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Article Title

Impact of Online Learning on Students' Engagement and Academic Performance at Higher Institutions

Abstract

This research examines the effects of e-learning on academic performance and student engagement in universities. Through a quantitative approach, data were gathered from a sample of 200 students drawn from a population of 1,050. Descriptive statistical procedures, i.e., mean, standard deviation, frequencies, and percentages, were used together with inferential tests like ANOVA and regression to test the association among variables. The results confirm that a reliable internet connection, access to digital devices, and technical support significantly improve students' experience through online learning. It suggests the integration of mixed-method studies with long-term designs in terms of developing a more complete profile of online courses of study. It also recommends that the use of good teaching practices, strong student support services, and equitable institutional policies should be embraced to enhance motivation and attainment. All these conclusions are essential to teachers and policymakers who aspire to get the most out of online learning.

Keywords: Online Learning, Student Engagement, Academic Achievement, Higher Education

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Title

Impact of Online Learning on Students' Engagement and Academic Performance at Higher Institutions

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Contents

Abstract

This research examines the effects of e-learning on academic performance and student engagement in universities. Through a quantitative approach, data were gathered from a sample of 200 students drawn from a population of 1,050. Descriptive statistical procedures, i.e., mean, standard deviation, frequencies, and percentages, were used together with inferential tests like ANOVA and regression to test the association among variables. The results confirm that a reliable internet connection, access to digital devices, and technical support significantly improve students' experience through online learning. It suggests the integration of mixed-method studies with long-term designs in terms of developing a more complete profile of online courses of study. It also recommends that the use of good teaching practices, strong student support services, and equitable institutional policies should be embraced to enhance motivation and attainment. All these conclusions are essential to teachers and policymakers who aspire to get the most out of online learning.

Keywords:

Online Learning, Student Engagement, Academic Achievement, Higher Education

Introduction

Online learning, electronic education, or remote learning is a web course that actually expands access to knowledge or information (Bossman & Agyei, 2022). Online learning existed since the late 1990s and gradually evolved. This is especially known as an option for adult students (Rahman et al., 2023). Electronic education revolutionized the educational environment, providing flexible, convenient, and inexpensive educational opportunities. With the rapid evolution of digital technology and the rapid evolution of the Internet, students have been able to study anytime, anywhere, and access educational materials. The environment of electronic learning was very important in vocational training and

higher education because students helped students to learn at their own speed and to receive individual learning.

The COVID-19 pandemic also stimulated the use of online learning by converting academic institutions around the world from regular personal approaches to electronic modes (DHAWAN, 2020). It can have strengths, but online learning is also limited to limited limitations such as interaction, digital separation, and authenticity of students in virtual tests (Hodges et al., 2020). This study studies the effects of online learning on students' effects, participation, and availability, and mentions the advantages and disadvantages of training in this way. In a study based on previous and topic studies, the study is trying to contribute to the future discussions of online education. Online education has many advantages for students, such as individual requirements, convenience, and flexibility, such as flexibility. Laptops or desktop computers use cheap online learning skills to help students learn anywhere and save time and access restrictions (Basar et al., 2021). Nevertheless, online learning makes it difficult to achieve academic achievement and academic success (Rajabalee & Santally, 2021). Despite the fact that this technology contributes to accessibility, it is limited because it is difficult for some students to access the Internet, so they prevent the interaction and attendance of electronic learning (Aguilera-Master, 2020; Nambir, 2020). Some of the problems are based on questions about training policies, education, accessibility, and flexibility (Maheshwari et al., 2021). Stable internet connections and access to digital devices are a problem in some developing countries, especially for students related to the economy (Pokhrel & Chhetri, 2021). In general, it is more difficult to support students in the online classroom compared to traditional classes (Kedia & Mencera, 2023).

Regardless of the advantages of electronic learning, there is little interaction between students and teachers. One of the biggest problems is that there is a lack of human touch needed to support colleagues and group work (Al-Amin et al., 2021). The COVID-19 pandemic also increased the need to adapt to electronic training because the school had to switch to a virtual platform (Elnour et al., 2023). This radical change led to

disagreements about the quality and satisfaction of students' academic work (BABER, 2020). During the closure of universities around the world, higher education institutions had to accept online educational practices to continue the contents of the curriculum. Online learning led to this change so that students could control learning under virtual conditions. Electronic education establishes a dialogue between course content, education, and technology so that students can get the maximum value in their studies. Teachers were responsible for the conceptualization of curriculum results, including methodologies with technical support. Nevertheless, there is a problem with the definition of the optimal learning strategy and the educational activity organization to satisfy various students.

