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An Evaluation of Pakistani Students' Usability of Online Learning Apps for Increasing Efficiency, Performance and Productivity

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Abstract: *This study highlights the usability of online learning apps among Pakistani students, specifically examining their effectiveness in enhancing efficiency, performance, and productivity. With the proliferation of e-learning applications like Learn Smart, Skoolify, Ilm ki Dunya, Sabaq's Muse App, and similar platforms, technological advancements have accompanied a new era of enriched learning experiences. Notably, in the post-COVID era, the symbiotic relationship between students and teachers through these apps has proven to be particularly beneficial. The primary objective of this study is to empower students to attain higher grades by providing them with access to high-quality teaching resources. Employing a quantitative approach, this research conducts a survey with 500 respondents randomly selected from diverse universities in Lahore, Pakistan. The findings illuminate the positive impact of e-learning on students' academic success, signifying a significant influence on their overall productivity. A majority of respondents affirm the positive effects of e-learning on academic performance, learning abilities, and communication skills. Furthermore, the study emphasizes that e-learning not only contributes to academic progress but also nurtures motivation and satisfaction within the learning process. In summary, the results show the considerable impact of e-learning on students' academic achievements, offering valuable insights into the transformative potential of online learning apps in the educational landscape.*

Key Words: Usability, E-learning Applications, Assessment, Productivity, Students, Pakistan

Introduction

The main driver of every nation's economy, development, and growth is education. In the era of globalization and technological progress, education is seen as a fundamental priority for all individuals. It is widely recognized as a key factor in the growth of human potential and is strongly connected to people's well-being and chances of achieving a more favorable life (Stahl et al., 2020; Huang et al., 2023; Twum-Antwi, Jefferies; Ungar, 2020). Getting the appropriate education is regarded as a fundamental principle and a basic human need. In most countries, the education sector has developed into an industry (Shaturaev, 2021 & Tanveer et al., 2020). Strong educational frameworks with powerful and skilled organizations produce more notable results for students and are prepared to provide high-quality services (Kiersch & Peters, 2017). The higher education commission (HEC) has advanced higher education in Pakistan steadily over the past ten years. Zuhairi et al. (2020) state that the conventional educational system underwent a metamorphosis into an electronic learning system by leveraging information and communication technology (ICT). The way people learn and acquire knowledge and information has changed as a result. The teaching and learning processes around the world are primarily influenced by information technology. As a result of this development, every educational and training institution worldwide uses online apps, channels, and search engines for educational purposes (Swanson, 2022).

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The method of e-learning involves neither the moderator nor the students being physically present in the same location at the same time (Elumalai et al., 2021 & Qazi et al., 2022). It implies that continuing education doesn't require spending more time in a traditional classroom. Many academics define e-learning as instruction delivered via the internet, websites, YouTube channels, intranets, extranets, interactive television, and CD-ROMs (Debrah et al., 2021). With the development of information technology in the middle of the 1990s, e-learning has attracted a lot of attention. E-learning is defined as "instruction provided on a digital medium such as a computer or mobile device to facilitate learning (Poultsakis et al., 2021). They said that E-learning is now referred to as "web-based learning," whereas it was previously known as "internet-based learning." Technically speaking, e-learning includes learning that is adapted to a particular learner's needs in addition to the instructor's instructions and coaching. Students can easily interact with the system using various methods through this e-learning technique, including graphic images, google classroom, and a classified learning environment, which enables the teacher to better understand the student's behavior and perception of the e-learning method (Bhardwaj et al., 2021). Additionally, there are numerous IT platforms that allow educational institutions to offer a wide range of online programs to students seeking an education for example swww.coursera.org, and www.edx.org (Fung et al., 2022; Noorbehbahani, Mohammadi; Aminazadeh, 2022 & Serin, 2022).

Students can receive education from all around the world with the use of e-learning. It provides a new perspective for both the teacher and the student. Students' analytical thinking, problem-solving skills, and dedication to their studies are all improved through e-learning (Kassymova et al., 2021; Puriwat & Tripopsakul, 2021; Sinaga & Setiawan, 2022). Using e-learning allows students to view a single subject from a variety of perspectives. Since students in e-learning can access the internet to learn, neither they nor the moderator are restricted to the classroom. E-learning can be done anywhere, at any time. Online content is the information flow in e-learning. As a result of its integration of technology and the internet, it provides all the fundamental information on any problem (Alqahtan & Rajkhan, 2020). Students' performance and efficiency are influenced by learning using educational apps. A student's efficiency can be determined by looking at their grade point average (GPA), overall performance on class tests, and time management skills throughout their academic career.

