Shahini, 2011). The present study tries to find whether stress and anxiety have an impact on students' overall performance as a result of evaluation.

The following research questions have evolved from the literature discussed.

Research Questions

- What assessment methods are predominantly used in higher education institutions?
- How do students and faculty perceive the effectiveness of these methods?
- How can assessment methods be improved to enhance learning and engagement?

4.OBJECTIVES OF THE STUDY

1. To identify the most commonly used assessment methods in higher education.
2. To evaluate the perceived effectiveness of these methods in achieving learning outcomes.
3. To suggest strategies for improving the design and implementation of effective assessments.

5. HYPOTHESIS OF THE STUDY

H1:Assessment Method Used positively influences the Overall Assessment Effectiveness

H2: Perceived Quality of Assessment mediates the relationship between Assessment method Used and Overall assessment Effectiveness.

6. PROPOSED MODEL

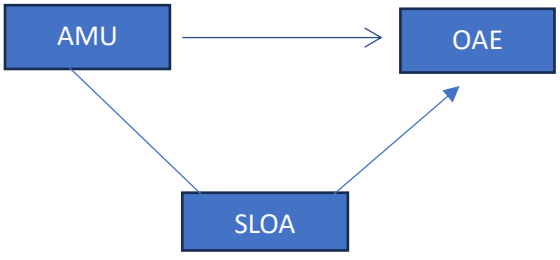

Fig. 1- Proposed Model

AMU- Assessment Method Used; PQA- Perceived Quality of Assessment;
OAE- Overall Assessment Effectiveness

7.METHODOLOGY

The study is descriptive in nature. The population, development of the survey instrument, determination of sample size and its collection, the data employed in the study and the tools for data analysis are stated below.

7.1 Population

The population of the study comprises of the students and faculty from higher education institutions of state of Kerala, India.

7.2 Development of Survey Instrument

An extensive review of literature was conducted on the evaluation techniques used by higher education institutions across the state of Kerala. Finally, for the study, the assessment methods are classified under three broad categories: a) Traditional Assessments- Exams and Quizzes (Mishra & Koehler, 2006) b) Alternative Assessment – Projects, Presentations, Portfolios and c) Technology-based Assessments- Online tests and Digital/ video submissions. (Soliman, 1999), (Jumisree & Shiuli, 2024). A 5-point Likert scale, ranging from 1 for "strongly disagree" to 5 for "strongly agree," was used in the questionnaire. A draft questionnaire was presented to a few experts to ensure face validity, and their feedback was collected to make some minor adjustments. Later, a pilot study was conducted among 40 respondents to determine the reliability. The results of the pilot survey indicated that the questions and the tools used in the collection of data are good enough as all the constructs were having reliability of > 0.70.

7.3 Determination of sample size and its collection

A convenient sampling technique was employed to distribute the questions among the various higher education institutions across the state of Kerala. The sample size of 384 is sufficient to draw a meaningful conclusion according to the Krejcie- Morgan Formula (Krejcie & Morgan, 1970). A total of 423 samples were collected from May 15th 2025 to September 30th 2025 but later 23 samples were rejected after data cleaning and finally the sample size was fixed at 400.

The data was collected from fifteen Arts and Science colleges, two Engineering colleges, two Teacher education institutions and one technical education institution. Out of the 423 respondents, 323 were students and 100 respondents were teachers. After final data cleaning, 304 students and 96 faculty responses were considered for the study. Seventy-five faculty members from Arts and Science, ten from Engineering, ten from Teacher education institutions, and five from technical education institutions. The data was collected from the Kozhikode (northern), Ernakulam(central), and Kottayam(southern) districts of Kerala.

7.4. Data Analysis

The demografic variables were analysed using mean and standard deviation. The relationship between the latent variables were establed using CFA (Confirmatory Factor Analysis). The mediation analysis was also performed using Bootsstrap technique.

8.RESULTS

8.1 Demographic Profile of Respondents

Table 1 shows that 46.2 % of respondents were male, while 53.8 % were female. The majority of the respondents were students (76%), and 24 % of the respondents were teachers. 21% of the respondents were from Arts and Humanities, 15% from Commerce, 25% from an engineering background, 30% from other Science streams, 5% from the education stream, while 4% cover other categories.