The literature showed that remote learning has a positive effect on developing devotion to training, as well as the ability to accept students' achievements and various learning methods (Muzammil et al., 2020). The online environment can provide lightness and balance between school and social life. Electronic learning also helps students use their learning process to achieve their knowledge based on experiences, problem-solving, and forums. Nevertheless, online learning has little personal interaction and is facing difficulty in supporting students' motivation. The effectiveness of online learning depends on aspects such as availability, class planning, and participation (Mandasari, 2020). In addition, teachers must also accept new teaching laws to maintain active participation in students' participation and educational activities.

Literature Review

The development of information technology is common using electronic mottoes such as desktop computers, laptops, and mobile phones, which has become common for Internet resources. The new electronic learning device is being developed continuously in education, but one of the Virtual Educational Environments (VLES) is a blackboard (BB). BB is an application that allows users to access the title module or course by accessing the unique user name and password. It started as one of the best commercial education systems and is used as a software package for the course

management system in schools and other educational institutions (Guo et al., 2016).

Computer training for the World Wide Web, or computer guidelines for the Internet, is already a reality due to the performance of broadcasting technology, communication, and network technology. The use of electronic materials is widely studied from various perspectives (Flavin & Quintero, 2018). For example, researching the use of learning techniques was found to find out if law students could help to get anxiety of Hewitt and Stubbs (2017) and increase self-efficiency.

Young and Nichols (2017) studied how scientists include digital learning approaches in the curriculum. In this extensive investigation, the use of the Internet and related innovative technologies has been added to some different terms that are somewhat interchangeably used throughout the literature. This is mixed learning, remote learning or remote learning, online education, web learning, and recent VLE (Young & Nichols, 2017). VLEs, such as BB, Canvas, and Web Chat (WebCT), can open 24 hours a day.

The Impact of the Virtual Education Environment on the Participation of Students

The virtual education environment has been shown to improve students' participation in certain research. In a study conducted by Akcaoglu and Lee (2016), VLES expands students' participation to allow joint training, real-time opinions, and independent education. In their study, VLE users were more involved in learning than users, not VLE. LIN et al. (2017) conducted a study that VLES greatly increased the number of learning languages. As discovered in the study, students' motivation and satisfaction have been improved for students using VLE compared to students who do not use VLE.

The Impact of the Virtual Education Environment on Academic Achievement

Virtual education was also observed as a positive contribution to academic achievement. Kebritchi et al. (2017) We have conducted research and found that VLE improves students' performance by ensuring access to multimedia and interactive materials, promoting independent education, and

providing immediate feedback. This study showed that students with VLE reached a better evaluation than those who did not use VLE. AYDIN and TASCI (2019) conducted a second study showing that VLES greatly increased student performance. According to this study, students using VLE are better for exams than students who have been formed by mathematics information without using VLE.

Similarly, Renties et al. (2016) have legalized the use of educational analysis and introduced conscious arbitration as appropriate to support students. In his study, Chawing (2016) pointed out that the use of microblogs on Twitter an online platform has improved education and education. It is important to further study how to improve online discussions and education, and you need to solve some prospects to provide students with high-quality experiences in online learning. One of the most important aspects of high-quality online education is to ensure students' participation (Sinclair et al., 2017). The use of electronic training in higher education systems has speeded up after Covid-19, and changes in practice to teach and strengthen digital learning methods (MEKALA et al., 2024). Both students and teachers need technical support for successful use of online learning.

This document shows that the use of online platforms such as Zoom, Google Classroom, and Microsoft Teams has been the basis for attracting students into virtual classes (Wargadinata et al., 2020). Technical problems, such as poor internet connections, lack of computer illiteracy, and electronic devices, are the main obstacles to education (Alawamleh et al., 2020). Also, JHA et al. (2023) show how technology restrictions interfere with training, despite the fact that students like autonomy in online classes. Educational knowledge forms the practice and skills adopted by the instructor for successful training.

