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The Impact of Online Learning Strategies on Students' Academic Performance: A Systematic Literature Review

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Abstract. Today, online learning is a challenging teaching strategy used by higher educational institutions (HEI) and requires ample technological and psychological preparation. This study aims to assess whether the transition to the virtual classroom improved or deteriorated students' academic performance. Through a systematic literature review, 37 related literatures sourced from Science Direct, Taylor & Francis, and Emerald Insight were obtained. A ten-year timeframe between 2012 and 2022 was used to narrow down the searches. The criteria used for the selection of literature were based on the provided abstract, journal impact factor, and contain the relevant keywords for the study. In this study, four different aspects linked with online learning strategies were noted, namely: technical, technological, psychological, and physical. Findings from this study reveal that online learning strategies are often linked with technical, technological, physical, and psychological elements. Results also show that students' performance is highly dependent on the presence of these elements during online classes. Furthermore, this study recommends the continued use of online learning if both students and instructors are technologically and physically prepared.

Keywords: online learning; academic performance; Higher Educational Institutions

1. Introduction

The height of the pandemic forced most universities to transform their teaching methods from traditional classroom setups to a virtual environment. However, the process of transforming and shifting the methods was not an easy task, requiring technological, physical, and psychological readiness from both the instructors and the learners.

In some cases, the inability to prepare for this kind of scenario prompted some universities to delay the start of the school year. For instance, Korean schools opted to postpone the start of school year to a later date so that they could

physically and mentally prepare students to learn in a virtual environment (Kim et al., 2022). On the contrary, some countries saw an improvement on students' grades after the move to virtual learning occurred (Zhao et al., 2022).

Several literatures discussing the impact of online learning strategies on learners' performance have been conducted. This study utilized a systematic literature review to gather relevant studies from multiple databases, resulting in comprehensive research on online learning strategies. By employing a systematic literature review, irrelevant studies that did not meet the researcher's selection criteria were also excluded, streamlining the review process. Prior to the occurrence of the pandemic, online learning was only used to provide quizzes and activities to university students. However, with the onset of the COVID pandemic, universities across the globe were forced to transition their teaching to an entirely virtual classroom setup.

The majority of the published literatures associate learning strategies with technological, physical, psychological, and technical aspects. These aspects are deemed to affect students' performance. For example, a study conducted in Ghana mentioned that learners' performance is significantly affected by the environment in which the learner is currently engaged (Addae et al., 2022). Consequently, surveys conducted also reveal that students tend to associate technological innovations as an aid in yielding better academic performance (Al-Kahtani, 2022). Conversely, a study from Lemay et al. (2021) pointed out that despite online learning leading to positive academic performance, students studying in a virtual environment are prone to psychological stress and anxiety.
This study aims to identify the impact of online learning strategies on students' academic performance. The primary focus of the study is students belonging to higher educational institutions. Aside from the main aim of the study, these two specific questions are also posed:

i. Did the shift from a traditional classroom setup to an online learning environment positively or negatively affect students' performance?
ii. Which aspect has a great impact on students' performance?

1.2 Theoretical Context

In this study, there were several theories related to online learning and its impact on students' academic performance. For example, Holmberg's theory of distance education explains the conventional method of guiding a student in a distant learning. This theory is also based on concepts of motivation, empathy, learner autonomy, and interpersonal communication (International Council of Open and Distance Education, nd). AECT (nd) also defines Holmberg's theory as a concept that promotes individualisation wherein learners can learn without having any non-contiguous communication.

Another theoretical concept applied in this study is the transactional distance. Moore's theory of transactional distance simply explains that the distance between the learner and the instructor often creates separation and communication gaps (AECT, nd). Consequently, this theory also explains that both the learners and the instructors are affected by the existing distance.

2. Methodology

This study employs a systematic review and meta-analysis (PRISMA) principles and guidelines outlining relevant selected scholarly articles. According to Byukusenge et al. (2022), researchers use PRISMA principles to define strategies, criteria, and the eligibility of collected data.

2.1 Literature Search

In this study, various scholarly search engines such as Science Direct, Emerald Insight, and Taylor and Francis were used to locate relevant scholarly articles that are deemed useful for the topic. A ten-year timeframe between 2012 and 2022 was used to narrow down the searches. Keywords such as "student performance", "virtual classroom", "online strategies", "learning", and "academic institutions" were used in identifying and locating relevant literature reviews.

