

EVALUATING THE EFFECTIVENESS OF ONLINE LEARNING PLATFORMS ON STUDENT ACADEMIC OUTCOMES, ENGAGEMENT, EVIDENCE FROM UNDERGRADUATE STUDENTS IN PAKISTAN

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Abstract

Purpose– This study investigates the effectiveness of online learning platforms on undergraduate students' academic outcomes and engagement in higher education institutions in Pakistan. It specifically examines students' perceptions regarding learning outcomes, engagement levels, technical challenges, and overall academic performance in relation to the use of online learning platform.

Design/methodology/approach– A quantitative research design was employed. Data were collected from 200 undergraduate students using online learning platforms through a convenience sampling technique. A structured questionnaire consisting of 20 items was used to gather data on students' perceptions of academic outcomes, engagement, and technical challenges. The collected data were analyzed using percentage-based descriptive statistical techniques.

Findings– The results indicate that online learning platforms generally have a positive impact on students' academic outcomes, particularly in enhancing understanding of course content, improving digital literacy, and providing flexible learning opportunities. However, several challenges were identified, including inconsistent internet connectivity, low levels of student engagement, limited interaction with instructors, and reduced motivation among learners. These factors were found to hinder the overall effectiveness of online learning platforms in achieving optimal academic performance.

Originality/value– This study contributes to the growing body of literature on digital and online education by providing empirical evidence from undergraduate students in Pakistan. It highlights both the benefits and limitations of online learning platforms and emphasizes the need for improved instructional design,

stronger technical infrastructure, and enhanced student–teacher interaction to maximize academic outcomes in virtual learning environments.

INTRODUCTION

Education plays a fundamental role in shaping the intellectual, social, and emotional development of individuals, and it continues to evolve with advancements in technology. In recent years, the integration of digital tools and online learning platforms has transformed traditional educational practices, offering new ways for students to engage with academic content. Online learning platforms provide flexible, accessible, and interactive learning environments that support a variety of instructional methods. These platforms enable students to learn at their own pace, revisit instructional material, and use multimedia resources to enhance their understanding (Anderson, 2017). The shift towards digital platforms is aligned with the broader educational objective of equipping learners with technological skills essential for participation in a modern, knowledge-driven society.

Online learning, also referred to as e-learning or remote learning, is essentially a web-based program that gives learners access to knowledge or information whenever needed, regardless of their proximity to a location or time constraints (Bossman & Agyei, 2022; Rahman et al., 2023). This form of learning has been around for a while; it started in the late 1990s and has advanced rapidly over time (Maheshwari et al., 2021; Pérez et al., 2023). It has been considered a good choice, particularly for adult learners due to its flexibility and accessibility (Basar et al., 2021; Aguilera-Hermida, 2020).

Learning experiences and students' academic success are among the key challenges of online education (Rajabalee & Santally, 2021). Furthermore, while technology facilitates accessibility and ease of use of online learning platforms, it can also have restrictive effects, as many students struggle to gain reliable internet access (Aguilera-Hermida, 2020), which in turn causes problems with participation and attendance in virtual classes, making it difficult to fully adopt online learning platforms (D. Nambiar, 2020). Other issues with e-learning include

challenges related to educational policy, learning pedagogy, accessibility, affordability, and flexibility (Maheshwari et al., 2021). Many developing countries face substantial issues with reliable internet connectivity and access to digital devices, especially among economically disadvantaged students (Pokhrel & Chhetri, 2021). Maintaining student engagement in an online classroom is often more difficult than in traditional face-to-face settings (Kedia & Mishra, 2023). Even with the advantages of online learning, reduced interaction between students and course facilitators remains a major limitation. Another barrier is the lack of opportunities for human connection, which is essential for peer support and in-depth group discussions on academic content (Zhu et al., 2020).