The effectiveness of the class reflects the students' capacity for learning, aptitude for communication, and academic success. It is possible to say that students' efficiency is, in some ways, the external representation of their talent. On the other hand, the key metric for assessing any e-learning method is the effectiveness of the students. The learning capacity, real-time feedback, communication abilities, and grades of pupils can all be acquired through acquiring their efficiency (Almaiah et al., 2020). The current study focuses on how educational e-learning apps affect a learner's effectiveness. Students' communication and learning skills are improved by e-learning. It aids students in achieving better grades throughout their academic careers. It gives students a sense of satisfaction and drive in regards to better educational and learning environments. Due to the abundance of material available through educational apps, it improves learners' efficiency and boosts their knowledge and information. Every student can get the knowledge even if they are unable to attend class thanks to e-learning and several educational apps that help students balance their commitments. Students thought they could simply attain higher scores with online coursework. Students said that e-learning was useful, fun, and easily measurable (Gonzalez et al., 2020; Ansari et al., 2021; Yaşar, 2020 & Rajabalee et al., 2020). Due to the flexibility of e-learning activities, students feel slightly more anxious in a traditional learning setting than they did in an e-learning one. E-learning is also less expensive than conventional education. E-learning is more adaptable than traditional education (Lazarevic & Bentz, 2021). The research article focuses on that how e-learning educational apps affect students' performance, grades, learning abilities, and communication skills.

Statement of Problem

The educational landscape in Pakistan has witnessed a transformative shift towards electronic learning (e-learning) facilitated by advancements in information and communication technology. This transition, particularly the widespread use of educational apps, presents a unique opportunity to assess its impact on the efficiency, performance, and productivity of Pakistani students. As the Higher Education Commission (HEC) has progressively advanced higher education in the country, understanding how e-learning apps

influence students' academic outcomes, learning abilities, and communication skills becomes crucial. The current study aims to investigate how educational e-learning apps impact a learner's effectiveness, focusing on students' performance, grades, learning abilities, and communication skills.

The primary focus of this research is to systematically evaluate the usability of e-learning apps among Pakistani students and their correlation with key performance indicators such as grade point averages (GPA), performance in class tests, and overall time management skills. By investigating the students' perspectives on the usefulness, enjoyment, and measurability of e-learning compared to traditional classroom settings, the study aims to provide a comprehensive understanding of the effectiveness and adaptability of this educational paradigm. Furthermore, it seeks to explore the impact of e-learning on students and its cost-effectiveness compared to conventional education. Through this investigation, the study endeavors to contribute valuable understandings that can inform educational policies, guide institutional practices, and optimize the use of technology in the search for quality education in Pakistan.

Objectives

The study's objectives are:

- To ascertain the effect of educational apps for e-learning on students' academic performance.
- To demonstrate how e-learning apps improve students' learning abilities and communication skills.
- To assess whether e-learning apps give satisfaction and motivation to the students to fulfill their needs.

Hypothesis

H1: E-learning improves students' academic performance (productivity, performance, and grades).
H2: E-learning apps improve students' communication skills.
H3: E-learning apps improve students' learning ability.

Significance of the Study

The shift from traditional education to the electronic learning environment, propelled by advances in information and communication technology (ICT), has transformed the way people acquire knowledge and information. In this evolving landscape, individuals now have the freedom to choose between traditional methods and internet-based learning. The widespread use of the internet in Pakistan has permeated every aspect of daily life, including education, leading to a rapid adoption of online courses, especially during the COVID-19 pandemic.

As institutions and students swiftly adapt to new perspectives on learning methods, the popularity of e-learning continues to rise. This study holds significance in the context of the growing prevalence of learning through e-learning apps. The researcher aims to investigate the impact of these evolving techniques on students' grades, learning capacities, and communication abilities. E-learning apps have become integral in improving efficiency, performance, and productivity across various domains. The flexibility offered by these apps allows learners to access educational content at their convenience, using devices such as smartphones, tablets, or laptops. This accessibility empowers learners to engage with materials at their own pace, seamlessly integrating learning into their busy schedules. Consequently, learners can optimize their time and productivity by choosing when and where to learn.