The transition from traditional classrooms to online education has changed teaching practices, and teachers will rebuild their strategies to ensure student interaction (Aristovnik et al., 2023). Studies have shown that teachers are not ready enough to effectively integrate digital tools into educational practice, which affects the ability to provide students with immediate feedback support (Dhillon & Murray, 2021). KNOX (2016) also

points out that asynchronous training models provide flexibility with enough time for students to digest information and participate in important discussions. The success of online learning also depends on the well-structured materials and encouraging contents of the course.

It has been revealed that it is more convenient for students to study the online environment with a low-level by-product with low motivation and understanding (LI & WANG, 2019). Second, a study conducted by Sun and Chen (2016) shows that online educational materials should focus on conversations and students and focus on learning results. Nevertheless, according to a study conducted by Ponnusamy and Perumal (2023), most students fought to maintain their research online because they did not have enough direct interactions with teachers.

Tpack Framework and Online Learning

Studies show that teachers with improved TPACK functions are more equipped to ensure high-quality education (Makawawa et al., 2021). Kim and Lee (2018) and Chaipidech et al. (2021) are important for improving teacher's digital education skills. This research confirms that the institution supports the current educational program and expands its education and technical skills among teachers.

Theoretical Framework

The theoretical structure of this study on the effects of online learning on academic achievements and the participation of the best students is rooted in various psychological and educational theories. These theories explain online how the learning environment affects students' motives, participation, and achievements.

Composition Learning Theory

Constructive Learning Theory (PIAGE, 1950; Vygotsky, 1978) suggests that students will build knowledge through active participation and interaction with the environment. Thanks to remote learning, students are involved in interacting with the computerized data, creating publications for the subject, working in groups, and creating knowledge. The approach and flexibility provided by remote learning can be learned at will and contribute to the participation of participation in pleasure.

Self -determination Theory (SDT)

Self -determination theory (Deci & Ryan, 1985) emphasizes the use of internal and external motives in training. The environment of the online course supports students' autonomy, competency, and intimacy, which is essential for motivation and participation. Education self-regulation, access to various resources, and interactions between colleagues and instructors can greatly contribute to academic success.

Community of Inquiry (CoI) Framework

The model of the research community (Garrison, Anderson & Archer, 2000) emphasizes the importance of learning, cognitive and social beings in online learning. Teaching students in the online process is often improved by the degree of feeling that students are connected to each other. Good beings of education, effective cognitive participation, and joint discussions can improve students' interaction and academic achievement.

Cognitive Load Theory (CLT)

The cognitive load theory (1988) argues that the cognitive load of the online learning environment must be balanced to maximize the training. Excessive information or unstructured content can overload students to reduce separate and academic achievement. High-quality online education, such as multimedia and forests, can improve interaction and performance.

Models of Tinto Students

Tinto (1975) The first model of academic and social integration tags in creating students' achievements. Teaching online learning questions teaches a classic approach to social integration, which intervenes with students' motives and patience. Virtual online chat, assigned work team cooperation, and professors' answers are only a process of disability for the results of the students mentioned above.

This conceptual structure combines a variety of perspectives to understand how online learning affects students' achievements and devotion. Teachers' theory, constructivism theory, self -determination theory, research community, cognitive load theory, and tinto students provide a strong foundation for studying how online learning affects higher education students. All of these

theories will inform the study method and data analysis in this study.

Statement of the Problem

As a result of technological achievement and the global situation, the rapid evolution of electronic training has changed the educational environment at the third education level. Flexibility and approach to large-scale resource pools are characterized by online learning, but they are worried about how they affect their participation in education and academic performance. Students face frequent interactions and motivation problems in virtual conditions, and the scientific consequences of online learning vary by condition.

In addition, the decision factors and academic achievements that teach students during online learning are still unknown. The quality of educational design, digital literacy level, instructor interaction, and technical support a variables that can change the situation. Nevertheless, this is true of each variable, and the way that affects each other in higher education is still more studied.