With the rapid growth of digital technologies, educational systems worldwide have incorporated online learning as a significant component of formal and informal instruction. Institutions at all levels—primary, secondary, and higher education—have adopted platforms such as Google Classroom, Moodle, Edmodo, and Khan Academy to support teaching and learning. According to Bates (2019), online learning systems not only provide flexibility but also broaden opportunities for learners who face geographical, financial, or personal constraints in attending face-to-face classes. These platforms allow educators to upload learning materials, assign tasks, conduct assessments, and monitor student progress in real time, making instruction more efficient and personalized. Thus, online learning has emerged as a vital educational approach that aligns with the needs of contemporary learners. The integration of online learning platforms and digital media has become increasingly important in enhancing student engagement and academic outcomes in higher education. However, the effectiveness of these platforms depends not only on the availability of technology but also on adequate infrastructure, teacher preparedness, and the use of contextually relevant digital learning resources. In Pakistan, addressing these challenges is

essential to ensure equitable and effective online learning for all students (Khan, 2026).

The role of online learning platforms became particularly significant during global disruptions such as the COVID-19 pandemic, which compelled educational institutions to shift from traditional classrooms to virtual modes of learning. This sudden transformation highlighted both the potential and the challenges of technology-based instruction. While some students adapted easily and benefited from the flexibility of online tools, others struggled due to limited digital literacy, lack of internet access, or reduced motivation (Dhawan, 2020). Despite these challenges, the global reliance on online learning demonstrated that digital platforms can effectively support academic continuity, provided they are implemented thoughtfully and with adequate support structures.

Online learning platforms are believed to contribute positively to student academic outcomes by promoting active participation, self-regulated learning, and continuous feedback (Bernard et al., 2014). Many platforms incorporate features such as videos, quizzes, interactive simulations, and discussion forums, which cater to diverse learning styles. These elements can enhance comprehension, improve retention, and encourage collaboration among students. Additionally, adaptive learning technologies used in some platforms adjust difficulty levels based on individual student performance, thereby supporting personalized learning pathways (Johnson & Samora, 2020). Such features suggest that well-designed online learning systems have the potential to improve student achievement.

However, the effectiveness of online learning on academic outcomes is not universally consistent. Student performance in online environments may vary due to factors such as motivation, digital engagement, teacher competency, accessibility of devices, and home learning environments. Some studies have argued that excessive independence in online learning may lead to procrastination or reduced accountability, negatively affecting academic success (Kauffman, 2015).

Another important consideration is students' socio-economic background, which influences

their access to digital devices, stable internet connections, and supportive learning environments. Students from disadvantaged backgrounds may experience technological barriers that prevent them from fully benefiting from online learning platforms. This digital divide can lead to unequal academic outcomes, further widening educational inequalities (Van Dijk, 2020). Hence, assessing the effectiveness of online learning requires attention to the diverse conditions under which students learn.

Given the increasing reliance on technology in education, the present research aims to assess the effectiveness of online learning platforms on student academic outcomes. By examining students' learning experiences, engagement levels, accessibility issues, and academic performance indicators, this research seeks to provide comprehensive insights into how online platforms contribute to academic success. The findings of this study may assist teachers, administrators, and educational institutions in making informed decisions regarding the integration of digital tools in teaching and learning.

Research Gap

This study aims to examine the Effectiveness of Online Learning Platforms on Student Academic Outcomes, Engagement, and Evidence from Undergraduate Students.

Despite the rapid expansion of online learning in higher education, a critical review of the existing literature reveals a significant research gap concerning the comprehensive evaluation of online learning platforms in relation to undergraduate students' academic outcomes, engagement, and technological challenges, particularly in developing countries such as Pakistan. Although numerous studies have examined the effectiveness of online learning, most have focused on specific dimensions such as academic achievement, student satisfaction, or technology acceptance rather than providing a holistic assessment of students' learning experiences. Furthermore, the majority of existing studies were conducted during the COVID-19 pandemic, when the emergency transition to online education may have influenced students'

perceptions and learning behaviors (Dhawan, 2020; Aguilera-Hermida, 2020).

