"Exploring the Impact of Online Learning on Student Academic Performance in Higher Education"

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Abstract

This research investigates the impact of online learning on student engagement and academic performance in the higher education landscape. In a sample of 300 students from public sector universities in Punjab, Pakistan, the researcher examined online learning experiences, demographic factors, and academic performance. The descriptive statistics revealed moderately positive online learning experiences and moderately favorable academic performance on average, accompanied by significant variability within the sample. Correlation analysis, however, unveiled very weak and often statistically insignificant relationships between these variables, suggesting complex and non-linear dynamics at play. Consequently, we advocate for personalized support, adaptable pedagogical approaches, inclusivity, accessibility, and interdisciplinary collaboration as essential components to enhance online learning. Moreover, this study calls for continued research to unearth the intricate dynamics of online education's influence on student outcomes, driving the evolution of evidence-based practices in higher education. The study underlines the necessity for continued research into online education's complex dynamics and student outcomes. This includes studying new technology, learning analytics, and pedagogical methods to inform evidence-based practices in higher education.
Keywords: Academic Performance, Higher Education, Online Learning, Student Engagement, Online Education

Introduction

Online learning is becoming an increasingly prominent modality of instruction in higher education institutions all over the world as a direct result of the rapid growth of both technology and the Internet (Abuhassna et al., 2020). Students who choose to participate in online learning have the advantage of being able to access educational resources and actively engage with course content from a remote location, typically at their speed(Cottrell, 2021). This change has been sped up by variables such as the accessibility of digital resources, the demand for flexible learning options, and the recent problems that have been posed by the global pandemic(Edmunds, Gicheva, Thrift, & Hull, 2021). In higher education, there is a growing interest in gaining a better understanding of how the use of online learning affects the academic performance of students as this mode of instruction becomes increasingly popular (Freire & Rodríguez, 2022). One of the most important results of receiving an education is known as academic performance, and it is determined by several different aspects, such as course grades, assessment scores, retention rates, and overall learning outcomes (Jawad & Shalash, 2020). It is imperative to do research into the effect that online learning has on academic achievement because the findings could have substantial repercussions for students, teachers, educational institutions, and legislators(Liu, Lomovtseva, & Korobeynikova, 2020). The purpose of the research project titled "Exploring the Impact of Online Learning on Student Academic Performance in Higher Education" is to investigate the nuanced connection that exists between online learning and the academic achievement of students (Mandasari, 2020). The purpose of this study is to investigate how students' experiences in online learning settings affect their ability to achieve their academic goals, do well in their classes, and ultimately be successful in higher education. Researchers use a variety of