The multimedia elements incorporated into e-learning apps, such as videos, interactive quizzes, simulations, and gamification techniques, enhance engagement and knowledge retention. This interactive approach revolutionizes the acquisition of knowledge and skills, ultimately leading to increased efficiency, improved performance, and heightened productivity across educational institutions. In a world where learning is not confined to physical classrooms, e-learning apps play a crucial role in shaping the future of education.

Literature Review

Online learning fosters higher engagement and creativity in pupils while providing a flexible and useful learning environment. Using internet to learn has some benefits for them (Yusnilita, 2020). The online

learning affected students' academic performance and motivates pupils and increases their enthusiasm for learning. The type of education employed in online training is helpful and adaptable for students. The majority of students stated that they will be able to get decent job, teach online, or become proficient enough to do so after completing an online degree programme (Akhter, 2020). By using e-learning improved students' academic achievement. This study stated that university's e-learning programmes had a beneficial effect on students' progress in the classroom. Few studies conducted to investigate the effects of online teaching and learning on the performance of the class. According to the findings, there was no discernible change in the academic presentation of the student (Banda et al., 2021; Al-Rawashdeh et al., 2021; Sarikhani et al., 2016 & Hamdan et al., 2021).

E-learning is more readily available to students, easier, cheaper, and potentially better. The university students are happy with and confident in e-learning as long as Pakistan's educational system is supported by technology. Additionally, the study discovered some detrimental link between the effects of online learning and student happiness and self-confidence. The study also demonstrated that a quick internet connection helps students feel confident and satisfied (Suresh et al., 2018 & Zaman & Nashmena, 2021). Many studies investigated how e-learning affected the educational system. Our economy and society have undergone various substantial changes as a result of the development of communication and information technology, particularly in the area of education. It altered how teaching and learning were done. Both traditional university students and online learners now have new chances thanks to it. Online learning is more timely, flexible, and engaging because students can learn anything at any time (Akour & Alenezi, 2022; Barrot et al., 2021 & Tajudeen et al., 2022).

E-learning has an effect on students' academic achievement but teachers should be well-prepared and knowledgeable while providing online lectures and should provide comprehensive information regarding e-learning programmes like What's App etc. E-learning significantly affects student motivation (Marlina, Tjahjadi & Ningsih, 2021). Students who are motivated to learn through an e-learning system learn more (Elshareif & Mohamed, 2021). A study conducted in Jordanian and UK in 2021 analysed that despite certain difficulties with communication, internet technology, and student perception of e-learning, the study did not find any statistically significant differences between the performance of UK and Jordanian students. Additionally, students gain advantages including access to recorded lectures online, flexibility, and the ability to learn at any time through online courses (Yaseen et al., 2021).

There is a relationship between student success in an online learning environment and their engagement, satisfaction, and desire for learning as well as their performance, self-esteem, and confidence. E-learning is a real tool for improving student information and understanding. Researchers discovered that e-learning was encouraging students to learn on their own (Marunevich et al., 2021; Kassymova, et al., 2021 & Encarnacion, 2021). The impact of an e-learning strategy on students' academic achievement at Al-Quds Open University was examined by Abdel Jawad and Shalash in 2020. A sample of 382 university students' GPAs were collected by the researcher. During the Covid-19, researchers discovered a sizable variation in the GPA of the pupils. Researchers found that while student GPAs as a whole improved by about 2.188, male students' GPAs were influenced more adversely by about 1.198 when compared to female students. Students believed that online learning could help them reach their goals and boost the effectiveness of their education (Adarkwah, 2021).

Flipped learning had a favourable impact on learners' perceptions during periods of disruption in online instruction. The participats was influenced by accessibility, assignment delivery, and e-learning platform use. According to the research, accessibility remained the most important element influencing online learning's effectiveness. As a result, the current study also examines how e-learning affects students' productivity. Researchers Laili and Nashir (2021) examine how college students perceive online learning during the COVID-19 pandemic, including its benefits and drawbacks. This study used the descriptive approach. According to the data, there are differing views among students about online education. While flexibility is a benefit of online learning, there are a lot of disadvantages as well, such as irregular signal, some students who weren't as prepared, difficulties following voice conversation, and a high cost of internet. The study found that students (91%) prefer in-person instruction to online instruction. But the continuing research studies examine and analyse the impact of educational e-learning apps on students' performance. Different researchers look into the connection between student academic

achievements and e-learning. 384 participants who were enrolled in higher education institutions (HEIs) in Pakistan's Punjab province provided the data, and the research model was empirically tested. The results show that, through student motivation and student satisfaction, all service quality (e-learning) is favourably related to students' academic achievement (Rashid & Yadav, 2020). There is a link between internet use and academic engagement in students. Modern technologies are incorporated into the educational process, with a significant impact on education. Multimedia presentations, and digital technology increase participants' educational experiences and outcomes in environments for asynchronous online learning (Mothibi, 2015; Liu et al., 2022 & Yang et al., 2020).