2.2 Inclusion and Exclusion Criteria

A systematic selection process was initially used and found 90 scholarly articles. Moreover, manual filtering was used to trim down and select articles that were fit for this study. The criteria used for the selection of literature were based on the provided abstract, journal impact factor, and contain the relevant keywords for the study, as shown in Table 1.

Table 1: Inclusion and exclusion criteria

Inclusion Criteria	Frequency
Articles must be published between 2012-2022	Articles published prior to 2012
Must be published in any scholarly search engine (ex. Science Direct, Emerald Insight, Taylor & Francis etc.)	Articles that are not from peer-review journals
Has an impact factor of at least 2.0	Below impact factor of 2.0
Articles published in English	Articles published in other languages aside from English
Must contain keywords: "student performance", "virtual classroom", "online strategies", "learning", and "academic institutions"	Does not contain any keywords such as "student performance", "virtual classroom", "online strategies", "learning", and "academic institutions"

With these given criteria, the researchers were able to yield a total of 62 scholarly articles. The selected publications were further examined and screened based on their full context. Moreover, these selected articles solely focused on students from higher educational institutions. Out of 62 initial selected articles, 25 were filtered out of the selection, resulting to a final selection of 37 scholarly articles. Figure 1 below represents a PRISMA diagram used in selecting and filtering scholarly articles.

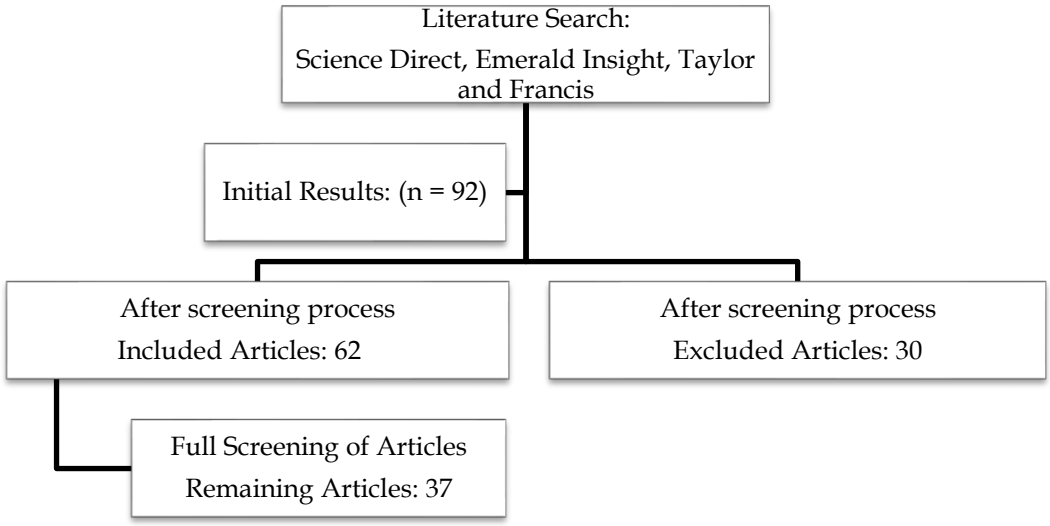

Figure 1: PRISMA diagram of the selection process of the reviewed studies

3. Results and Discussion

In this study, all the related literatures discussing the concept of online learning and its relationship with student performance were listed. It is noted that the majority of the scholarly works were published during the time of pandemic where most universities opted to conduct classes virtually.

3.1 Online Learning and Student Performance

Based on the gathered and selected literatures, the impact of online learning on students' performance can be attributed into four strategies, namely: psychological, physical, technical, and technological. Table 2 shows the list of the selected journal articles and their corresponding aspects deemed to impact online learning strategies and student academic performance. The majority of these articles were from the period between 2020-2022, although there are a few studies conducted prior to 2020 and some dated in 2012, 2016, 2017, and 2018.