Therefore, this study aims to study the impact of online learning on students' participation and academic achievements and to determine the main factors that form these measures in the context of the environmental training environment. Understanding this epidemiology is important for developing an effective online educational model in which teachers, politicians, and institutions support interaction and academic achievements.

Research Objectives

1. To investigate the impact of online learning on students' engagement at a higher level
2. To assess the impact of online learning on student's academic performance at a higher level
3. Factors of online learning that influence students' Engagement and Academic Performance at a Higher Level

Research Questions

1. What is the impact of online learning on students' engagement at higher levels?

2. What is the impact of online learning on students' academic performance at higher levels?
3. What are the Factors of online learning that influence students' engagement and academic performance at higher levels?

Delimitations of the Study

This study is geographically delimited to the district of Multan, focusing on higher education institutions, namely NUML and Women's University. The data is collected from students of CS and IT departments, specifically regarding online learning.

Methodology

Research Design: This study uses a quantitative research design that focuses on the relationship between online learning (independent variables) and students' participation and academic achievements.

Population and sampling: In this case, the population includes Computer Science students CS), Information Technology departments (IT), and the National University of Modern Languages (NAML). The entire population consists of 490 students and 560 students in Numl, and this population consists of 1050 years. 200 students were used as samples using any sampling method for presentations without displacement.

Data collection: Data was collected using an independent questionnaire developed by the researcher. The survey tool was built by gaining ideas for online learning, student participation level, and student performance. There are 16 statements in the questionnaire, and each statement has five options, consent, complete agreement, neutral, agreement, and categorical consent.

Statistical tools and data analysis: summarized the collected data using description statistics such as standard deviation, average value, percentage, and frequency. In addition, we used the regression analysis and the statistical test of ANOVA to test the importance of independent variables and the importance of their relationship.

Table 1

Frequency Distribution at the Basis of Demographic Analysis

Sr.	Title	Description	Frequency	Percentage
1	Gender	Male	76	38.0%
		Female	124	62.0%
2	Age	19-25	148	74.0%
		26-32	48	24.0%
		33-40	4	2.0%
3	Education of the respondent	Undergraduate	136	68.0%
		Graduate	64	32.0%
4	Computer usage of the respondent	None	12	6.0%
		Daily	126	63.0%
		Weekly	38	19.0%
		Monthly	24	12.0%

Table 1 presents the demographic profile of the respondents participating in this study on the impact of online learning in higher education. Out of 200 students, a majority were female (62%), while males made up 38% of the sample. The dominant age group was 19-25 years, representing 74% of participants, followed by 24% in the 26-32 range and a small fraction (2%) aged 33-40. In terms of educational level, most respondents were undergraduates (68%), while graduates accounted for 32%. Regarding computer usage, 63% of students reported daily use, indicating a high level of digital engagement essential for online learning, while 19% used computers weekly, 12% monthly, and only 6% had no usage, reflecting overall strong technological readiness among participants.

Table 2

Factors Of Online Learning That Influence Students' Engagement and Academic Performance

Sr.	Description	SA	A	N	DA	SDA	M	SD
1	The availability of online learning resources (e.g., e-books, and recorded lectures) enhances my academic performance.	42.0	8.0	29.0	3.0	18.0	3.53	1.497
2	The flexibility of online learning allows me to better manage my time and study effectively.	45.0	24.0	14.0	6.0	11.0	3.86	1.345
3	Regular interaction with instructors in an online setting increases my engagement with course materials.	17.0	48.0	22.0	10.0	3.0	3.66	0.974
4	Technical issues (e.g., poor internet connection, and software problems) negatively impact my learning experience.	12.0	39.0	35.0	13.0	1.0	3.48	0.902
5	Online learning platforms provide sufficient tools for collaboration and discussion with classmates.	19.0	29.0	42.0	5.0	5.0	3.52	1.017
6	The clarity and structure of online course content significantly influence my understanding and academic performance.	18.0	26.0	46.0	5.0	5.0	3.47	1.007
7	Self-motivation plays a crucial role in my engagement with online learning activities.	14.0	27.0	40.0	13.0	6.0	3.30	1.056
8	The assessment methods used in online learning (e.g., quizzes, and assignments) accurately reflect my understanding of the subject.	24.0	33.0	28.0	8.0	7.0	3.59	1.144
9	Online learning reduces my academic stress compared to traditional face-to-face learning.	27.0	27.0	32.0	5.0	9.0	3.58	1.196