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techniques and approaches to evaluate student engagement, motivation, time management, and learning outcomes, all while taking into consideration demographic and institutional aspects that may play a part in the process (Marlina, Tjahjadi, & Ningsih, 2021). This allows them to investigate the complex link between the two. This research is not just of interest on a theoretical level but also of significance in the real world (Rasheed, He, Khalid, Khizar, & Sharif, 2022). It provides educational institutions and policymakers with information regarding the effectiveness of online learning and supports them in making decisions that are based on accurate information to improve the quality of education (Sobaih, Hasanein, & Elshaer, 2022). In addition to this, it assists teachers in the development of efficient online courses and provides support for students throughout their educational pursuits(Doo, Bonk, & Heo, 2020). The field of research that investigates the influence of online learning on the academic performance of students enrolled in higher education institutions is dynamic and constantly undergoing development(El Said, 2021). Learning that takes place via the internet, commonly known as e-learning or remote education, has swiftly emerged as a force with the potential to revolutionize the field of higher education. Students can participate in their coursework from a remote location and frequently do not need to be physically present on campus while using this style of education, which is defined by the delivery of educational information and teaching through digital platforms (Elshareif & Mohamed, 2021). This shift from traditional face-to-face instruction to online learning has been driven by a convergence of technical breakthroughs, shifting pedagogical methods, and changing student demands and preferences. Traditional face-to-face instruction has been around for a long time (Gopal, Singh, & Aggarwal, 2021). The Need to Investigate the Impact of Online Learning on Student Academic Performance: Increasing Frequency in the World of Higher Education The predominance of online education in higher education is demonstrated by several important trends and advancements, including the following: The proliferation of high-speed internet and the development of sophisticated learning management systems (LMS) and online tools have contributed to the rising viability of providing high-quality education in a digital format(Hidalgo-Camacho, Escudero, Villacís, & Varela, 2021). Accessibility and Flexibility: Flexibility has become synonymous with online learning, which also offers accessibility(Kumar, 2021). It can suit a wide variety of learner profiles, such as working adults, non-traditional students, and individuals who are constrained by geographic location, giving these individuals the option to access educational resources at their own pace and by their schedules(Li & Che, 2022). Online education has a global reach because it eliminates the need for students to relocate to participate in programs and classes provided by educational establishments located all over the world. Because of their global reach, educational institutions are increasingly becoming more international (Nácher, Badenes-Ribera, Torrijos, Ballesteros, & Cebadera, 2021). Pedagogical Innovation: Educators and educational institutions are consistently exploring new approaches to the development and administration of online courses(Nácher, et al., 2021). The incorporation of multimedia, content that can be interacted with, as well as peer-to-peer collaboration, all contribute to an improvement in the quality of the online learning experiences(Rozi et al., 2021). Response to Emergencies: Recent worldwide crises, such as the COVID-19 epidemic, have sped up the implementation of online education (Clark, Nong, Zhu, & Zhu, 2021). To ensure that students continue to receive instruction despite disruptions caused by emergencies, educational institutions are increasingly relying on online delivery methods (Darkwa & Antwi, 2021). Blended Learning: Many educational institutions are increasingly using blended learning strategies, which combine online and traditional methods of instruction to deliver a comprehensive educational experience that makes the most of the positive aspects of both techniques(Ferrer, Ringer, Saville, A Parris, & Kashi, 2020). Increased acceptance The value of online degrees and certificates, as well as the recognition of the high level of education that may be obtained online, are gaining wider acceptance in the labor market(Iglesias-Pradas, Hernández-García, Chaparro-Peláez, & Prieto, 2021). The introduction of online learning has not only transformed the way that education is provided, but has also raised important concerns regarding the effects that this style of instruction has on students' academic performance, engagement, and overall learning outcomes(Leo, Alsharari, Abbas, & Alshurideh, 2021). Research must be conducted into how online learning affects the academic journey of students who are seeking higher education because online learning is continuing to shape the educational environment (MacNaul, Garcia, Cividini-Motta, & Thacker, 2021). The investigation of the effect that online education has on the academic performance of students centers on this investigation as its central focus(Omar, Ali, & Belbase, 2021). Growth at

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an Exponential Rate and Widespread Adoption Both the growth of online education at an exponential rate and its widespread adoption by universities and other institutions of higher education around the world are indisputable facts (Raccanello et al., 2022). Because technology is rapidly becoming an essential component of educational delivery, it is of the utmost importance to gain knowledge of the impact it has on academic performance (Stevanović, Božić, & Radović, 2021). Higher education institutions are responsible for catering to a varied student population, each of whom has their specific requirements and areas of focus of interest(Tang et al., 2021). It is common practice to promote online learning as a flexible alternative; yet, the debate of whether or not it is successful for various student populations persists (Adeyeye et al., 2022). Investigating its impact can assist instructional practices be tailored to the unique characteristics of individual learners. Pedagogical Revolution: Traditional teaching methods are not simply duplicated and presented in an online format to constitute online learning (Alismaiel, Cifuentes-Faura, & Al-Rahmi, 2022). In many cases, it involves novel teaching approaches, the utilization of multimedia resources, and the incorporation of interactive components (Andreevich, 2020). There is a need for research to evaluate the impact that these pedagogical innovations have on academic outcomes (Gonçalves, Sousa, & Pereira, 2020). Allocation of Resources Educational institutions dedicate a large amount of resources to the development and maintenance of online learning systems(Han & Ellis, 2021). For decision-making and resource distribution, it is necessary to have a solid understanding of the return on investment and the efficiency of these resources in boosting academic achievement(Lacka, Wong, & Haddoud, 2021). Academic achievement is a key predictor of student success and retention (Nassoura, 2020). Student success and retention are directly correlated with each other (Wang, Xia, Guo, Xu, & Zhao, 2022). The academic results of students who participate in online learning should improve for that mode of instruction to be considered a viable option(Wang, et al., 2022). Investigating this connection can assist educational institutions in developing ways that increase the academic achievement of their students(Wijaya, Sumule, Weismann, Supartini, & Tari, 2021). Assurance of Quality: The quality of education that can be obtained through the use of online means is a topic that is under investigation and discussion(Al Rawashdeh, Mohammed, Al Arab, Alara, & Al-Rawashdeh, 2021). To sustain and improve the quality of online education, doing research into the impact that it has on academic performance is crucial(Eze, Chinedu-Eze, Okike, & Bello, 2020). Policymakers and educators alike require empirical facts before they can make educated judgments on the incorporation of online learning into existing educational systems(El-Sayad, Md Saad, & Thursday, 2021). The findings of the research have the potential to influence policy and pedagogy, as well as best practices, regarding the utilization of technology in educational settings(Herguner, Son, Herguner Son, & Donmez, 2020). If we understand how it affects academic achievement, we can better align educational methods with global trends and make it easier for people to work together across national boundaries (Kanetaki, Stergiou, Bekas, Troussas, & Sgouropoulou, 2021). Continuous Improvement: Educators should always be striving to achieve continuous improvement in their practices. Investigating the impact that online learning has on academic achievement provides chances for iteratively refining educational delivery methods and developing new approaches(Müller & Mildenberger, 2021). In conclusion, there is an urgent need to investigate the impact that online learning has on the academic performance of students. This need is driven by the shifting educational landscape, the development of pedagogical methods, and the ongoing search for quality and efficiency in education(Spitzer & Musslick, 2021). This research is beneficial not only to the academic community, but also to students, institutions, and policymakers as they negotiate the always shifting landscape of higher education(Sun & Kim, 2023).