Table 2: Online learning and its impact on student performance

No	Authors	Title	Journal	Findings	Aspect
1	Tang, Y., Tseng, H., & Tang, X. (2022)	The impact of information-seeking self-efficacy and online learning self-efficacy on students' performance proficiency	The Journal of Academic Librarianship	Self-efficacy is required so that students learning virtually can achieve better proficiency and performance	Psychological
2	Mendoza, N., Yan, Z., & King, R. (2022)	Supporting students' intrinsic motivation for online learning tasks: The effect of need-supportive task instructions on motivation, self-assessment, and task	Computers & Education	Students require a need-supportive strategy during task instructions to generate better intrinsic motivation to finish an online task	Psychological

		performance			
3	Yang, A., Chen, I., Flanagan, B., & Ogata, H. (2022)	How students' self-assessment behavior affects their online learning performance	Computers and Education: Artificial Intelligence	After class learning assessment is required so that students can achieve better grades while an online class is taking in place	Technical
4	Theobald, M., & Bellhauser, H. (2022)	How am I going and where to next? Elaborated online feedback improves university students' self-regulated learning and performance	The Internet and Higher Education	Students require feedback intervention to improve their self-regulated achievement and learning.	Technical
5	Clark, A., Nong, H., Zhu, H., & Zhu, R. (2021)	Compensating for academic loss: Online learning and student performance during the COVID-19 pandemic☆	China Economic Review	Student performance in online exams would often depend on the quality of the recorded lessons conducted by teachers in China. Use of computers during exams yielded better student grades than the use of smartphones.	Technical
6	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	Students who are studying at home or in dormitories are most likely to experience a decline in academic performance.	Physical
7	Jia, C., Hew, K., Du, J., & Li, L. (2022)	Towards a fully online flipped classroom model to support student learning outcomes and engagement: A 2-year design-based study	The Internet and Higher Education	The refined online flipped model was deemed to be more effective in students' engagement and performance	Psychological
8	Al-Kahtani, N. (2022)	A survey assessing the health science students' perception towards online learning at a Saudi Higher Education Institution during COVID-19 pandemic	Heliyon	Use of information technology tool such as Blackboard allowed students to perform well in their studies when learning virually	Technological
9	Lee, D., Rothstein, R., Dunford, A., Berger, E., Rhoads, J., & DeBoer, J. (2021)	"Connecting online": The structure and content of students' asynchronous online networks in a blended engineering class	Computers & Education	Students learn more when instructors exhibit authority during class discussions and promote open forum after classes.	Technical
10	Wang, Q., Xiong, C., Liu, J., (2021)	Does culture or self-directed learning drive online performance?	International Journal of Educational Management	Self-directed learning has a significant effect on students' performance during	Psychological

				online learning classes.	
11	Addae, H., Alhassan, A., Issah, S., & Azupogo, F. (2022)	Online learning experiences among nursing and midwifery students during the Covid-19 outbreak in Ghana: A cross-sectional study	Heliyon	Learners' performance decline during online learning due to constraints such as high cost of data and home distractions	Physical
12	Agyeiwaah, E., Baiden, F., Gamor, E., & Hsu, F. (2022)	Determining the attributes that influence students' online learning satisfaction during COVID-19 pandemic	Journal of Hospitality, Leisure, Sport & Tourism Education	The creation of a pleasant online environment and a motivating atmosphere tends to improve students' online learning performance	Technological
13	Kuan, F., & Lee, S. (2022)	Effects of self-efficacy and learning environment on Hong Kong undergraduate students' academic performance in online learning	Public Administration and Policy: An Asia-Pacific Journal	Students belonging to a lower socio-economic income bracket tend to show a lower academic performance which can be attributed to the use of an online learning platform and its efficacy	Technological / Psychological
14	Zimmerman, A., & Kulikowich, J. (2016)	Online Learning Self-Efficacy in Students with and Without Online Learning Experience	American Journal of Distance Education	Students' performance during online classes can be attributed to three different factors, as follows: management, technology use, and online environment itself.	Technological / Psychological
15	Strang, K. (2016)	How student behavior and reflective learning impact grades in online business courses	Journal of Applied Research in Higher Education	By introducing students to the functionalities of online learning (eg., online quizzes), students are able to cope with the demands of online classes, allowing them to perform and produce better grades.	Technical/ Psychological
16	Tan, C. (2021)	The impact of COVID-19 on student motivation, community of inquiry and learning performance	Asian Education and Development Studies	A lack of infrastructure and social support during online classes tends to result in a loss of motivation and a decline in student performance	Psychological / Technical/