There are statistically significant differences between students' scores while utilising traditional learning methods and those when using ICT-supported learning methods. The nature of some courses, which are better taught traditionally rather than relying on information and communications technology, may be the cause of the disparate results. However, adoption of e-learning strategies improves students' academic achievements (Elfaki et al., 2019). The use of communications and information technology affect student's performance at four Saudi universities in terms of gender, educational programme, and degree of academic accomplishment. The research showed that when using an information and communication technology-based learning strategy, students other than those studying computer programming performed better than others. Hence E-learning motivates students and improves their academic performance in addition to encouraging self-learning and giving a feeling of ease in use and engagement, enabling greater flexibility in learning time (Kee, 2020 & El-Sabagh, 2021). All the factors like computer's self-efficacy, self-study aptitude, ease and benefit, e-mail engagement, and social presence have a favourable impact on learning and knowledge transfer (Medero, & Albaladejo, 2020).
After reviewing the above literature, the researcher has formulated the following hypothesis.

Theoretical Framework

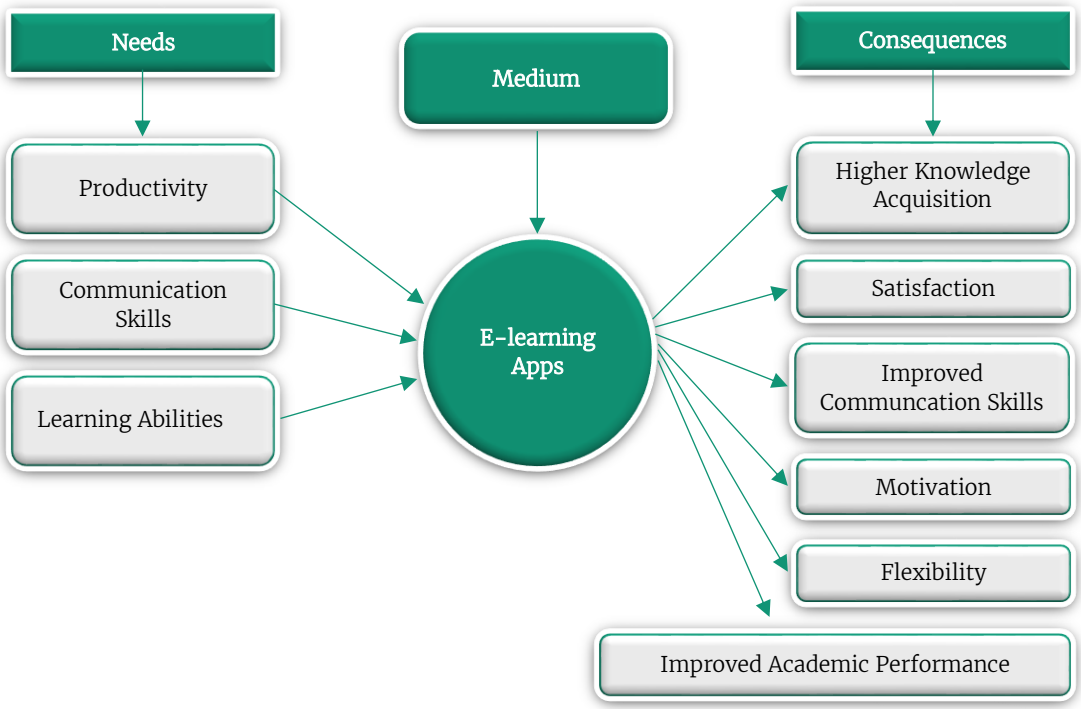
In this research article, the Uses and Gratification Theory and E-Learning Success Model have been applied as a framework.

