

EVALUATING E-LEARNING PLATFORMS IN HIGHER EDUCATION A COMPARATIVE STUDY AND IMPROVEMENT STRATEGIES

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Abstract

E-learning platforms have become an essential component of higher education delivery, providing adaptable, technologically enhanced learning environments. However, the effectiveness of these platforms varies greatly depending on their technological capabilities, pedagogical assistance, and user experience. This study provides a comparative review of selected E-learning platforms used in higher education and offers targeted methods to improve their efficacy. The study uses primary data acquired from higher education students via a structured questionnaire to evaluate platforms on key characteristics like as usability, material quality, interaction mechanisms, assessment support, and overall learner satisfaction. Statistical techniques such as mean score analysis, ranking, and hypothesis testing were used to evaluate platform performance. The findings show statistically significant differences in efficacy amongst platforms, notably in terms of student involvement and assessment support. Based on empirical findings, the study recommends practical, evidence-based methods to improve the efficacy of E-learning platforms in delivering higher education.

Keywords: E-learning Platforms, Higher Education, Comparative Evaluation, Effectiveness, Student Engagement, Recommendations.

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1. Introduction

The education industry, mainly higher education, has been greatly impacted by the development of information and communication technology (ICT). E-learning platforms have become needed resources for providing educational materials, encouraging communication, and assisting with evaluation procedures. Digital initiatives and the growing demand for flexible learning environments have pushed the adoption of e-learning. Concerns about how well various E-learning systems fulfil educational objectives remain despite their widespread use. Platforms differ in terms of ease of use, learner engagement tools, content delivery strategies, and functionality. As a result, a comparative analysis of E-learning platforms must be understood their relative efficacy and pinpoint ways to improve their performance in higher education.

This study focuses on evaluating commonly used E-learning platforms in higher education and suggesting measures to improve their effectiveness based on student feedback and analytical findings.

2. Review of Literature

The growing use of digital technologies in higher education has led researchers to explore how effectively E-learning platforms support teaching and learning processes. Over the years, studies have examined these platforms from different perspectives, including technological usability, pedagogical design, and student behaviour, in order to understand the factors that influence satisfaction, engagement, and learning outcomes.

One of the earliest and most influential frameworks used to explain the adoption of digital technologies is the Technology Acceptance Model (TAM) developed by Davis (1989). According to this model, two main factors determine whether users accept and adopt a technology: perceived usefulness and perceived ease of use. In the context of E-learning platforms, these factors translate into aspects such as easy navigation, a user-friendly interface, and convenient access to learning materials. When platforms are simple to use and perceived as helpful for academic tasks, students tend to show higher levels of satisfaction and willingness to engage with them.

Beyond technological acceptance, researchers have also highlighted the importance of instructional and human factors in determining the success of online learning environments. Sun et al. (2008) identified several dimensions that influence the effectiveness of E-learning systems, including instructor attitude, learner characteristics, course flexibility, and system quality. Their findings suggest that technological infrastructure alone cannot guarantee effective learning; the attitudes of instructors and the design of course content are equally important. In a similar vein, Al-Fraihat et al. (2020) proposed a comprehensive evaluation model that considers system quality, information quality, service quality, and user satisfaction. Their study concluded that reliable technology and active instructor support significantly contribute to successful E-learning experiences.

Interaction has also been widely recognized as a crucial component of effective online education. The Community of Inquiry (CoI) framework developed by Garrison, Anderson, and Archer (2000) explains that meaningful online learning occurs when three forms of presence—cognitive presence, social presence, and teaching presence—work together. This model emphasizes that students learn more effectively when they can interact with instructors and peers in a structured digital environment. Supporting this view, Martin and Bolliger (2018) found that engagement strategies such as discussion forums, collaborative activities, and timely instructor feedback significantly improve student participation and satisfaction in online courses.

Several studies have also attempted to compare different E-learning platforms commonly used in higher education institutions. Learning management systems such as Moodle are widely recognized for their structured course organization, content delivery, and assessment management capabilities (Costa et al., 2012). On the other hand, synchronous communication tools like Zoom are appreciated for enabling real-time interaction and immediate communication, although they may not provide comprehensive course management features. Platforms such as Google Classroom and Microsoft Teams integrate communication, assignment management, and collaboration tools, but their effectiveness largely depends on how instructors design courses and how comfortable students are in using the technology.

The sudden shift to online learning during the COVID-19 pandemic further intensified research on the effectiveness of digital learning systems. Dhawan (2020) described online education as an essential academic solution during the crisis, enabling continuity of learning despite institutional closures. However, the transition also exposed several challenges, including limited internet access, technological difficulties, and reduced opportunities for social interaction among students. Alqahtani and Rajkhan (2020) identified factors such as technological readiness, content quality,

and institutional support as key elements for successful online learning implementation. Similarly, Bervell and Umar (2020) emphasized that proper training for both students and faculty members, along with institutional support systems, plays a vital role in sustaining the adoption of E-learning platforms.