17	Yee, B., Nawi, A., & Abdullah, T. (2022)	Potential disruptive innovation: online learning of public speaking courses in higher education	Foresight	Preference over face-to-face classes is a must for courses that require public speaking. Disruptive internet connection and lack of audience often result in poor student public speaking performance	Technical/ Technological
18	McPhee, I., & Soderstrom, T. (2012)	Distance, online and campus higher education: reflections on learning outcomes	Campus-Wide Information Systems	Regardless of whether the learning strategy is online or traditional, students' performance remains the same in Sweden.	Technological / Technical
19	Diab-Bahman, R., Al-Enzi, A., Sharafeddine, W., & Aftimos, S. (2021)	The effect of attendance on student performance: implications of using virtual learning on overall performance	Journal of Applied Research in Higher Education	Learning capabilities of freshmen and sophomores in an online learning environment are most likely to influence the resulting grades	Psychological
20	Stevens, G., Bienz, T., Wali, N., Condie, J., & Schismenos, S. (2021)	Online university education is the new normal: but is face-to-face better?	Interactive Technology and Smart Education	About 41% of students state that an online learning setup would yield better academic performance	Technical
21	Halabi, A., Essop, A., Carmichael, T., & Steyn, B. (2014)	Preliminary evidence of a relationship between the use of online learning and academic performance in a South African first-year university accounting course	Africa Education Review	Accounting students who spend more time in online classes are more likely to improve their coursework grades	Technical
22	Sun, T., & Kim, T. (2022)	The Effects of Online Learning and Task Complexity on Students' Procrastination and Academic Performance	International Journal of Human–Computer Interaction	In terms of meeting deliverables, students tend to procrastinate more in online learning settings than with traditional classroom settings.	Psychological
23	Avci, U., & Ergun, E. (2022)	Online students' LMS activities and their effect on engagement, information literacy and academic performance	Interactive Learning Environments	A need for close interaction between instructor and student is deemed to result in better academic performance and student information literacy	Technical
24	Zhao, H., Yang, X., Qu, F., Zhang, X., Song, L., & Yang, X.	The impact of the COVID-19 outbreak on physical fitness and academic performance of Chinese college	Journal of American College Health	In China, mean average scores of college students tend to improve during the usage of online	Technical

	(2022)	students		learning platforms	
25	Brown, T., Robinson, L., Gledhill, K., Yu, M., Isbel, S., & Greber, C. (2022)	Predictors of undergraduate occupational therapy students' academic performance during the Covid-19 pandemic: A hierarchical regression analysis	Scandinavian Journal of Occupational Therapy	In the case of Australia, a study reveals that shifting to an online classroom setup has significantly impacted the academic performance of occupational therapy students	Technical/ Technological
26	Xing, W. (2022)	Does the early bird catch the worm? A large-scale examination of the effects of early participation in online learning	Distance Education	Early participation in online classes often yields better student academic performance in China	Technical
27	Hashemi, A. (2021)	Effects of COVID-19 on the academic performance of Afghan students' and their level of satisfaction with online teaching	Cogent Arts & Humanities	Afghan students are dissatisfied with the online learning platform thus resulting in a poor academic performance as there is limited support and guidance available to the students	Technical
28	Alkis, N., & Temizel, T. (2018)	The Impact of Motivation and Personality on Academic Performance in Online and Blended Learning Environments	Educational Technology & Society	Study reveals that self-efficacy is required so that students can accomplish a task and perform well during online and blended class.	Psychological
29	Rissanen, A. & Costello, J. (2021)	The effectiveness of interactive online tutorials in a first-year large biology course	Journal of Applied Research in Higher Education	Providing prior online learning experience and engagement to Biology students resulted in an increase in academic performance	Technical
30	Broadbent, J. (2017)	Comparing online and blended learner's self-regulated learning strategies and academic performance	The Internet and Higher Education	Study reveals that students utilized self-regulated learning more in online than blended learning which later resulted in improved academic performance.	Technical
31	Horzum, M., Onder, I., & Besoluk, S. (2014)	Chronotype and academic achievement among online learning students	Elsevier Learning and Individual Differences	It is believed that online learning can aid the problem of improving academic performance	Technological