Uses and Gratification Theory

The theoretical framework for this study draws on the Uses and Gratification Theory, which considers audiences as active users in the media flow. This theory adopts a user-centered approach, emphasizing individuals' motivations and self-perceived requirements. According to Wang, Liu, & Parker (2020), people can use the same communication message for various goals, and the same media content can satisfy diverse demands for different individuals. In the context of education, students choose information based on their preferences, investigating content on platforms like YouTube and Google, and deriving unique meanings. The study focuses on the cognitive need within the Uses and Gratification Theory, specifically concerning knowledge and information attainment. Students purposefully select a medium, collect necessary information, and continue consuming its material if it fulfills their cognitive needs. If a medium falls short, students seek alternatives until their needs are satisfied, aligning with the theory's principles.

The research also incorporates the Model for Successful E-Learning proposed by DeLone and McLean in 1992. This model outlines six dimensions of success factors—system quality, information quality, service quality, use, user happiness, and net benefit—tailored for the e-learning context. Effective use of e-learning apps by students and teachers enhances academic performance and learning capacity (Al Rawashdeh et al., 2021). The model explores whether technology motivates students, examining how they leverage e-learning applications to meet their academic needs. The e-learning success model describes both positive and negative effects. Positive outcomes include increased academic performance, improved communication and learning skills, enhanced flexibility, and higher knowledge acquisition. However, DeLone and McLean (2003) note that students primarily use technology to fulfill personal needs. The study aligns with this model and the Uses and Gratification Theory, highlighting that students prefer online mediums to gratify their needs, enhance educational standards, and improve their overall learning experience. On the basis of above theoretical framework, following model has been proposed for the study.

Figure 1



Methodology

Research Design

This research employs a quantitative research method, specifically a survey design, to investigate the impact of e-learning educational apps on students' performance, academic achievement, learning abilities, and communication skills. The survey approach allows for the collection of structured data from a diverse sample of university students in Lahore. The choice of a quantitative survey design is justified by its ability to provide numerical data that can be statistically analyzed (Vasileiou et al., 2018). This approach facilitates the measurement of relationships between variables (Chai et al., 2023), enabling a rigorous examination of the impact of e-learning apps on various aspects of students' academic experiences.

Population of the Study

The target population for this study includes male and female students aged between 18 to 30, enrolled in various universities in Lahore. This demographic range ensures a broad representation of students at different stages of their academic journey.

Inclusion Criteria

To be included in the study, participants must meet the following criteria:

- Currently enrolled as a student at a university in Lahore.
- Age between 18 to 30 years.
- Willingness to participate in the study and provide responses to the survey questionnaire.

Exclusion Criteria

Participants who do not meet the inclusion criteria or those unwilling to participate are excluded from the study.

Sampling Techniques

Random sampling techniques have been employed to ensure the representativeness of the sample. This approach minimizes bias and allows each member of the population an equal chance of being selected. The goal is to collect data from 500 students (of Lahore College for Women University, Kinnard, University of Management and Technology and University of the Punjab) to obtain a comprehensive understanding of the impact of e-learning apps.

Pilot Study

Before the full-scale data collection, a pilot study was conducted with 200 students. This pilot study served to refine the survey instrument and assess its validity and reliability. The results of the pilot study indicated a high level of reliability with a Cronbach's Alpha of .801, ensuring the robustness of the research instrument.

Instrument

Data is collected through self-structured survey questionnaire (containing total 30 items, 10 for each hypothesis) distributed among the selected students. The questionnaire is designed on five Likart Scale (A 5-point Likert scale where 1 indicates "Strongly Disagree" and 5 represents "Strongly Agree") to capture information on students' experiences with e-learning apps, academic performance, and learning outcomes.

Findings

Pearson Correlations

Pearson Correlation test has been applied on hypothesis 1 "E-learning improves students' academic performance (productivity, performance and grades)". The following table presents an overview of H1.

Table 1

Students' productivity, performance, and grades (N=500)

	E-learning	Student efficiency
E-learning	-	.79**
Student efficiency		-

***p<.01.*

Note: The correlation between e-learning and student efficiency is displayed in Table 1. It demonstrates that the correlation is highly significant. It shows that online e-learning apps have a positive association with the productivity of students. The P-value (**p<.01) shows that e-learning improves students' productivity, performance, and grades. Hence, H1 is accepted.

Regression Analysis for Predictors of Student Efficiency (N=500)

Regression Analysis for hypothesis 2 "E-learning apps improve students' communication skills" has been applied. The following table presents an overview of H2.