Sr.	Description	SA	A	N	DA	SDA	M	SD
10	Institutional support (e.g., academic counseling, IT support) improves my engagement and success in online learning.	19.0	31.0	30.0	11.0	9.0	3.40	1.178

Table 2 highlights key factors of online learning that influence student engagement and academic performance among higher education students. The findings show that flexibility is a standout factor, with 45% strongly agreeing and a mean score of 3.86, indicating that online learning helps students manage their time more effectively. Regular interaction with instructors also emerged as important (M = 3.66), enhancing engagement. Access to online resources (M = 3.53) and effective assessment methods (M = 3.59) are similarly seen as contributing positively to performance.

However, self-motivation (M = 3.30) and institutional support (M = 3.40) received slightly lower mean scores, suggesting that while these are relevant, they may not be fully optimized in current online settings. Additionally, technical issues (M = 3.48) are acknowledged as a barrier, though not overwhelmingly so, indicating moderate challenges faced by students. Overall, the table underscores the multifaceted nature of online learning, where content flexibility, instructor interaction, and resource availability play the most critical roles in enhancing academic outcomes.

Table 3

Impact of online learning on students' engagement

Sr.	Description	SA	A	N	DA	SDA	M	SD
1	Online learning has made it easier for me to actively participate in class discussions.	47.0	11.0	26.0	6.0	10.0	3.79	1.355
2	I feel motivated to complete my coursework in an online learning environment.	37.0	37.0	13.0	8.0	5.0	3.93	1.128
3	Online learning provides me with sufficient opportunities to interact with instructors.	19.0	50.0	21.0	9.0	1.0	3.77	0.895
4	I find it easier to ask questions in an online class than in a traditional classroom.	19.0	29.0	43.0	7.0	2.0	3.56	0.944
5	Online learning has improved my ability to manage my time effectively.	16.0	24.0	46.0	10.0	4.0	3.38	1.000
6	Technical issues (e.g., internet connectivity) negatively impact my engagement in online learning.	17.0	26.0	37.0	13.0	7.0	3.33	1.117
7	Online learning materials (e.g., recorded lectures, and readings) help me stay engaged in my courses.	40.0	13.0	28.0	4.0	15.0	3.59	1.426
8	I am more likely to complete assignments on time in an online learning environment.	38.0	31.0	11.0	8.0	12.0	3.75	1.355
9	I find online assessments (quizzes, exams) engaging and effective for my learning.	23.0	46.0	18.0	9.0	4.0	3.75	1.036
10	Online learning allows me to balance academic responsibilities with personal commitments.	21.0	36.0	27.0	11.0	5.0	3.57	1.091
11	The flexibility of online learning increases my engagement with course content.	21.0	26.0	37.0	11.0	4.0	3.67	2.045
12	I feel comfortable participating in discussions on online forums and discussion boards.	20.0	29.0	37.0	8.0	6.0	3.49	1.084
13	Online learning makes it easier for me to access learning resources.	24.0	29.0	29.0	10.0	8.0	3.51	1.190

Table 3 presents the impact of online learning on students' engagement, showing generally positive perceptions with some areas for improvement. Notably, students reported feeling more motivated

in an online environment (M = 3.93) and found it easier to participate in discussions (M = 3.79) and interact with instructors (M = 3.77). Online assessments and assignment completion also scored well (both M = 3.75), suggesting that structured tasks help maintain engagement. However, while flexibility (M = 3.67) and access to resources (M = 3.51) are seen as beneficial, technical issues (M = 3.33) continue to negatively affect

engagement. Time management (M = 3.38) and comfort in online discussions (M = 3.49) received moderate ratings, pointing to areas where students might still struggle. Overall, the table highlights that while online learning fosters motivation and task completion, challenges remain in sustaining consistent engagement and overcoming technical and interactional barriers.