Statement of the problem:

With the development of online learning, the dynamic landscape of higher education has undergone substantial upheaval, yet this shift raises pressing questions about its impact on student academic achievement. Online learning, which is distinguished by its adaptability, flexibility, and accessibility, provides an alternate mode of instruction, allowing students to interact with educational content and materials from a distance. While the expansion of online learning is obvious, a crucial problem that requires extensive research is the impact of this modality of instruction on student academic achievement in higher education. As more institutions of higher learning use online learning as a pedagogical tool, the fundamental question of how this form of learning affects academic results, such as course grades, assessment scores, and overall educational success, must be addressed. This investigation is driven by the realization that student academic achievement is a critical indicator of

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educational quality and student success. Understanding the connection between online learning and academic success is critical for educators, educational institutions, policymakers, and students. A diversified student body, including traditional and non-traditional students, adult learners, and international students, characterizes today's educational scene. Each student group brings to its educational path its own set of requirements, preferences, and circumstances. Online learning is frequently positioned as an inclusive and adaptable strategy, but the extent to which it serves the different needs of these learners remains unknown. Furthermore, online learning constitutes a pedagogical shift, providing novel techniques for instruction. This form of learning includes multimedia resources, interactive content, and collaborative online environments. These novel components may have an impact on how students interact with course materials, participate in conversations, manage their time, and ultimately succeed academically. To assess the usefulness of these innovations and their effects on student learning outcomes, more research is required. Furthermore, educational institutions devote significant resources to the development, maintenance, and expansion of online learning platforms. Understanding the return on investment and the effectiveness of these resources in improving academic achievement is critical for both institutional leaders and legislators. Without empirical evidence of its effectiveness, resource allocation and decision-making about online learning may be lacking. In summary, the study challenge is motivated by the need to investigate the impact of online learning on student academic performance in higher education. This issue involves issues of efficacy, inclusivity, instructional innovation, resource allocation, and the consequences for student achievement. It is critical to address this issue not only for the academic community, but also for students, educators, educational institutions, and legislators as they navigate the changing educational landscape.

Research objectives:
a. To assess the relationship between online learning and student academic performance in higher education.
b. To identify the key factors that mediate the impact of online learning on student academic performance, including student engagement, motivation, and time management.
c. To explore the moderating variables that influence the relationship between online learning and academic performance, such as students' learning styles and the quality of online course design.

Research Questions
a. What is the difference in academic performance between students engaged in online learning and those in traditional face-to-face learning environments?
b. To what extent does student engagement mediate the relationship between online learning and academic performance in higher education?
c. How does students' self-reported motivation influence their academic performance in online learning environments?