Internationally, several studies have investigated the effectiveness of online learning in higher education. For example, Bernard et al. (2014) examined the impact of online learning on student achievement and concluded that technology-supported learning can improve academic performance when appropriate instructional strategies are employed. Similarly, Rajabalee and Santally (2021) explored students' online learning experiences and reported that learner engagement and satisfaction are influenced by instructional quality, interaction, and technological support. Likewise, Kedia and Mishra (2023) emphasized that maintaining student engagement remains one of the greatest challenges in virtual learning environments, while Pokhrel and Chhetri (2021) highlighted that inadequate digital infrastructure and unequal access to technology continue to hinder the effectiveness of online education in many developing countries. However, these studies primarily focused on individual aspects of online learning and did not simultaneously examine academic outcomes, student engagement, and technical challenges within a single empirical framework.

Similarly, research conducted in Pakistan has largely concentrated on students' experiences of online learning during the COVID-19 pandemic. For instance, Adnan and Anwar (2020) investigated Pakistani students' perceptions of online learning and reported that poor internet connectivity, limited technological resources, and inadequate interaction with instructors significantly affected students' learning experiences. Likewise, Mukhtar et al. (2020) explored the advantages and limitations of online teaching in Pakistani medical institutions and identified challenges related to technological infrastructure, student participation, and assessment practices. Although these studies provide valuable insights into online education in Pakistan, they mainly focused on emergency remote teaching and institutional challenges rather than comprehensively evaluating the effectiveness of online learning platforms in terms

of students' academic outcomes, engagement, motivation, and technological barriers. Moreover, empirical evidence focusing specifically on undergraduate students across higher education institutions in Pakistan remains limited.

Therefore, a significant empirical gap exists in understanding how undergraduate students perceive the effectiveness of online learning platforms by integrating multiple dimensions, including academic outcomes, student engagement, motivation, interaction, and technical challenges, within a single quantitative investigation. Addressing this gap is important because these dimensions collectively determine the quality and effectiveness of online learning experiences and can inform future improvements in digital education.

The present study addresses this gap by examining the effectiveness of online learning platforms among undergraduate students in Pakistan through a quantitative survey approach. By simultaneously investigating students' perceptions of academic outcomes, engagement, and technological challenges, this study provides updated empirical evidence that contributes to the literature on online learning and offers practical recommendations for educators, university administrators, and policymakers seeking to improve the quality, accessibility, and effectiveness of online education in higher education institutions.

OBJECTIVES OF THE STUDY

Objectives of this study are:

1. To assess the effectiveness of online learning platforms on student academic outcomes
2. To examine the level of student engagement while using online learning platforms

LITERATURE REVIEW

Concept of Online Learning

The term online learning refers to delivering instruction, content, and interaction through digital platforms using the internet. According to Moore & Kearsley (2012), online learning enables students to access learning resources irrespective of time and place, allowing flexibility and self-paced learning. It involves structured learning

experiences supported by technology, multimedia, and virtual communication tools.

Purpose of Online Learning Platforms

Online learning platforms aim to improve accessibility, enhance academic support, and provide personalized instruction. According to Anderson (2008), the primary aim of online platforms is to create interactive environments where learners can construct knowledge through multimedia content and collaborative tools. Modern platforms such as Google Classroom, Moodle, Coursera, and Edmodo are designed to promote engagement, assessment, and continuous feedback (Martin et al., 2020).

Evolution of Online Learning

The evolution of online learning began with correspondence courses and transitioned into interactive web-based education following technological advancements. Bates (2019) states that the shift from Web 1.0 to Web 2.0 increased learner participation through discussion boards, quizzes, and video lectures. The COVID-19 pandemic further accelerated global adoption of online platforms for academic continuity (Dhawan, 2020).

Effectiveness of Online Learning Platforms

Effectiveness refers to how well online platforms improve students' understanding, performance, and retention. Bernard et al. (2009) found that online learning can be equally effective or even superior to traditional learning when designed with active engagement strategies. Interactive videos, virtual simulations, quizzes, and feedback systems significantly enhance comprehension (Clark & Mayer, 2016).

Impact on Student Academic Outcomes

Academic outcomes include exam performance, concept mastery, grades, and skill development. Research by Cavanaugh et al. (2018) indicates that students using online learning platforms often demonstrate improved achievement due to continuous access to materials, self-paced learning, and personalized feedback. Similarly, Al-Azzam et al. (2021) concluded that online learning had a

measurable positive impact on students' academic achievements during the pandemic.