32	Li, Q., Banuelos, M., Liu, Y., & Xu, D. (2022)	Online instruction for a humanized learning experience: Techniques used by college instructors	Computers & Education	By adapting the eight techniques, instructors can foster relationship with students and provide better outcome with students' performance in a virtual environment	Technical
33	Davis, A., Rand, R., & Seay, R., (2016)	Remote Proctoring: The Effect of Proctoring on Grades	Advances in Accounting Education: Teaching and Curriculum Innovations	Findings show that students who are proctored by instructors during online classes significantly improve their grades over those who are not proctored.	Technical
34	Cavanaugh, J., Jacquein, S., & Junker, C., (2022)	A look at student performance during the COVID-19 pandemic	Quality Assurance in Education	Despite the abrupt shift to virtual classes, US HEI students saw an increase in GPA by 0.10.	Technical/ Technological
35	Lemay, D., Bazelais, P., & Doleck, T. (2021)	Transition to online learning during the COVID-19 pandemic	Computers in Human Behavior Reports	Online learning helped students to improve their grades; however, increased stress and anxiety rates have been noted as a result of the isolation.	Psychological
36	Lukas, B. A., & Yunus, M. M. (2021).	ESL Teachers' Challenges in Implementing E-learning during COVID-19.	International Journal of Learning, Teaching and Educational Research	Disadvantaged students encountered challenges with virtual learning during the pandemic.	Psychological
37	Mukuna, K. R., & Aloka, P. J. (2020).	Exploring educators' challenges of online learning in COVID-19 at a rural school, South Africa.	International Journal of Learning, Teaching and Educational Research	Virtual learning led to various challenges, a major one being the poor academic performances seen among students.	Technical/ Technological

3.2 Significant aspect linked with students' performance

In this study, four different aspects linked with online learning strategies were noted, namely: technical, technological, psychological, and physical. The said aspects directly affect students' performance. Figure 2 shows the distribution of the four aspects linked with online strategies.

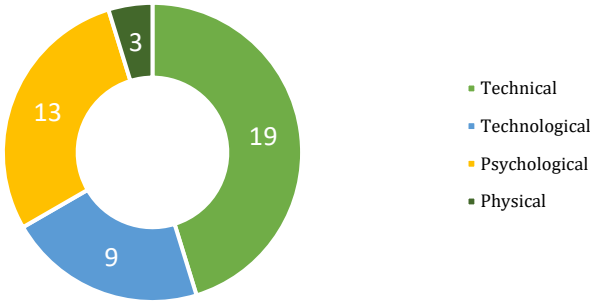

Figure 2: Distribution of Aspects linked with Online Learning Strategies

In the reviewed articles, there are some scholarly works that deal with two or more aspects. For instance, Brown et al. (2022) revealed that a combination of technical and technological aspects improved occupational therapy students' academic performance.

Out of the 37 reviewed literatures, 19 were linked with the technical aspect and 13 with the psychological aspect. It can also be said that being self-efficient and providing a good medium of instruction during online classes can result in a better output. Moreover, one study also noted that despite having a good academic output, students also suffer psychologically due to self-isolation and a lack of social support (Lemay et al., 2021).

On the other hand, some studies also mentioned the physical aspect. The physical aspect is defined as the state or condition in which a person works (Country Health Rankings, nd). In some studies, it is believed that the environment a student is in during online class sessions has a corresponding effect on the students' performance. Moreover, some studies also mentioned the technological aspect of online learning. For instance, usage of technological innovations such as Blackboard, Zoom, Google Meet and the like are deemed to help students to be productive during online classes.

3.3 Impact of online learning strategy on students' performance

The current technological advancements have prompted learning institutions to embrace online learning in an attempt to address challenges encountered with physical learning. Online learning is convenient, flexible and it is easy to reach a vast majority of students across countries; however, it is imperative to understand how this learning strategy affects the performance of students in different countries and institutions. Based on the increasing need for remote learning and the adverse impacts of Covid-19, many researchers have begun to study online learning. Recent debate surrounding online learning tends to compare its impact on the academic performance of students with that of students in conventional classrooms. As such, various researchers have conducted studies to examine these impacts.

3.3.1 Positive effects of online learning strategy on students' performance

According to Alkis and Temizel (2018), the academic performance of students is impacted by their level of motivation and their personalities, regardless of the learning environment they are subjected to (Alkış & Temizel, 2018). Another study by Avcı and Ergün (2022) found that LMS activities were related to student engagement, information literacy, and academic performance. More so, online satisfaction among students is influenced by a variety of factors; for instance, if a student finds it easy to use the online course materials, they are more likely to perform better. Similarly, students receiving support from their educators perform well in their course design (Agyeiwaah et al., 2022; Lee et al., 2021; Clark et al., 2021; Xing, 2022). Self-regulated learning strategies are important for good academic performance among students regardless of their learning environment (Broadbent, 2017; Kuan & Lee, 2022), but virtual learning has an overall impact on student performance (Diab-Bahman et al., 2021). More so, some studies found that remote proctoring, or the use of online proctors to monitor students during exams, positively affected grades (Davis et al., 2016).