Table 2

E-learning enhances the efficiency and communication abilities of students.

Predictors	R^2	R^2	B
e-learning	.62	.62	.79***

Note: E learning is the most significant predictor of students' efficiency. Table 3.2 shows that the R Square value is .622 which means that our independent variable e-learning has 62.2% impact on the dependent variables (students' efficiency and communication abilities). Furthermore, the β coefficient associated with e-learning is .79, which suggests a strong positive relationship between e-learning and students' efficiency and communication abilities. The "***" notation typically indicates statistical significance, indicating that the relationship between e-learning and students' efficiency is unlikely to have occurred by chance. Hence, H2 E-learning apps are effective for learning and enhance efficiency and communication abilities of students is accepted.

One Way ANOVA

One-way ANOVA has been applied to hypothesis 3, "E-learning apps improve students' learning ability." The following table shows an overview of H3.

Table 3

E-learning apps fulfill/satisfy student's educational needs and requirements and motivate them to learn effectively (n-500)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3435.085	1	3435.085		
	Residual	2089.292	128	16.323	210.450	.000[a]
	Total	5524.377	129			

Note: The ANOVA table shows that the regression model is significant, with a p-value of 0.000. This means that there is a statistically significant relationship between E-learning and student's educational needs, requirements and motivation to learn effectively. The F-statistic of 210.450 is also very large, which further supports the conclusion that the regression model is significant. The mean square of the regression (3435.085) is much larger than the mean square of the residuals (16.323). This suggests that the variation in the dependent variable can be explained by the independent variable, rather than by chance. Overall, the ANOVA table suggests that the regression model is a good fit for the data. The model is statistically significant, and the variation in the E-learning and student's educational needs, requirements and motivation to learn effectively. Overall, the regression model appears to be statistically significant, indicating that the independent variable (e-learning) has a significant impact on the dependent variables (student's educational needs, requirements and motivation to learn effectively. However, in light of the fact that the p value in Table 2, H3 E-learning apps fulfil/satisfy student's educational needs and requirements and motivate them to learn effectively is accepted.

Discussion

In the digital age, e-learning apps have revolutionized education, reshaping how students learn and perform academically. These apps offer unparalleled potential in enhancing efficiency, communication skills, grades, and overall academic performance. Providing students with 24/7 access to learning materials, e-learning facilitates efficient, personalized learning at their own pace, saving time and elevating achievements. However, the effectiveness of e-learning is contingent on factors such as the quality of platforms, instructional design, student engagement, and learning styles. E-learning grants flexibility to access diverse materials like online libraries and research databases, fostering better understanding and research skills. This accessibility enhances engagement, motivation, and satisfaction, ultimately improving performance and grades. E-learning apps enable effective time management and collaboration through discussion forums, group projects, and online communication tools, with immediate feedback promoting quick adjustments and sustained motivation.

This paper has focused on the impact of e-learning on students' productivity, grades and performance and how these apps enhance their efficiency, communication abilities by fulfilling and satisfying their educational needs and requirements. It is also discussed that how e-learning apps motivate them to learn effectively. Quantitative method has been used to analyze impact of e-learning and data from 500 respondents (through survey questionnaire) from different universities of Lahore have been collected through random sampling technique.

Akhter and Mahmood (2018) support the study's results, affirming that e-learning motivates students and boosts their enthusiasm for studying. Online training, as noted by Banda et al. (2021), correlates positively with students' academic performance. Jawad and Shalash (2020) observed significant GPA differences during the COVID-19 period when physical classes were impossible. Students opt for e-learning for its inspirational impact on enrollment, career prospects, and learning motivation, as highlighted in Neema-Abooki & Kitawi's (2014) findings. Zaman & Nashmena (2021) noted high satisfaction and confidence among university students in e-learning in Pakistan.

The ongoing study aligns with these findings, revealing that e-learning contributes to students' knowledge growth, increased communication and learning skills, and overall academic success. Information and communication technology, as emphasized by Encarnacion (2021), exerts a favorable influence on university students' academic achievements, showcasing the instrumental role of e-learning in enhancing understanding and information acquisition.