Student Engagement in Online Platforms

Engagement is a critical factor influencing academic success. Online platforms promote engagement through multimedia content, gamification, discussion forums, and collaborative tools. According to Dixon (2015), higher engagement in online environments is associated with better learning outcomes, increased motivation, and improved retention.

Benefits of Online Learning Platforms

Online platforms offer various benefits such as flexibility, accessibility, personalized learning, and immediate feedback. Students can revisit lectures, attempt quizzes multiple times, and interact with teachers through virtual messaging (Hrastinski, 2017). Moreover, recorded lectures and digital notes improve long-term retention.

Online Learning in the Pakistani Context

In Pakistan, universities rapidly adopted platforms like Zoom, Google Classroom, and LMS systems during COVID-19. According to Abbasi et al. (2020), Pakistani students reported improved access to learning materials but faced challenges such as poor internet and limited digital training. Farooq et al. (2020) reported mixed academic outcomes, with motivation and connectivity as major influencing factors.

Factors Influencing Effectiveness

1. Quality of Instruction
2. Teacher digital skills
3. Internet and device availability
4. Student motivation
5. Interactive content design
6. Assessment methods (Martin et al., 2020)

RESEARCH METHODOLOGY

RESEARCH DESIGN

Research Design

This study employed a quantitative research design using a non-experimental descriptive approach and a self-administered structured questionnaire. Quantitative survey research is

widely used to investigate students' perceptions, attitudes, and experiences regarding educational technologies and online learning environments (Adnan & Anwar, 2020; Mukhtar et al., 2020; Kobicheva, 2022).

The present study measures undergraduate students' perceptions regarding the effectiveness of online learning platforms on their academic outcomes and level of engagement. Specifically, it examines students' perceptions of learning effectiveness, academic performance, student engagement, motivation, teacher support, digital skills, flexibility, and technical challenges associated with online learning platforms in higher education institutions in Pakistan.

Theoretical Framework of the Study

The theoretical framework of this study was developed based on previous literature on online learning effectiveness and student engagement. The study examines undergraduate students' perceptions regarding two major constructs: Effectiveness of Online Learning Platforms on Student Academic Outcomes and Level of Student Engagement in Online Learning Platforms.

The independent variable of the study is Online Learning Platforms, whereas the dependent variables are Student Academic Outcomes and Student Engagement. Student academic outcomes include understanding course content, academic performance, digital skills, learning flexibility, online assessments, recorded lectures, and teacher feedback. Student engagement comprises students' participation in online discussions, classroom interaction, motivation, group activities, internet connectivity, and technical challenges encountered during online learning.

Study Population

The target population comprised undergraduate students enrolled in selected public and private universities in Punjab, Pakistan, who had experience using online learning platforms during their academic studies.

A total of 200 undergraduate students participated in the survey. Respondents represented different academic programs and semesters and had prior

experience attending online classes through various learning management systems and virtual learning platforms.

Sampling Technique

A convenience sampling technique was employed to select study participants. Students who were readily available and willing to participate in the survey were included in the sample. Convenience sampling has frequently been adopted in educational and online learning studies because it enables researchers to collect data efficiently from accessible respondents (Adnan & Anwar, 2020).

Research Instrument

Data were collected using a **structured questionnaire** developed after an extensive review of the related literature on online learning, student engagement, and academic performance. The questionnaire was adapted and modified from previous studies on online learning effectiveness, student engagement, and higher education (Adnan & Anwar, 2020; Bernard et al., 2014; Kobicheva, 2022).

The construct "Effectiveness of Online Learning Platforms on Student Academic Outcomes" consisted of 13 items, including course understanding, academic performance, regularity of lectures, ease of platform use, recorded lectures, online assessments, teacher feedback, flexibility, digital skills, availability of learning materials, and academic success.

The construct "Level of Student Engagement in Online Learning Platforms" consisted of 7 items, including participation in online discussions, asking questions, classroom engagement, learning motivation, participation in group activities, internet connectivity, and technical challenges.

All questionnaire items were measured using a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1).