Significant of the study:
The research on the effects of online learning on the academic performance of students in higher education is of great interest to a variety of stakeholders, including the following: Understanding the effects that online learning has on academic achievement can provide educational institutions with the information they need to make educated decisions regarding the incorporation of technology into their instructional strategies. With this information, educational institutions can develop successful online classes that contribute to the academic success and continued enrolment of their students. Educators: Educators can use the findings to modify their instructional practices and the structure of their courses to better meet the requirements of students who are participating in online learning. Increasing student involvement, motivation, and participation in the content of the course may be one way to do this. Students: This research has the potential to aid students by illuminating the aspects that contribute to their academic achievement when taking online classes. It could help individuals build productive study habits and abilities for managing their time, which would be useful for online learning. Policymakers: Educational authorities and policymakers can utilize the findings of this research to guide their judgments about the distribution of resources and the development of regulations about online education. It contributes to the conversation that is currently going on about the accessibility and quality of online learning. Academic Researchers This study can serve as a basis for academic researchers working on the subject of education who are interested in further investigating the shifting

environment of online learning. It paves the way for further research to investigate the complexities of the link between the two. The Impact of Online Learning on Society As Online Learning Becomes More Commonplace in Higher Education; the Impact of Online Learning Extends Beyond Individual Institutions. The findings of the study shed light on how technology and education overlap and influence academic outcomes, both of which have the potential to have wider-reaching effects on society. In a nutshell, the research question and aims of this study attempt to discover the complicated relationship between student academic performance in higher education and online learning, to provide insights that have practical significance for educators, educational institutions, and policymakers. Understanding this dynamic is vital for the development of successful teaching and learning in the digital era since the educational landscape is always shifting, and this understanding is necessary for making progress.

METHODS:

Participants and procedures:

The population of this study included all male and female students in public sector universities in Panjab district, Pakistan. The reason behind choosing these universities is that the study uncovered "exploring the impact of online learning on student academic performance in higher education" in Pakistan. The results were beneficial for administrators to focus on those particular areas where improvement is required to maximize student academic performance in the education sector. Out of all the 46 public sector universities in Punjab (Higher Education Commission, 2023), five universities in Lahore (University of Punjab, University of Lahore, University of Education, Government College University, and University of Engineering & Technology University of the Punjab) and four department's (i.e., department of sciences, department of arts, department of agriculture, and department of engineering) were selected. Out of these selected universities, 300 students were conveniently selected. A technique that was used for sampling was stratified random sampling to select the sample from the population of the study. A survey research design was used for data collection because it does not require much time or follow-up from individuals. Therefore, depending on the nature of the study, the researcher designed a questionnaire based on theories on student academic performance and online learning, such as Anderson & Dron (2011) and Tinto (1993), and used it to collect data from the sample of the study. Likert-type scale would be used to provide options for each of the items on survey.

Statistical analysis:

The data was analyzed with the coding and entry of all completed surveys into the Statistical Package for Social Sciences (SPSS). The findings were derived through the use of descriptive and Pearson correlation was used for the analysis of data.

Ethical Consideration:

Keeping in mind ethical practices, the study adhered to ethical guidelines, including obtaining informed consent from participants, ensuring data privacy, and maintaining data security. Institutional review board (IRB) approval was sought to guarantee ethical standards and the protection of participants' rights and privacy. Furthermore, to keep the student's data confidential, they were not asked to provide their name on the questionnaire during data collection. The researcher also emphasized that participants could withdraw at any time.

RESULT:

Table.3.1

Descriptive Statistics:

Items	N	Minimum	Maximum	Mean	Std. Deviation
OLEV	300	9.00	24.00	16.8067	2.87463
SAPV	300	9.00	26.00	18.4267	3.22272

Descriptive Statistics for Online Learning Experience (OLEV) and Student Academic Performance (SAPV)

Table 1 displays the descriptive statistics for two variables: Online Learning Experience (OLEV) and Student Academic Performance (SAPV) based on a sample size of 300 respondents. For the variable OLEV (Online Learning Experience), the data indicates a minimum score of 9.00, a maximum score of 24.00, a mean score of 16.8067, and a standard deviation of 2.87463. The mean score of 16.8067 suggests that, on average, participants reported a moderately positive online learning experience, with scores ranging from 9.00 to 24.00. The standard deviation of 2.87463 indicates that there is some variability in the responses, with most participants falling within one standard deviation

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of the mean. For the variable SAPV (Student Academic Performance), the data displays a minimum score of 9.00, a maximum score of 26.00, a mean score of 18.4267, and a standard deviation of 3.22272. The mean score of 18.4267 suggests that, on average, participants achieved a moderately favorable academic performance, with scores varying from 9.00 to 26.00. The standard deviation of 3.22272 indicates a degree of variability in academic performance scores, with most participants' scores falling within one standard deviation of the mean.