The purpose of the current study was to investigate the effects of educational apps for e-learning on students' performance, how these apps improve students' learning abilities and communication skills and whether e-learning apps give satisfaction, and motivation to the students and fulfill their needs. Throughout the globe and in Pakistan too, e-learning is regarded as the most significant and popular technology (Asad et al., 2021). Universities and students now need to use e-learning to raise their educational standards. Because e-learning is widely accepted. The results of the current study are discussed in relation to those of the earlier studies to determine whether or not the researcher can relate the results to those of the earlier studies. The researcher's objectives and hypotheses are ultimately resolved after data analysis. The results of the test used in this study showed that e-learning significantly affects students' productivity, performance. enhance efficiency and communication skills and fulfil/satisfy their educational needs and requirements and motivate them to learn effectively. This customization can enhance students' efficiency by providing content and activities that align with their learning styles and pace (Almaiah, Al-Khasawneh, & Althunibat, 2020). E-learning apps often provide instant feedback on quizzes, assessments, and assignments. This immediate feedback allows students to identify and correct mistakes promptly, leading to more efficient learning and improvement (Truong, 2016).

A study revealed that students engaged in e-Learning exhibited greater levels of motivation, encompassing the desire for knowledge acquisition, engagement in tasks, and the experience of stimulation, as compared to those students attending in-person sessions on campus. This conclusion finds alignment with the findings of Harandi (2015), who affirmed that students tend to manifest increased motivation when exposed to e-Learning environments. Engaging in digital discussions with peers and instructors promotes effective written communication, as students articulate their thoughts, ask questions, and provide insights in a structured manner (Kelly & Kortegast, 2023). This digital interaction nurtures the ability to convey ideas clearly and succinctly, a skill essential in both academia and the professional world.

Therefore, Studies by Alawamleh et al. (2020) & Amir et al. (2020) contradict the above studies and results of this study. They said that many students still favor traditional classroom sessions over online classes due to several challenges they encounter while participating in virtual learning. These challenges encompass issues like reduced motivation, difficulty grasping the course content, diminished interaction between students and educators, and a sense of isolation stemming from the online learning environment. They added that difficulties experienced during distance learning encompassed both external factors, like unreliable internet connections and additional financial costs for internet data, as well as internal factors, including managing time effectively and struggling to maintain focus during extended online learning sessions.

However, internet has altered people's ways of thinking and living in Pakistan since technology is developed there. Most students use e-learning apps because they produce better learning results. The e-learning apps are chosen to gain new knowledge and facts. The researcher discovers that student learning results are influenced by e-learning through various educational apps. Additionally, it showed how using a certain e-medium for instruction affected the students' performance. After using educational apps to learn, students believe they can readily voice their opinions in regular classroom settings (Pham & Huynh, 2018). Students think that using apps helps them improve their communication and learning skills (Kumar & Bajpai, 2015). The findings indicated that a variety of educational apps and teaching strategies highly motivate students. Numerous studies have demonstrated that the integration of E-learning methodology yields positive and statistically significant effects on students' academic advancement (Elfaki et al., 2019; Mothibi, 2015; Abooki and Kitawi, 2014; Basri et al., 2018; Salamat et al., 2018). The findings consistently indicate that the utilization of E-learning approaches within higher education institutions leads to improved academic achievements among students and it is also discovered that e-learning is a positive idea in Pakistan (AL-Sous et al., 2023). Additionally, the results of this study addressed all the objectives and hypotheses are approved.

There exist several studies which findings align with those of this research. Notably, Yang and Cornelius (2004) affirmed that students reported positive experiences due to factors such as flexibility, cost-effectiveness, access to electronic research materials, ease of internet connectivity, and a well-

designed online class interface. Gustiani (2020) said students' motivation for e-Learning was primarily influenced by their aspiration to acquire novel skills and their enthusiasm for exploring new learning methodologies. However, studies by Hameed et al. (2008); Klein & Ware (2008); Al-Musa & Al-Mobark (2005) do not favour online learning methods as they say that in e-learning, the learner might suffer from isolation and the lack of direct social interaction, as sometimes found with distance learning, therefore requiring the learner to have relatively strong motivation and skills with regard to time management to mitigate this effect. E-learning might have a negative impact on the development of communication skills of learners. In other words, although a learner might have acquired excellent academic knowledge, yet he or she might not have the skills to communicate this knowledge to others. Their studies added that e-learning might be less effective than face-to-face learning in terms of aspects of the learning process such as clarification and explanation, as these may be easier in face-to-face encounters. In addition, e-learning may lack the support provided by non-verbal clues provided or by observing the interactions of others.