Table 4

Impact of online learning on students' academic performance

Sr.	Description	SA	A	N	D	SD	M	SD
1	Online learning has improved my overall academic performance.	64.0	11.0	16.0	2.0	7.0	4.23	1.21
2	I am able to achieve better grades through online learning compared to traditional classroom learning.	38.0	33.0	16.0	6.0	7.0	3.89	1.19
3	Online learning provides me with sufficient resources to understand course content effectively.	31.0	37.0	25.0	4.0	3.0	3.89	0.99
4	The flexibility of online learning has positively impacted my ability to complete coursework on time.	19.0	41.0	31.0	8.0	1.0	3.69	0.90
5	I can retain information better through online lectures than through in-person classes.	25.0	27.0	34.0	11.0	3.0	3.60	1.07
6	Online learning allows me to review recorded lectures, which enhances my understanding of the subject.	21.0	31.0	33.0	8.0	7.0	3.51	1.12
7	I feel confident in my ability to succeed academically in an online learning environment.	22.0	25.0	33.0	10.0	10.0	3.39	1.22
8	Online assessments (quizzes, exams) accurately measure my academic progress.	22.0	24.0	26.0	16.0	12.0	3.28	1.30
9	I am able to meet academic deadlines more effectively in an online learning setting.	14.0	23.0	39.0	14.0	10.0	3.17	1.14
10	The availability of digital resources (e-books, research papers, etc.) enhances my academic performance.	11.0	31.0	30.0	18.0	10.0	3.15	1.15
11	Online learning has helped me develop better self-discipline and	23.0	28.0	26.0	14.0	9.0	3.42	1.24
12	time management skills.	48.0	16.0	22.0	6.0	8.0	3.90	1.29
13	The lack of face-to-face interaction with instructors negatively affects my academic performance.	37.0	37.0	15.0	4.0	7.0	3.93	1.15
14	The ability to learn at my own pace in an online environment improves my understanding of course material.	20.0	46.0	22.0	6.0	6.0	3.68	1.05
15	Technical difficulties (internet issues, software problems) hinder my academic performance in online learning.	11.0	35.0	39.0	13.0	2.0	3.40	0.92

Table 4 reveals that students generally perceive online learning as beneficial to their academic performance, though with some noted challenges. A strong majority agree that online learning has

improved their overall academic performance (M = 4.23) and helped them achieve better grades (M = 3.89). Flexibility and self-paced learning are seen as key advantages, positively impacting coursework

completion (M = 3.69) and understanding (M = 3.68). Additionally, time management skills appear enhanced (M = 3.90), though self-discipline shows a moderate score (M = 3.42). However, students report that technical difficulties (M = 3.40) and lack of face-to-face interaction (M = 3.93) somewhat hinder their progress. While digital resources (M = 3.15) and online assessments (M = 3.28) are moderately effective, areas like meeting deadlines (M = 3.17) and building confidence in academic success (M = 3.39) score lower, indicating room for improvement. Overall, the table highlights a positive but mixed impact, with clear strengths in flexibility and access but challenges in interaction and consistency.

Table 5

Correlation Analysis between online learning on students' engagement

Correlation Analysis		Online Learning	Students' Engagement
Online Learning	Pearson Correlation	1	.508**
	Sig. (2-tailed)		.000
	N	200	200
Students' Engagement	Pearson Correlation	.508**	1
	Sig. (2-tailed)	.000	
	N	200	200

Table 5 describes the correlation between online learning on students' engagement. There is a pure linear relation between online learning vs online learning and students' engagement vs students' engagement and vice versa. The Pearson correlation between online learning on students' engagement is positive (.508). This shows that if there is online learning then students' engagement will increase.

Table 6

Regression Analysis to find out the effects of Online Learning on Students' Engagement

Regression Analysis	R	R²	F	B	β	t	Sig.
(Constant)	.508a	.259	69.037	21.922		7.161	.000
Online Learning				.711	.508	8.309	.000

Table 6 defines the details of correlation between the Online Learning and Students' Engagement through regression analysis. In this analysis, Students' Engagement is the dependent variable and Online Learning is taken as the independent variable. R-value represents the simple correlation value which is .508 which indicates that there is a correlation between the dependent variable and independent variable. The R^2 value (25.9%) indicates how much of the total variation is in the dependent variable. Here value of P=.000 which is less than .05, indicates that overall, the regression model statistically significantly predicts the outcome variable. B values help to develop the regression equation which is Loss of Students' Engagement = 21.922+ .711(Online Learning).