These statistics provide a summary of the central tendencies, ranges, and variations in the data for both variables, allowing for an initial understanding of the online learning experiences and academic performance of the sample participants.

Table.3.2

Correlation analysis:

Gender	*1*	*-.035*	*-.042*	*-.017*
Age	-.035	1	.021	-.002
OLEV	-.042	.021	1	-.021
SAPV	-.017	-.002	-.021	1

Correlation Matrix for Gender, Age, Online Learning Experience (OLEV), and Student Academic Performance (SAPV).

The correlation between Gender and Age is -0.035. This indicates a very weak negative correlation between gender and age. In practical terms, this means that there is a very slight tendency for older individuals to be slightly less likely to be of a particular gender. However, the correlation is very close to zero and not practically significant. Gender and age do not show a meaningful relationship in this sample. The correlation between Age and OLEV is 0.021. This suggests a very weak positive correlation between a student's age and their online learning experience. In other words, as a student's age increases, there is a slight tendency for their online learning experiences to be slightly more positive. However, this correlation is also very close to zero and not practically significant. Age and online learning experience do not exhibit a strong relationship in the data. The correlation between Gender and OLEV is -0.042. Similar to the previous interpretations, this suggests a very weak negative correlation between gender and online learning experience. This means that there is a very slight tendency for individuals of a particular gender to have slightly less positive online learning experiences. However, like the other correlations, this is close to zero and not practically significant. Gender and online learning experience do not appear to be strongly related in the dataset. The correlation between OLEV and SAPV is -0.021. This indicates a very weak negative correlation between online learning experience and student academic performance. In practical terms, this suggests that as online learning experiences become slightly more positive, there is a very slight tendency for student academic performance to be slightly lower. However, this correlation is close to zero and not practically significant. Online learning experience and academic performance do not exhibit a strong linear relationship in this data. In summary, the correlation matrix shows that all the correlations are very close to zero, indicating very weak associations between these variables. These results suggest that there are no meaningful linear relationships between gender, age, online learning experience, and student academic performance in the sample data. If any relationships exist, they are too weak to be detected through linear correlation analysis.

DISCUSSION

The results of the study provide insights into the central tendencies and relationships among key variables related to online learning experiences and student academic performance. The analysis of descriptive statistics highlights that, on average, participants reported moderately positive online learning experiences (mean OLEV = 16.8067) and achieved moderately favorable academic performance (mean SAPV = 18.4267). However, these statistics are accompanied by standard deviations that suggest notable variability in the responses within the sample. In the correlation analysis, weak correlations were observed among the variables, and these correlations were often very close to zero. Gender, age, online learning experience and student academic performance did not exhibit strong linear relationships. This suggests that these variables may have complex and non-linear interactions or that other unexamined factors could play a more substantial role in influencing academic performance. The findings raise important questions about the impact of online learning on student academic performance. While no strong linear relationships were identified, it is essential to consider potential reasons behind these results: Complexity of Learning Environments: Online learning environments can vary significantly in terms of design, pedagogical approaches, and the

technologies used. These variations may introduce complexity into the analysis, making it challenging to establish straightforward relationships between online learning experiences and academic performance. Diverse Student Profiles: The study encompasses a diverse student population with varying ages, backgrounds, and learning preferences. The individualized nature of online learning may lead to differences in how students perceive and engage with the learning process, making it difficult to generalize findings. Other Influential Factors: Academic performance is influenced by numerous factors beyond online learning experiences, including socio-economic status, prior educational experiences, and personal motivation. The study did not account for these potential confounding variables, which may have obscured more direct relationships.

Limitations

a.   Sample Specificity: The study focused on a specific sample from public sector universities in a particular region, which limits the generalizability of the findings to a broader population of students.

b.   Scope of Variables: The study primarily considered linear relationships between variables, potentially overlooking more complex or indirect effects that could influence academic performance.

c.   Areas for Future Research: Longitudinal Studies: Future research could explore the long-term effects of online learning on academic performance by conducting longitudinal studies that track students over an extended period.

d.   Comparative Studies: Conducting comparative studies between different online learning models and traditional in-person education to better understand the relative impacts on student performance.

e.   Multifactorial Analysis: Expanding the analysis to include a broader range of factors that could influence academic performance, such as socio-economic background and instructor effectiveness.

f.   While the current study did not identify strong linear relationships between online learning experiences and academic performance, it raises important questions for further exploration. Understanding the complex interplay of variables in online learning environments is crucial for improving educational practices and enhancing student outcomes.