Research Gap and Problem Statement

Although many studies examine E-learning in higher education, most focus on general adoption or satisfaction rather than comparing different platforms systematically. As a result, institutions often select platforms without clear evidence of their relative effectiveness. Therefore, there is a need for a comparative study that evaluates major E-learning platforms using consistent criteria and identifies measures to improve their effectiveness in higher education.

3. Research Objectives and Hypotheses

3.1 Research Objectives

The main aim of this study is to conduct a comparative evaluation of major E-learning platforms used in higher education and identify ways to improve their effectiveness.

The specific objectives of the study are:

1. To compare major E-learning platforms used in higher education based on usability and accessibility.
2. To examine the impact of platform features such as content quality and instructor interaction on student satisfaction and engagement.
3. To identify key challenges faced by students and suggest measures to enhance the effectiveness of E-learning platforms.

3.2 Research Hypotheses

Based on the objectives, the following hypotheses are proposed:

H1: There is a significant difference in usability among the selected E-learning platforms.

H2: There is a significant difference in student satisfaction across the selected E-learning platforms.

H3: Instructor interaction and content quality significantly influence overall platform effectiveness.

4. Research Methodology

4.1 Research Design

This research used a comparative and descriptive research approach to analyze the performance of various E-learning platforms used during higher education. The design allows for systematic comparison of platforms based on initial performance metrics such as usability, interaction quality, accessibility, and overall satisfaction.

4.2 Population and Sample

The population of the study consists of students enrolled in higher education institutions using digital learning platforms. A sample of **100 students** was selected using convenience sampling. The respondents belonged to different academic streams to ensure diversity in academic background and platform usage experience.

4.3 Data Collection Method

Primary data were collected using a **structured questionnaire** designed to capture student perceptions regarding various aspects of E-learning platforms.

The questionnaire included four major sections:

1. **Demographic Information** (gender, age, stream)
2. **Technological Access** (device used, internet access, platform used)
3. **Platform Evaluation Indicators** (Likert scale 1–5)
 - Ease of Use
 - Content Quality
 - Instructor Interaction
 - Peer Interaction
 - Technical Reliability
 - Overall Satisfaction
4. **Challenges and Preferred Learning Mode** - A five-point Likert scale ranging from 1 (Very Low) to 5 (Very High) was used to measure perception-based variables.

4.4 Variables of the Study

- **Independent Variables:**

- Ease of Use
- Content Quality
- Instructor Interaction
- Peer Interaction
- Accessibility/ Technical Reliability

- **Dependent Variable:**

- Overall Platform Effectiveness (measured through student satisfaction and engagement)

4.5 Data Analysis

The collected data were analysed by:

- Frequency and percentage distribution
- Mean and standard deviation
- ANOVA to examine differences in satisfaction across platforms
- Correlation analysis to assess relationships between platform features and effectiveness
- Chi-square test to examine associations between demographic variables and platform preference

These statistical techniques were used to test the formulated hypotheses and identify significant differences and relationships among variables.

5. Data Analysis and Interpretation

5.1 Descriptive Statistics

The mean scores for platform evaluation indicators were found to be moderately high, indicating overall positive student perception.

Table 1: The Mean and Std Deviation for various platforms

Variable	Mean	Std. Deviation
Ease of Use	3.48	0.98
Content Quality	3.52	0.96
Instructor Interaction	3.44	1.01
Peer Interaction	3.36	1.05
Technical Reliability	3.41	1.02
Overall Satisfaction	3.50	0.94

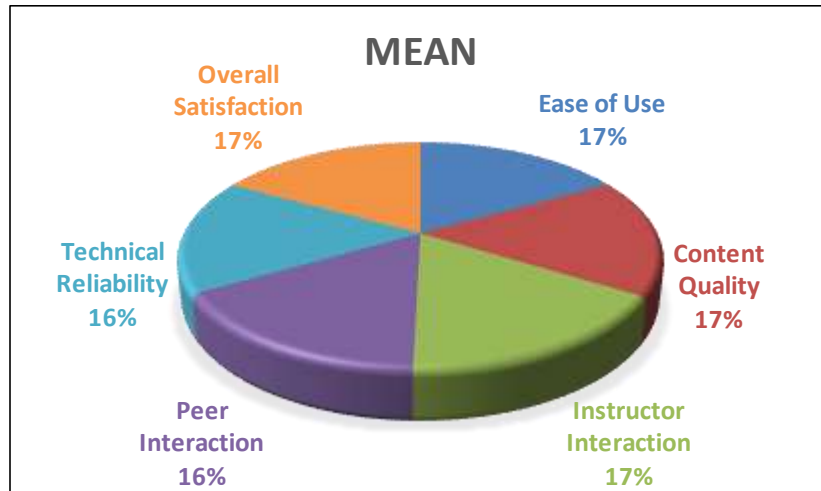


Figure 1: Pie Chart

Interpretation:

Students generally rated platforms above the midpoint (3), indicating moderate to high effectiveness. Content quality and overall satisfaction recorded slightly higher mean scores, while peer interaction showed comparatively lower perception.