Table 1: Demographic profile of respondents

	Frequency	**Percentage**
Gender		
Male	184	46.2
Female	215	53.8
Respondent Type		
Students	304	76
Faculty	96	24
Discipline		
Arts and Humanities	84	21
Commerce and management	60	15
Science	120	30
Engineering and Technology	100	25
Education	20	5

Others	16	4

8.2 Reliability Analysis

Table: 2: Assessing the Effectiveness of Assessment Techniques Used-variables and constructs identified

Constructs	Items	Items Labels	Cronbach's Alpha
Assessment Method Used (AMU)	Written Exams	AMU-1	
	Quizzes/tests	AMU-2	
	Assignments/ Essays	AMU-3	0.830
	Presentations	AMU-4	
	Group projects	AMU-5	
	Portfolios	AMU-6	
	Online/digital assignments	AMU-7	
Perceived Quality of Assessment (PQA)	Assessment criteria used has clarity and it aligns with with course outcome	PQA-1	**0.854**
	The timeliness and quality of Feedback	PQA-2	
	Encourage the students to participate in active learning	PQA-3	
	Fair to all students	PQA-4	
	Reduce Stress and anxiety	PQA-5	
Overall Assessment Effectiveness (OAE)			
	Academic performance of students s improved with assessment	OAE-1	0.784
	Evaluating how far the student has gained additional knowledge	OAE-2	
	Prepares the student for future	OAE-3	
	Encourage social and environmental responsibilities in students	OAE-4	
	Prepare a student for facing real-world challenges	OAE-5	

A reliability test performed on the variables shows that all the Cronbach's Alpha values are above 0.7, which proves the data is fit and consistent and can be further used for analysis.

8.3.Analysis of Structural Model

STRUCTURAL MODEL

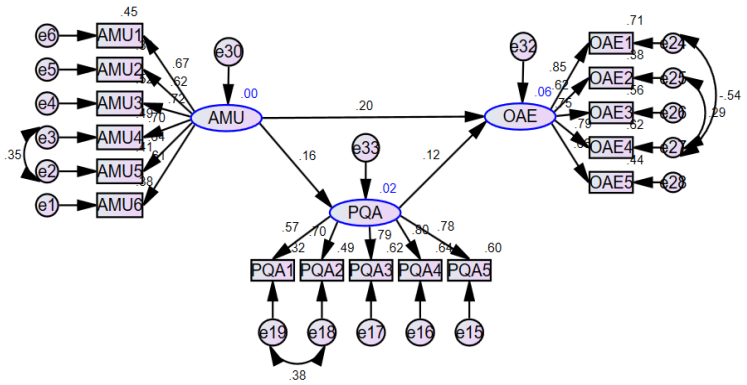

Fig. 2: Structural Model

Source: Primary data

AMU- Assessment Method Used; PQA- Perceived Quality of Assessment; OAE- Overall Assessment Effectiveness.

Table 3: Tests of model fit

Fit Indices	**Recommended Value**	**Model value**
Measures of Absolute Fit		
X2 (Chi-square)		173. 596
df (Degree of Freedom)		97
Chi-square/df(x2/df)	<5	1.790
RMSEA	<0.08	0.044
Measures of Incremental fit		
NFI (Normal Fit Index)	>0.90	0.935
CFI (Comparative Fit Index)	>0.90	0.970
IFI (Incremental Fit Index)	>0.90	0.970
RFI (Relative Fit Index)	>0.90	0.920
Measures of Parsimony Fit		
PNFI (Parsimony Normal fit Index)	>0.50	0.756
PCFI (Parsimony Comparative of Fit Index)	>0.50	.784

Source: primary data

Table 3 shows the model fit values of the structured model. All the fit indices like measures of absolute fit (chi-square, degrees of freedom, x2/df, GFI and RMSEA), Incremental fit Indices (AGFI, NFI, CFI, RFI) and Parsimony fit indices (PNFI and PCFI) of the Assessment of Evaluation techniques fall within the acceptable range, so that we can

accept the Effectiveness of the Assessment Technique Model.

8.4 Hypotheses testing and path analysis

Structural equation modelling was used to represent the relationship between the constructs. Table 4 shows the relationship between the independent variable and the dependent variable. The table explains the degree of change in the dependent variable (endogenous) as a result of one unit change in the independent variable (exogenous). All the paths are found to be statistically significant ($p>0.05$). Hence, Hypothesis 1(H1) is proved.

Table 4 Standardised Regression Weights between proposed paths

Relationship among the exegeneous and endogenous variables	Standardised estimates	S.E	CR	P-value
OAE ß AMU	**0.197**	**0.154**	**3.301**	**<0.000**
PQAß AMU	**0.158**	**0.061**	**2.598**	**0.009**
OAEß PQA	**0.123**	**0.145**	**2.172**	**0.030**

Source: primary data
Significant at 5% level.

AMU- Assessment Method Used; PQA- Perceived Quality of Assessment; OAE- Overall Assessment Effectiveness

8.4.2 Testing the Mediation Effect

A mediation variable is used to explain how and why an independent variable influences a dependent variable. Since the direct effect between Assessment Method Used and Overall Assessment Effectiveness, the mediating effect of Assessment Method Used and Overall Assessment Effectiveness needs to be tested. (Hayes, 2009) approach is used for testing the mediation effect of Perceived Quality of Assessment by using bootstrapping in AMOS software. The number of bootstrap samples selected was 2000 and the Bias- Corrected Confidence interval taken as 95%.

The mediation effect of a variable is tested in two steps:

a) Testing the direct effect between the independent and dependent variable.
b) Test the relationship between the independent variable and dependent variable, in the presence of a mediator variable.