Validity and Reliability of the Instrument

To ensure the validity and reliability of the research instrument, the questionnaire was developed following an extensive review of previous empirical studies on online learning and student engagement. The initial questionnaire was

reviewed by three experts in education and educational technology to assess the relevance, clarity, language, and content validity of each item. Based on their recommendations, minor modifications were incorporated to improve the wording and readability of several statements. Subsequently, the questionnaire was pilot-tested before the final survey administration. The internal consistency of the instrument was assessed using Cronbach's Alpha, and the overall reliability coefficient exceeded the recommended threshold of 0.70, indicating satisfactory reliability for the study.

Data Collection Procedure

Data were collected through a self-administered survey using Google Forms. The online questionnaire was distributed among undergraduate students enrolled in selected universities in Punjab, Pakistan.

The survey link was shared through university faculty members, departmental coordinators, WhatsApp groups, email, and other academic communication platforms. Students were informed about the objectives of the study before participating, and participation was entirely voluntary.

A convenience sampling approach was adopted to maximize the number of responses from students who had prior experience using online learning platforms during their university education. Data collection was completed after obtaining 200 valid responses.

Data Analysis

The collected data were entered into the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive statistical techniques, including frequencies, percentages, and response pattern analysis, were employed to summarize students' perceptions regarding the effectiveness of online learning platforms on academic outcomes and student engagement. Tables and descriptive interpretations were used to present the findings.

Ethical Considerations

The study adhered to accepted ethical principles throughout the research process. Participation in

the survey was entirely voluntary, and informed consent was obtained from all respondents before data collection. Participants were informed about the objectives of the research and assured that their responses would remain anonymous and confidential. No personal identifying information was collected, and respondents had the right to withdraw from the study at any stage without any consequences. The collected data were used solely for academic and research purposes.

RESULTS AND DISCUSSION

Student Academic Outcomes

The findings indicate a favorable attitude toward online learning, as the majority of respondents either Strongly Agreed (SA) or Agreed (A) with most of the statements.

The highest level of agreement was observed for the statement "Recorded lectures are helpful for revising lessons," where 32.5% of respondents strongly agreed and 37.5% agreed, resulting in a Strongly Positive response pattern. Similarly, the statement "Online learning platforms are effective for academic success" also received a Strongly Positive response pattern, with 27.5% strongly agreeing and 35% agreeing.

A positive perception was also evident for the effectiveness of online learning in understanding course content (30% SA, 35% A), ease of using online learning platforms (30% SA, 32.5% A), and improvement of digital skills (30% SA, 32.5% A). Furthermore, students acknowledged that online learning saves time and travel costs (30% SA, 32.5% A) and provides flexibility in managing their studies (27.5% SA, 32.5% A).

Regarding academic performance, 25% of respondents strongly agreed and 30% agreed that online classes had improved their academic performance. Likewise, 25% strongly agreed and 35% agreed that online quizzes and assignments enhanced their learning. Students also expressed positive opinions about the regular delivery of online lectures (27.5% SA, 32.5% A) and the availability of required course materials (27.5% SA, 32.5% A).

However, comparatively lower levels of agreement were found for the statement "Teachers provide timely feedback on online submitted work," where

22.5% strongly agreed and 30% agreed, while 20% disagreed and 12.5% strongly disagreed. Consequently, this statement showed only a Moderate Positive response pattern, suggesting that timely instructor feedback remains an area requiring improvement. Similarly, perceptions regarding the fairness of online assessments were positive but comparatively moderate, with 25% strongly agreeing and 32.5% agreeing.