This study employed the e-learning success model proposed by DeLone and McLean (2003) to analyse that how e-learning educational apps affect students' grades. The model outlined how effective use of technology raises student performance and grades. After evaluating the data, it is discovered that 62.5% of students agreed that using educational apps help them to learn and reach their academic goals, 17.6% were undecided, and 19.9% disagreed. According to Hanncy & Newvine (2006), pupils who learn online obtain higher grades than those who learn in traditional classroom settings.

In addition, the researcher discovered that 64.1% of students thought that e-learning through apps in Pakistan was a good idea. Because of its flexibility, students believed that e-learning was more acceptable because online material fulfills their needs and requirements as uses and gratification theory said (Yusnilita, 2020). According to Akuratiya & Meddage (2020) students believe that online learning is more comfortable, effective, and entertaining. The current study discovered that e-learning allowed students more time to consider and reflect on the subject matter than conventional lectures. According to Agarwal & Kaushik (2020), online learning is more convenient and fun. Furthermore, the results of the study are also aligned with studies conducted by Liu et al. (2022); Gurban & Almogren, (2022); Lee & Kim (2023) which explore that e-Learning adoption like ease of use, utility, enjoyment, system quality, information quality, service quality, self-efficacy, usability, and playfulness has great impact on the results and academic performance of students. Similarly, Ritonga et al. (2020) reached a similar conclusion, highlighting the significant effect of e-Learning on student learning achievements. Baber (2020) explores that classroom interactions, course structure, instructor expertise, and the facilitation inherent in e-Learning systems all positively contribute to students' perceived learning outcomes.

However, the influence of e-Learning may not be uniformly experienced by all students, particularly those lacking proficiency in its usage or access to necessary requisites like an internet connection. Agbejule et al. (2021) provided evidence supporting this notion, indicating that various barriers impede the success of e-Learning. These barriers encompass concerns of instructional nature, a deficit of social connectivity, the nature of educational programs, and geographical factors.

Collectively, these studies verify and reinforce the findings outlined in our research, reinforcing the positive impact of e-Learning systems on enhancing student outcomes and academic achievements. Education has been transformed by the advent of e-learning apps, offering a vibrant and captivating platform. These apps empower students with personalized learning journeys, digital engagement, instant feedback, and the mastery of supplementary skills, culminating in their readiness to surpass academic milestones and transcend them. As technology's evolution persists, the promise of e-learning apps shaping the educational sphere looms optimistically, presenting a more luminous prospect for global learners.

Conclusion

In the realm of e-learning, the physical constraints on students are lifted, allowing them to engage with their educators through various digital platforms like the internet, Google Classroom, or educational apps. This flexibility transcends geographical boundaries, capturing diverse perspectives and viewpoints. Information and communication technology, particularly through e-learning apps, has elevated educational standards in Pakistan, offering students alternative pathways to academic success. The study highlights the impact of e-learning educational apps on student grades, learning abilities, communication

skills, motivation, and overall satisfaction with learning. The findings reveal that personalized instruction and feedback in e-learning can contribute significantly to grade improvement and skill enhancement. The results unequivocally demonstrate the positive influence of e-learning on students' learning experiences, with a strong consensus among respondents that it significantly enhances productivity, academic performance, and communication skills. Participants also express a sense of motivation and satisfaction in their learning journey. The study investigates impact of e-learning on pupils' academic achievement, with a majority recognizing the improvement in their skills and the wealth of information accessible across subjects. Acknowledging diverse learning preferences, the study suggests that a blended learning approach, combining e-learning with traditional methods, can optimize results for different students. In conclusion, the study reinforces the transformative potential of e-learning in shaping a dynamic and enriching educational landscape for students in Pakistan and beyond.

Limitations and Recommendations

When conducting research on the usability of online learning apps among Pakistani students with a focus on increasing efficiency, performance, and productivity, consider the following recommendations for your research article. Further studies related to online learning platforms globally and specifically in the context of Pakistan are need to explore its positive and negative impacts and the challenges faced by Pakistani students, and propose enhancements for improved efficiency, performance, and productivity. Methodologically, the researchers have applied quantitative method while in future, mixed method approach like surveys, interviews, and focus groups can be used in future. It is explored that still there are few areas where technological infrastructure in Pakistan is missing so it can be improved for the usability of online learning apps.

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