Table 7

Correlation Analysis Between Online Learning on Students' Academic Performance

Correlation Analysis		Online Learning	Academic Performance
Online Learning	Pearson Correlation	1	.527**
	Sig. (2-tailed)		.000
	N	200	200
Academic Performance	Pearson Correlation	.527**	1
	Sig. (2-tailed)	.000	
	N	200	200

Table 7 describes the correlation between online learning on students' Academic Performance. There is a pure linear relation between online learning vs online learning and students' Academic Performance vs students' Academic Performance and vice versa. The Pearson correlation between online learning on students' Academic Performance is positive (.527). This shows that if there is online learning then students' Academic Performance will increase.

Table 8

Regression Analysis to find out the effects of Online Learning on Students' Academic Performance

Regression Analysis	R	R²	F	B	β	t	Sig.
(Constant)	.527a	.278	76.154	28.363		9.504	.000
Online Learning				.728	.527	8.727	.000

Table 8 defines the detail of correlation between Online Learning and Students' Academic Performance through regression analysis. In this analysis, Students' Academic Performance is the dependent variable and Online Learning is taken as the independent variable. R value represents the simple correlation value which is .527 which indicates that there is a correlation between the dependent variable and independent variable. The R² value (27.8%) indicates how much of the total variation is in the dependent variable. Here value of P=.000 which is less than .05, indicates that overall, the regression model statistically significantly predicts the outcome variable. B values help to develop the regression equation which is Loss of Students' Academic Performance = 28.363+ .728(Online Learning).

Findings

Respondents' population statistics (Table 1) show more women (62%) than 38%of 200 people of higher education. Most of the respondents were young people between 19 and 25 years old (74%), 26-32 years old (24%), and a minimum ratio (2%) of ages 33-40. The highway (68%) was determined compared to 32%of graduates. To prepare for digital, most students (63%) use computers every day to showcase the intensive use of online education. Students who use computers weekly (19%) and monthly (12%) bass were also part of the sample but only 6 did not use computers, indicating general stable preparation for the online learning environment. The indicators of students' motivation and academic success (Table 2) are the most powerful features of electronic learning (m = 3.86), which emphasizes that students can organize more time. Continuous interaction with instructors

(m = 3.66) and electronic learning data (m = 3.53) had a positive impact on students' academic success. The evaluation method is advantageously evaluated (m = 3.59), which indicates that quizzes and work have a positive impact on student performance. Self-motivation (M = 3.30) and the support of the organs (m = 3.40) are advantageously evaluated below, which indicates the potential area of improvement. The technical problem (M = 3.48) has been found to be a medium obstacle, which indicates that students experience the problem but not very negatively. When studying students' participation (Table 3), the overall results are generally advantageous. Students had increased motivation (m = 3.93), and they were more likely to interact with instructors in the assistant agencies (m = 3.79) and virtual settings (m = 3.77). In addition, the online test was described as stimuli (m = 3.75), and the promise of promise was increased (m = 3.75). Nevertheless, there are certain problems to be solved, including the average estimation of elements such as technical problems (M = 3.33) time management (m = 3.38), and the simplicity of promoting online discounts (m = 3.49). This indicates that online learning supports motivation and participation, but the continuous participation and simplicity of the technology are the problem areas. In the case of academic achievement (Table 4), students generally watched online learning positively. Most of them have improved general academic efficiency (m = 4.23) and improved estimates (m = 3.89). Independent training and flexibility were evaluated as the best advantage, and it was promoted to complete the term terms (m = 3.69) and understanding (m = 3.68). Although the time management technology has been improved (m = 3.90), faith in self-contrast

(m = 3.42) and academic achievement (m = 3.39) are as follows. Technical problems (m = 3.40) and lack of personal interaction (m = 3.93) were mentioned as fall. In addition, the appropriate rating of regulations (M = 3.17) and resource use (m = 3.15) indicates the area that must be solved when optimizing the online learning platform.