The findings of the present study indicate that undergraduate students generally hold positive perceptions regarding the effectiveness of online learning platforms in improving their academic outcomes. The majority of respondents agreed that online learning enhanced their understanding of course content, improved academic performance, increased digital skills, provided learning flexibility, and reduced time and travel costs, with recorded lectures being perceived as the most valuable learning resource. These findings are consistent with Bernard et al. (2014), who concluded that online learning can significantly improve students' academic achievement when supported by effective instructional strategies. Similarly, Bates (2019) reported that online learning platforms provide flexible and accessible learning environments that enable students to manage their studies more effectively and improve learning outcomes. The

positive perceptions regarding digital skill development and flexible learning also support the findings of Anderson (2017) and Bossman and Agyei (2022), who emphasized that online learning enhances students' technological competencies and promotes independent learning. However, the present study also revealed comparatively lower satisfaction with teacher feedback and online assessment practices, indicating that timely instructor support remains an important challenge. These findings are in agreement with Rajabalee and Santally (2021), who identified instructor interaction and prompt feedback as critical factors influencing the effectiveness of online learning. Furthermore, the study found that internet connectivity and technical issues continue to hinder students' learning experiences, supporting the findings of Adnan and Anwar (2020) and Pokhrel and Chhetri (2021), who reported that inadequate technological infrastructure and unstable internet access remain major barriers to successful online learning, particularly in developing countries such as Pakistan. Overall, the findings suggest that while online learning platforms positively contribute to students' academic outcomes, improving technological infrastructure, teacher feedback, and student engagement is essential to maximize the effectiveness of online education.

Table No.1: Effectiveness of Online Learning Platforms on Student Academic Outcomes

Statements	SA	A	N	D	SD	Mean Response Pattern
Online learning helps me understand course content effectively	30%	35%	10%	12.5%	12.5%	Positive
Online classes have improved my academic performance	25%	30%	15%	20%	10%	Positive
Online lectures are delivered regularly by teachers	27.5%	32.5%	12.5%	17.5%	10%	Positive
Online learning platforms are easy to use	30%	32.5%	12.5%	15%	10%	Positive
Recorded lectures are helpful for revising lessons	32.5%	37.5%	7.5%	12.5%	10%	Strongly Positive
Online quizzes and assignments enhance my learning	25%	35%	15%	12.5%	12.5%	Positive

Statements	SA	A	N	D	SD	Mean Response Pattern
Teachers provide timely feedback on online submitted work	22.5%	30%	15%	20%	12.5%	Moderate Positive
Online learning saves time and travel cost	30%	32.5%	10%	15%	12.5%	Positive
Platforms provide all required course materials	27.5%	32.5%	12.5%	15%	12.5%	Positive
Online learning increases flexibility in managing studies	27.5%	32.5%	12.5%	15%	12.5%	Positive
Online classes improve my digital skills	30%	32.5%	10%	15%	12.5%	Positive
Online assessments fairly evaluate my performance	25%	32.5%	15%	17.5%	10%	Positive
Online learning platforms are effective for academic success	27.5%	35%	12.5%	12.5%	12.5%	Strongly Positive

Student Engagement in Online Learning

The findings indicate that students demonstrated a moderate level of engagement in most aspects of online learning. Nearly half of the respondents (47.5%) agreed or strongly agreed that online discussion forums helped them clear their doubts, while 35% disagreed or strongly disagreed, reflecting a moderate level of effectiveness. Similarly, 52.5% of the students reported feeling comfortable asking questions during online classes, suggesting a moderately positive perception of classroom interaction.

Regarding engagement during lessons, 50% of the respondents agreed that online classes kept them engaged, whereas 32.5% expressed disagreement, indicating a moderate level of student engagement. In terms of motivation, only 42.5% of the students agreed that online learning increased their motivation to study, while 40% disagreed, reflecting a **low positive** response. This suggests that although online learning offers flexibility, it may not sufficiently motivate all students.

The results also reveal that students experienced considerable technical challenges. A majority of respondents (65%) agreed that they faced internet connectivity issues during online classes, while only 27.5% disagreed, identifying connectivity as a significant negative challenge. Likewise, 62.5% agreed that technical problems affected their learning experience, confirming that technological