Conclusion

This study has delved into the intricate web of relationships between online learning experiences, demographic factors, and student academic performance within higher education. While the average responses indicated that participants generally reported moderately positive online learning experiences and achieved moderately favorable academic performance, the underlying data revealed a complex and nuanced landscape. The correlations observed among these variables were consistently weak and often failed to reach statistical significance. These findings suggest that the interplay between online learning and academic performance is not solely dictated by linear relationships. Instead, it appears to be shaped by multifaceted and non-linear dynamics. To enhance the effectiveness of online learning, educators and institutions should adopt a multifaceted approach. This includes providing personalized support tailored to individual students' needs, adapting pedagogical approaches to optimize online learning experiences, ensuring inclusivity and accessibility for all learners, and actively participating in collaborative research efforts. These endeavors are essential for addressing the diverse and evolving landscape of online education. The study also underscores the necessity of continued exploration in this field. To comprehensively understand the nuanced dynamics of online education's impact on student outcomes, future research should consider non-linear relationships, mediating factors, and the enduring effects of online learning. Furthermore, interdisciplinary collaboration between educators, researchers, and administrators is crucial to gaining a more holistic perspective and developing evidence-based practices that will ultimately benefit students in the ever-evolving realm of online higher education.

Recommendation

1.   Customized Assistance: Educational institutions ought to provide individualized support services, such as mentorship and tutoring, to effectively address specific obstacles and enrich the online learning journey for students.

2. Varied Pedagogical Approaches: Educators must embrace flexible and diversified pedagogical approaches, encompassing a combination of synchronous and asynchronous activities, to accommodate the various learning styles and preferences in online education.
3. Inclusive and Accessible Design: Guarantee inclusivity and accessibility in online learning platforms by creating courses that cater to a wide range of learners and offering resources in many formats.
4. Foster Interdisciplinary Collaboration: Stimulate cooperation among educators, researchers, and technologists to create cutting-edge tools and approaches, cultivating a highly efficient online learning environment.
5. Highlight the significance of continuous research in understanding the intricate dynamics of online education, which leads to evidence-based strategies and enhancements in higher education outcomes.

References

Abuhassna, H., Al-Rahmi, W. M., Yahya, N., Zakaria, M. A. Z. M., Kosnin, A. B. M., & Darwish, M. (2020). Development of a new model for utilizing online learning platforms to improve students' academic achievements and satisfaction. *International Journal of Educational Technology in Higher Education, 17*, 1-23.

Adeyeye, B., Ojih, S. E., Bello, D., Adesina, E., Yartey, D., Ben-Enukora, C., & Adeyeye, Q. (2022). Online learning platforms and Covenant University students' academic performance in practical related courses during the COVID-19 pandemic. *Sustainability, 14*(2), 878.

Al Rawashdeh, A. Z., Mohammed, E. Y., Al Arab, A. R., Alara, M., & Al-Rawashdeh, B. (2021). Advantages and disadvantages of using e-learning in university education: Analyzing students' perspectives. *Electronic Journal of E-learning, 19*(3), 107-117.

Alismaiel, O. A., Cifuentes-Faura, J., & Al-Rahmi, W. M. (2022). Online learning, mobile learning, and social media technologies: An empirical study on constructivism theory during the COVID-19 pandemic. *Sustainability, 14*(18), 11134.

Andreevich, P. D. (2020). THE IMPACT OF E-LEARNING AND SOCIAL PARAMETERS ON STUDENTS ACADEMIC PERFORMANCE. *Science for Education Today, 10*(6), 143-161.

Clark, A. E., Nong, H., Zhu, H., & Zhu, R. (2021). Compensating for academic loss: Online learning and student performance during the COVID-19 pandemic. *China Economic Review, 68*, 101629.

Cottrell, R. S. (2021). Student performance in online classes at a Hispanic-serving institution: A study of the impact of student characteristics in online learning. *Online Learning, 25*(3), 18-35.