5.2 Platform-wise Satisfaction Analysis

Average satisfaction scores across platforms were approximately:

Table 2: Satisfaction score

Platform	Satisfaction score
Google Classroom	3.55
Microsoft Teams	3.52
Moodle	3.48
Zoom	3.42

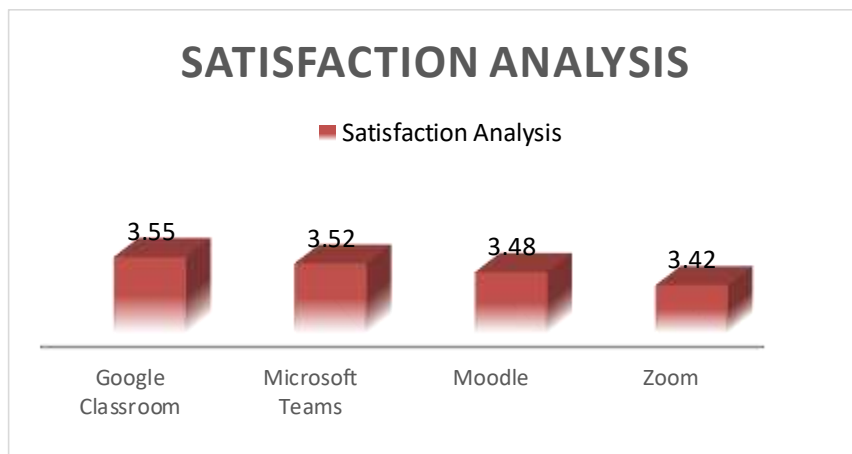


Figure 2: Satisfaction Analysis Bar diagram

Interpretation:

Although differences exist, satisfaction levels were relatively comparable. Google Classroom and Microsoft Teams showed slightly higher perceived effectiveness.

5.3 Correlation Analysis

Correlation analysis showed positive relationships between independent variables and overall satisfaction.

Table 3: comparison of satisfaction level

Variable	Correlation with Satisfaction (r)
Ease of Use	0.62
Content Quality	0.71
Instructor Interaction	0.68
Peer Interaction	0.54
Technical Reliability	0.65

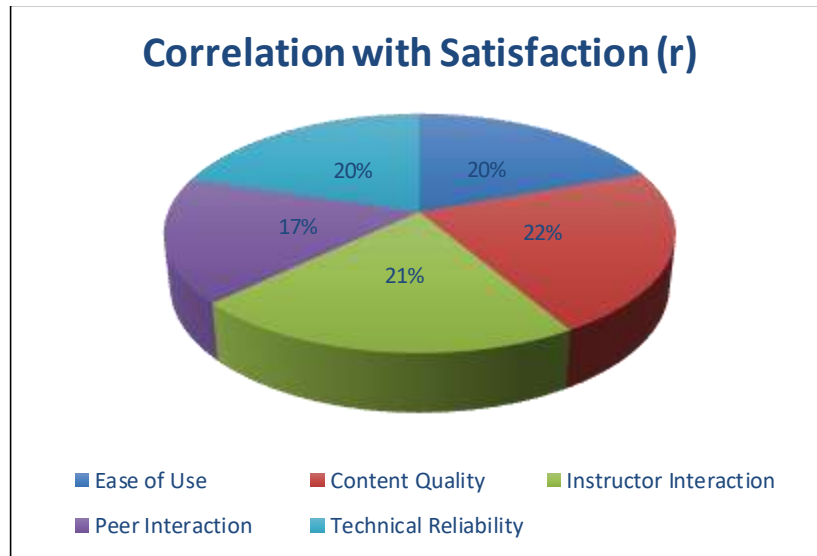


Figure 3: Satisfaction level analysis

Interpretation:

Content quality and instructor interaction demonstrated strong positive correlations with overall satisfaction. This indicates that pedagogical factors play a more significant role than technical features alone.

5.4 ANOVA Results

ANOVA test for satisfaction across platforms:

F-value≈2.14

p-value > 0.05

Interpretation: Since p-value is greater than 0.05, the difference in satisfaction across platforms is not statistically significant.