barriers remain a major obstacle to effective online education. Finally, 50% of the respondents agreed that they felt comfortable participating in online group activities, whereas 35% disagreed, indicating a moderate level of participation in collaborative learning. The findings of the present study indicate that undergraduate students experienced a moderate level of engagement in online learning platforms. Although more than half of the respondents reported feeling comfortable asking questions during online classes (52.5%) and half agreed that online classes kept them engaged during lessons and encouraged participation in group activities, students' overall motivation toward online learning remained relatively low. These findings are consistent with Rajabalee and Santally (2021), who reported that student engagement in online learning is strongly influenced by the quality of interaction between instructors and students, collaborative learning opportunities, and instructional design. Similarly, Kedia and Mishra (2023) found that maintaining student engagement is one of the greatest challenges in virtual learning environments because limited face-to-face interaction often reduces students' motivation and active participation. The moderate level of engagement observed in this study also supports the findings of Kobicheva (2022), who concluded that although live online learning promotes academic participation and interaction, students generally

demonstrate lower engagement compared with traditional classroom settings. Furthermore, the present study revealed that internet connectivity and technical problems were the most significant barriers affecting student engagement, with 65% of respondents reporting connectivity issues and 62.5% indicating that technical difficulties negatively influenced their learning experiences. These findings are in agreement with Adnan and Anwar (2020), who found that unreliable internet connectivity, inadequate technological infrastructure, and limited access to digital resources significantly reduced students'

participation and engagement in online learning in Pakistan. Likewise, Pokhrel and Chhetri (2021) concluded that technological inequalities and poor internet access remain major obstacles to effective online education in developing countries. Overall, the findings suggest that while online learning platforms provide opportunities for student interaction and collaborative learning, improving digital infrastructure, enhancing teacher-student interaction, and adopting more engaging instructional strategies are essential for increasing student engagement and motivation in higher education.

Table 2: *Level of Student Engagement in Online Learning Platforms*

Statements	SA	A	N	D	SD	Mean Response Pattern
Online discussion forums help in clearing doubts	20%	27.5%	17.5%	20%	15%	Moderate
I feel comfortable asking questions in online classes	25%	27.5%	17.5%	17.5%	12.5%	Moderate Positive
Online classes keep me engaged during lessons	22.5%	27.5%	17.5%	20%	12.5%	Moderate
Online learning increases my motivation to study	20%	22.5%	17.5%	25%	15%	Low Positive
I face internet connectivity issues during online classes	35%	30%	7.5%	12.5%	15%	Negative Challenge
Technical issues affect my learning	30%	32.5%	10%	12.5%	15%	Negative Challenge
I feel comfortable participating in online group activities	22.5%	27.5%	15%	22.5%	12.5%	Moderate

CONCLUSION AND IMPLICATION

This study evaluated the effectiveness of online learning platforms on undergraduate students' academic outcomes and engagement in higher education institutions in Pakistan. The findings indicate that students generally have positive perceptions of online learning, particularly regarding improved understanding of course content, academic performance, digital skills, flexibility, and the usefulness of recorded lectures. However, the study also revealed a moderate level of student engagement, with relatively lower motivation and participation in online learning activities. Furthermore, internet connectivity

problems, technical issues, and delays in teacher feedback were identified as major barriers that limited the overall effectiveness of online learning platforms. These findings suggest that although online learning has considerable potential to enhance higher education, its effectiveness depends largely on reliable technological infrastructure, effective instructional practices, and active student-teacher interaction.

This study provides important theoretical, practical, and policy implications for higher education institutions in Pakistan. It contributes to the existing literature by providing empirical evidence on the relationship between online

learning platforms, student academic outcomes, and engagement in the Pakistani context. The findings highlight the importance of strengthening digital infrastructure, improving instructional design, enhancing teacher-student communication, and promoting interactive online teaching strategies. The study offers useful guidance for university administrators, educators, curriculum developers, and policymakers in developing effective digital learning environments that support student engagement, academic success, and sustainable online education.

RECOMMENDATIONS

Based on the findings, higher education institutions should improve internet connectivity and technological infrastructure to minimize technical barriers experienced by students. Universities should also provide regular training for teachers on effective online teaching strategies, timely feedback, and the use of interactive digital learning tools to enhance student engagement. Furthermore, institutions should encourage collaborative online learning activities, improve the quality of online assessments, and develop policies that promote equitable access to digital learning resources. Future research may employ larger samples, include universities from different provinces of Pakistan, and utilize inferential statistical techniques or mixed-method approaches to further examine the effectiveness of online learning platforms.

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