Correlation Analysis (Table 5) confirms that there is a statistically significant positive relationship between online learning and students (r = 0.508, p <0.01). In addition, the regression test (Table 6) showed that online education was 25.9% (r² = 0.259) of students' distribution, but the prognosis correlation (p <0.001). The regression equation shows that students' participation is greater if online learning increases.

Similarly, Table 7 shows the high, positive correlation between performance and online learning (r = 0.527, p <0.01). Regression Analysis (Table 8) also describes 27.8%of online learning (r² = 0.278), and the regression model is statistically significant (p <0.001). This indicates that online learning is an important factor that determines productivity.

In general, this study emphasizes that web education helps to improve students' participation and academic performance due to flexibility, accessibility and evaluation of resources. Nevertheless, it still exists due to these advantages, technical problems, interaction obstacles and self - regulatory violations, and requires specific interventions to use on the Internet.

Discussion

The results of this research emphasize the comprehensive contribution of online learning to bridging students' engagement and academic achievement among university students. The demographic survey indicated a predominance of young, female, undergraduate students with high digital readiness — a determining factor in favor of effective online learning. The extensive utilization of computers among 63% of the study participants indicates the fundamental technology proficiency needed to competently participate in online learning environments.

Among the most striking findings is the great importance students assign to flexibility with online learning (M = 3.86). This concurs with prior work by Dhawan (2020), who noted that flexibility is one of the major strengths of online learning, allowing people to organize learning according to personal and work schedules. This flexibility, complemented by positive attitudes towards routine contact with staff and usage of facilities, is in line with the belief that online settings, if well organized, are able to support long-term intellectual stimulation.

In addition, the findings from the research also determined that participatory factors online like motivation boost (M = 3.93) and facility to engage in debates (M = 3.79) are positively affected by the online learning designs. The evidence is also complemented by that of Martin and Bolliger (2018), who found that students' engagement in online modules is highly influenced by the presence of the instructor as well as interactive course design. Nonetheless, medium scores on self-motivation (M = 3.30), time management (M = 3.38), and technical issues (M = 3.48) suggest that while online education promotes participation, these have to require students have or need to acquire robust self-regulatory capacities and institutions in order to repress technical incursions.

Academically, students reported notable improvement, particularly in overall performance (M = 4.23) and grades (M = 3.89). This accords with the correlation (r = 0.527, p < 0.01) and the outcome of regression analysis, where it appears that online learning explains a significant percent of the variance (27.8%) in academic performance. Independent learning ability and enhanced time management ability (M = 3.90) are probable reasons for these positive results. Lower means of self-discipline (M = 3.42) and confidence in academic success (M = 3.39) suggest that there are still issues with student autonomy in online environments.

Technical problems and the absence of face-to-face interaction (M = 3.93) also were among the issues, indicating the need for improving support systems and hybrid methods that would help to alleviate isolation. The moderate ratings in meeting deadlines (M = 3.17) and utilization of resources (M = 3.15) also indicate areas in which online sites need to be optimized for improved student performance.

Overall, the results validate the growing body of evidence that effective online learning environments — defined as flexibility, accessible materials, and interactive testing — enhance

student involvement and academic success. Yet, to reap these benefits fully, institutions need to overcome technical reliability, student self-regulation, and interactive opportunities issues.

Conclusions

This study aimed to study the effects of electronic education on students' participation and academic achievements. The results confirm that web learning has a significant impact on participation and academic performance due to flexibility, easily accessible data, and effective evaluation. High correlation and regression analysis also emphasize that high-profit electronic learning environments are motivated and related to academic achievement. Surprisingly, the students also had high motivation, and time management, and reported increased performance to confirm the potential of well-developed online education systems to promote students' development.

Nevertheless, this study also shows that it must be solved by intervention to promote the maximum yield of electronic training. Technical problems that have less personal interactions, greater discipline, and self-control were one of the problems observed among students. The inclusion of institutional intervention, great technical intervention, self -motivation and self -motivation and communication will be inevitable. Schools focusing on this field can use the web education system to enhance students' motivation and achievement in the new context of higher education.

Recommendations

- Enhance institutional support services to address technical issues and provide timely assistance to students.
- Incorporate interactive elements such as live sessions and discussion forums to improve student-instructor engagement.
- Implement training programs to strengthen students' self-regulation, time management, and online learning skills.

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