Table 5

Mediation effect of Perceived Quality of Assessment on the relationship between Assessment method Used and Overall assessment Effectiveness.

Effect	Standardised Estimation	P-Value	Result
Total effect	0.216	0.002*	Significant Impact
Direct Effect	0.197	0.004 *	Significant Impact
Indirect effect	0.019	0.011*	Significant Impact

Source: Primary data
Significant at 5% level

AMU- Assessment Method Used; PQA- Perceived Quality of Assessment; OAE- Overall Assessment Effectiveness

The effect of Assessment Method Used on Overall Assessment Effectiveness in the presence of mediator Perceived Quality of Assessment shows a standardised indirect effect as 0.019 with a sig value of 0.011 (Table 5). The result proves a mediation effect. In the presence of mediator Perceived quality of Assessment, the direct effect of the independent variable Assessment method Used to Overall assessment Effectiveness was found to be

0.197, which is still found to be significant (p-value-0.003) and the total effect of Assessment method Used on Overall assessment Effectiveness in the presence of mediator Perceived Quality of assessment is 0.216 (p-value = 0.002), which is also significant.

Hence, it is proved that there exists a partial mediation by Perceived quality of Assessment between Assessment Methods Used and Overall assessment effectiveness

Table 6

Summarised results of the hypothesis testing

Hypothesis	Result
H1: Assessment Method Used positively influences Overall Assessment Effectiveness	Accepted
H2: Perceived Quality of Assessment mediates the relationship between Assessment method Used and Overall assessment Effectiveness	Accepted (Partial mediation)

9. DISCUSSION AND CONCLUSION

The present study aims to assess the effectiveness of the assessment and evaluation techniques of students adopted by the various higher education institutions in India and to find whether the quality of these assessment techniques impact the overall effectiveness of assessment. The study found a positive relationship with a well structured and well designed assessment or evaluation techniques with overall perceived effectiveness of these methods in achieving learning outcomes and further found that the quality of assessment has a mediating role in this relationship.

The traditional assessment techniques mainly focused on written exams and quizzes; their effectiveness in assessing the students' overall development still remains underexplored. Even though many alternative techniques like assignments, presentations, and group projects have been introduced, many higher education institutions have yet to change to the modern techniques like maintaining portfolios, digital assessments, flipped classrooms, and blended learning. The study tries to establish that when these modern techniques of assessment are also blended with the traditional techniques, a student's overall assessment can be done effectively. There is a need to integrate sustainability into the assessment practices. These techniques must be designed in such a manner that it influences the student engagement and encourage the student to learn more.

The results clearly indicate that that the effectiveness of any assessment lies in the quality of the assessment in terms of the clarity with which the assessment techniques are administered, how far they align to the learning outcomes the timely feedback provided to the students, how much the assessment techniques are encouraging a student to improve, fairness with which these assessments are made and does these assessments create stress and anxiety among the students. A well-designed assessment technique, when systematically administered, improves the effectiveness of assessment and leads to overall growth of the student.

10. CONTRIBUTIONS AND IMPLICATIONS

The study provides valuable insights for academicians, policymakers and teachers on how to develop and improve upon the use of assessment techniques in higher education. The conclusions of the research remind that the institutional goals and the student needs must be kept as a priority in designing and administering an assessment technique. The present study aims to provide deeper and enhanced academic learning for the students through improvements in the current assessment techniques.

Higher education institutions must move from a traditional teacher-centric approach to a learner-centric approach, which focuses on the competency of the student. Prominence must be laid on providing faculty training, designing assessments in accordance with outcome-based objectives, and continuous quality maintenance mechanisms. The assessments must be made, not forgetting that each student is different and the assessments should be ultimately designed to help the student be a successful individual and help and encourage him for lifelong learning.

11. FUTURE RESEARCH RECOMMENDATIONS

Future research may explore the effect of more mediating factors like competency of the faculty, the support for the institutions in learning, student engagement and level of motivation on the effectiveness of assessments. Studies may be carried out to assess the impact of Outcome-Based Education on the students' learning. Additionally, there is

scope for studying the impact of using Learning Management Systems (LMS), AI-based assessment techniques. To gauge the long term sustainability of the assessment techniques , studies may be carried to learn the impact of learner outcomes along with the employability aspects.

12. CONCLUSIONS

The success of any assessment depends on what is taught and what and how the student has learned (Reid & Amanat, 2020). Assessment is essentially required to reward a learner and to help the student to give a direction towards areas where more focus is required. This study focuses on evaluating the assessment techniques in terms of how they contribute to the effectiveness of assessment in terms of achieving learning outcomes and the mediating role of quality of assessment.

The past few years have witnessed a major shift in diversity of assessment methods- transforming the evaluation techniques from the traditional exams to digital tools, portfolios, group projects, peer-to-peer learning, flipped classroom, blended learning, collaborative learning and to the most modern techniques of gamification, project-based learning, and inquiry-based learning. These techniques aim to make the education more sustainable and tailored to the needs of individual students and thereby increase student engagement.

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