Darkwa, B. F., & Antwi, S. (2021). From classroom to online: Comparing the effectiveness and student academic performance of classroom learning and online learning. *Open Access Library Journal, 8*(7), 1-22.

Doo, M. Y., Bonk, C., & Heo, H. (2020). A meta-analysis of scaffolding effects in online learning in higher education. *International Review of Research in Open and Distributed Learning, 21*(3), 60-80.

Edmunds, J. A., Gicheva, D., Thrift, B., & Hull, M. (2021). High tech, high touch: The impact of an online course intervention on academic performance and persistence in higher education. *The Internet and Higher Education, 49*, 100790.

El-Sayad, G., Md Saad, N. H., & Thurasamy, R. (2021). How higher education students in Egypt perceived online learning engagement and satisfaction during the COVID-19 pandemic. *Journal of Computers in Education, 8*(4), 527-550.

El-Said, G. R. (2021). How did the COVID-19 pandemic affect higher education learning experience? An empirical investigation of learners' academic performance at a university in a developing country. *Advances in Human-Computer Interaction, 2021*, 1-10.

Elshareif, E., & Mohamed, E. A. (2021). The Effects of E-Learning on Students' Motivation to Learn in Higher Education. *Online Learning, 25*(3), 128-143.

Eze, S. C., Chinedu-Eze, V. C., Okike, C. K., & Bello, A. O. (2020). Factors influencing the use of e-learning facilities by students in a private Higher Education Institution (HEI) in a developing economy. *Humanities and Social Sciences Communications, 7*(1), 1-15.

Ferrer, J., Ringer, A., Saville, K., A Parris, M., & Kashi, K. (2020). Students' motivation and engagement in higher education: The importance of attitude to online learning. *Higher Education*, 1-22.

Freire, T., & Rodríguez, C. (2022). The transformation to an online course in higher education results in better student academic performance. *RIED. Revista Iberoamericana de Educación a Distancia, 25*(1), 299-322.

Gonçalves, S. P., Sousa, M. J., & Pereira, F. S. (2020). Distance learning perceptions from higher education students—the case of Portugal. *Education Sciences, 10*(12), 374.

Gopal, R., Singh, V., & Aggarwal, A. (2021). Impact of Online Classes on the Satisfaction and Performance of Students during the pandemic period of COVID-19. *Education and Information Technologies, 26*(6), 6923-6947.

Han, F., & Ellis, R. A. (2021). Predicting students' academic performance by their online learning patterns in a blended course. *Educational Technology & Society, 24*(1), 191-204.

Herguner, G., Son, S. B., Herguner Son, S., & Donmez, A. (2020). The Effect of Online Learning Attitudes of University Students on Their Online Learning Readiness. *Turkish Online Journal of Educational Technology-TOJET, 19*(4), 102-110.

Hidalgo-Camacho, C., Escudero, G. I., Villacís, W., & Varela, K. (2021). The Effects of Online Learning on EFL Students' Academic Achievement during Coronavirus Disease Pandemic. *European Journal of Educational Research, 10*(4), 1867-1879.

Iglesias-Pradas, S., Hernández-García, Á., Chaparro-Peláez, J., & Prieto, J. L. (2021). Emergency remote teaching and students' academic performance in higher education during the COVID-19 pandemic: A case study. *Computers in human behavior, 119*, 106713.

Jawad, Y. A. L. A., & Shalash, B. (2020). The Impact of E-Learning Strategy on Students' Academic Achievement Case Study: Al-Quds Open University. *International journal of higher education, 9*(6), 44-53.

Kanetaki, Z., Stergiou, C., Bekas, G., Troussas, C., & Sgouropoulou, C. (2021). Analysis of engineering student data in online higher education during the COVID-19 pandemic. *Int. J. Eng. Pedagogy IJEP, 11*, 27-49.

Kumar, S. P. (2021). Impact of Online learning readiness on students satisfaction in higher educational institutions. *Journal of Engineering Education Transformations, 34*(0), 64-70.

Lacka, E., Wong, T., & Haddoud, M. Y. (2021). Can digital technologies improve students' efficiency? Exploring the role of Virtual Learning Environment and Social Media use in Higher Education: computers *& Education, 163*, 104099.

Leo, S., Alsharari, N. M., Abbas, J., & Alshurideh, M. T. (2021). From offline to online learning: A qualitative study of challenges and opportunities as a response to the COVID-19 pandemic in the UAE higher education context. *The effect of coronavirus disease (COVID-19) on business intelligence*, 203-217.