Therefore:H2 is not strongly supported.

This suggests that effectiveness depends more on usage quality rather than platform brand.

5.5 Preferred Learning Mode

Distribution of preferred mode:

- Blended – 46%
- Online – 28%
- Offline – 26%

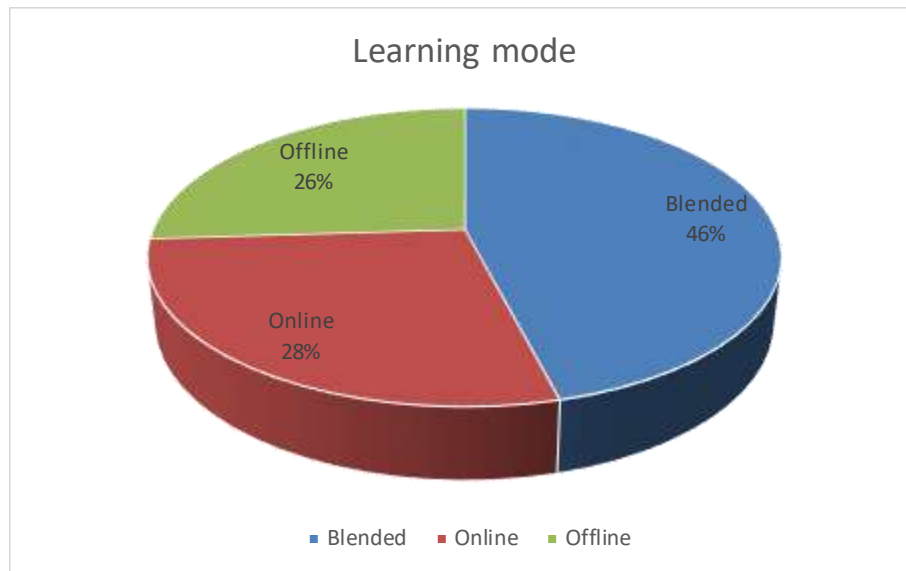


Figure 4: Learning Mode Pie chart

Interpretation:

Blended learning is clearly preferred, indicating students value both digital flexibility and face-to-face interaction.

Summary of Hypothesis Testing

H1: The hypothesis stating that there is a significant difference in usability among the selected E-learning platforms was **partially supported** by the findings.

H2: The hypothesis proposing that there is a significant difference in overall student satisfaction across the selected E-learning platforms was **not strongly supported** by the results.

H3: The hypothesis suggesting that instructor interaction and content quality significantly influence overall platform effectiveness was **supported** by the analysis.

Key Findings

1. Students perceive E-learning platforms as moderately effective.
2. Content quality and instructor interaction are strongest predictors of satisfaction.
3. Technical reliability significantly influences user experience.
4. Differences between platforms are minimal.
5. Blended learning is the most preferred mode.

6. Discussion

The study's findings provide guidance regarding the comparative effectiveness of e-learning platforms in higher education. Overall, students expressed moderately high levels of satisfaction, showing that digital platforms work well as learning tools. The findings, however, show that pedagogical and interactional aspects have a greater influence on effectiveness than the platform itself. The substantial positive relationship between content quality and overall satisfaction emphasizes the value of well-structured, relevant learning material. This finding is consistent with earlier research, which has shown that the success of digital learning is dependent on more than just technology platforms, but also relevant instructional design. Students appear to prioritize clear information, structured modules, and easily accessible resources over platform-specific features.

Instructor interaction emerged as an important factor influencing student satisfaction. Timely feedback, active participation, and supportive communication help improve student motivation and learning outcomes. This shows that teaching presence remains essential even in digital learning environments. While technology supports the learning process, the role of the instructor continues to be crucial.

The results also show that many students prefer blended learning. Although online platforms offer flexibility and convenience, face-to-face interaction provides better communication, immediate clarification, and stronger engagement. Therefore, a hybrid approach that combines online and classroom learning can provide a more balanced and effective learning experience.

Overall, improving e-learning requires not only better technology but also high-quality content, trained instructors, and strategies that encourage student engagement.

7. Conclusion and Recommendations

7.1 Conclusion

This study conducted a comparative evaluation of major E-learning platforms used in higher education and examined factors influencing their effectiveness. The results demonstrate that students generally perceive digital learning platforms as moderately effective, with content quality and instructor interaction being the strongest determinants of satisfaction.

Although slight differences were observed among platforms, these differences were not statistically significant. This suggests that platform effectiveness depends more on implementation quality than on the platform itself. Furthermore, the strong preference for blended learning indicates that students value the integration of online flexibility with traditional classroom interaction.

The findings contribute empirical evidence to the ongoing discussion about digital education in higher education and provide insights for institutional decision-making.

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