Li, J., & Che, W. (2022). Challenges and coping strategies of online learning for college students in the context of COVID-19: A survey of Chinese universities. *Sustainable Cities and Society, 83*, 103958.

Liu, Z.-Y., Lomovtseva, N., & Korobeynikova, E. (2020). Online learning platforms: Reconstructing modern higher education. *International Journal of Emerging Technologies in Learning (iJET), 15*(13), 4-21.

MacNaul, H., Garcia, R., Cividini-Motta, C., & Thacker, I. (2021). Effect of assignment choice on student academic performance in an online class. *Behavior Analysis in Practice, 14*(4), 1074-1078.

Mandasari, B. (2020). The impact of online learning on students' academic performance on a business correspondence course. *EDUTECH: Journal of Education and Technology, 4*(1), 98-110.

Marlina, E., Tjahjadi, B., & Ningsih, S. (2021). Factors affecting student performance in e-learning: A case study of higher educational institutions in Indonesia. *The Journal of Asian Finance, Economics and Business, 8*(4), 993-1001.

Müller, C., & Mildenberger, T. (2021). Facilitating flexible learning by replacing classroom time with an online learning environment: A systematic review of blended learning in higher education. *Educational Research Review, 34*, 100394.

Nácher, M. J., Badenes-Ribera, L., Torrijos, C., Ballesteros, M. A., & Cebadera, E. (2021). The effectiveness of the GoKoan e-learning platform in improving university students' academic performance. *Studies in Educational Evaluation, 70*, 101026.

Nassoura, A. B. (2020). We are measuring students' perceptions of online learning in higher education. *Int. J. Sci. Technol. Res, 9*(4), 1965-1970.

Omar, H. A., Ali, E. M., & Belbase, S. (2021). Graduate students' experience and academic achievements with online learning during the COVID-19 pandemic: sustainability*, 13*(23), 13055.

Raccanello, D., Balbontín-Alvarado, R., da Silva Bezerra, D., Burro, R., Cheraghi, M., Dobrowolska, B., . . . González-Fernández, B. (2022). Higher education students' achievement emotions and their antecedents in e-learning amid COVID-19 pandemic: A multi-country survey. *Learning and Instruction, 80*, 101629.

Rasheed, H. M. W., He, Y., Khalid, J., Khizar, H. M. U., & Sharif, S. (2022). The relationship between e-learning and academic performance of students. *Journal of Public Affairs, 22*(3), e2492.

Rozi, F., Ramdlani, M., Najah, F., Azizah, N., Niswa, H., Abdillah, M., & Rozi, F. (2021). *Distance Learning and Independent Learning of Students in Higher Education.* Paper presented at the Journal of Physics: Conference Series.

Sobaih, A. E. E., Hasanein, A., & Elshaer, I. A. (2022). Higher education in and after COVID-19: The impact of using social network applications for e-learning on students' academic performance. *Sustainability, 14*(9), 5195.

Spitzer, M. W. H., & Musslick, S. (2021). Academic performance of K-12 students in an online learning environment for mathematics increased during the shutdown of schools in the wake of the COVID-19 pandemic. *PloS one, 16*(8), e0255629.

Stevanović, A., Božić, R., & Radović, S. (2021). Higher education students' experiences and opinions about distance learning during the Covid-19 pandemic. *Journal of Computer Assisted Learning, 37*(6), 1682-1693.

Sun, T., & Kim, J.-E. (2023). The effects of online learning and task complexity on students' procrastination and academic performance. *International Journal of Human–Computer Interaction, 39*(13), 2656-2662.

Tang, Y. M., Chen, P. C., Law, K. M., Wu, C.-H., Lau, Y.-y., Guan, J., . . . Ho, G. T. (2021). Comparative analysis of Student's live online learning readiness during the coronavirus (COVID-19) pandemic in the higher education sector. *Computers & Education, 168*, 104211.

Wang, Y., Xia, M., Guo, W., Xu, F., & Zhao, Y. (2022). Academic performance under COVID-19: The role of online learning readiness and emotional competence. *Current Psychology*, 1-14.

Wijaya, H., Sumule, L., Weismann, I. T. J., Supartini, T., & Tari, E. (2021). Online learning evaluation in higher education: Study survey method. *Journal of Education Technology, 5*(3), 401-408.