Chronotype, or the individual differences in preferred times of day for sleep and wakefulness, was also found to be related to academic achievement among online learning students (Horzum et al., 2014). Similarly, based on the findings by Zimmerman et al. (2016), having an online learning experience increases a student's self-efficacy. The authors posit that online learning strategies increase students' confidence and pushes them towards success because with confidence, they believe in their abilities more (Zimmerman et al., 2016).

Furthermore, for students in Hong Kong, their virtual learning experience reveals that their performance depends on the immediate learning environment and personal efficacy (Kuan & Lee, 2022). As suggested by Tang et al. (2022), information-seeking and online learning self-efficacy significantly impact students' performance proficiency when it comes to online learning strategies. The authors suggest that these strategies help students to become more successful in their studies (Tang et al., 2022). According to the article by Yang et al. (2022), the authors examine how students' self-assessment impacts their online learning performance (Yang et al., 2022). The findings from this article indicate that self-assessment strategies can be beneficial in improving student engagement, knowledge acquisition, and performance in online learning environments (Yang et al., 2022).

Moreover, asynchronous online networks were found to positively impact student performance in a blended engineering class (Lee et al., 2021). Another study found that the structure and content of students' asynchronous online networks were important factors in determining their academic performance in this environment (Lee et al., 2021).

Due to the world health crisis caused by the Covid-19 pandemic, many institutions chose to switch to an online method of learning. This created a need to investigate the impact of online learning on the performance of students across the globe. Brown et al. (2022) revealed that online strategies such as

audio/visual aids, discussion boards, and group work positively impacted students' academic performance. The authors suggest that online strategies can be beneficial for increasing students' academic performance, especially during pandemics (Brown et al., 2022). According to a study performed on Ghanian nursing and midwifery students, different students had different experiences with virtual learning during the pandemic. Some reported increased engagement, and others reported challenges with access and motivation (Addae et al., 2022). A survey in Saudi Arabia found that health science students had largely positive perceptions of online learning during the pandemic, though some reported challenges with internet connectivity and motivation (Al-Kahtani, 2022). Undergraduate occupational therapy students' academic performance during the pandemic was found to be influenced by a variety of factors, including prior academic achievement, motivation, self-regulation, and engagement with course materials (Brown et al., 2022).

Additionally, studies by Clark et al. (2021) and Lukas and Yunus (2021) illustrated that disadvantaged students encountered challenges with virtual learning during the pandemic (Clark et al., 2021; Lukas & Yunus, 2021). Further, Al-Kahtani (2022) reveals how health science students in a Saudi Higher Education Institution perceived virtual learning during Covid-19. His findings illustrate the positive impacts of virtual learning on the academic performance of students in aspects like increased self-directed learning, improved attitudes, improved motivation, and better academic results. Another found that student performance during the pandemic varied by course level and instructional mode, with some students experiencing academic loss and others experiencing academic gain (Cavanaugh et al., 2022). Afghan students' academic performance and satisfaction with online teaching were found to be negatively impacted by the pandemic (Hashemi, 2021).

Based on the obtained literature reviews, findings show that the transition to an online learning setup allowed most students to improve their academic performance. This statement is further supported by Broadbent (2017), wherein students saw an improvement in their final grades following the implementation of an online learning setup. Moreover, the same case occurred in the United States wherein students' GPA improved by 0.10 during the pandemic (Cavanaugh et al., 2022). The same results were also seen in China: students' mean average grades improved during the pandemic (Zhao et al., 2022).

3.3.2 Negative effects of online learning strategy on students' performance

Even though these studies show the positive outcomes of online learning, it is crucial to examine all elements of the learning strategy. In a study conducted by students Lemay et al. (2021), it was found that students are most likely to experience increased anxiety and stress during online class sessions.

Further, students also felt distracted during online classes due to disruptions occurring in their physical environment during sessions. This is further validated in the study conducted by (Addae et al., 2022) in Ghana wherein

students' performance declined due to high data costs and disruptions in the working area during online classes.

Some undergraduate students encountered poor performances because of the impacts of the pandemic even with virtual learning (Brown et al., 2022). Hashemi (2021) posits that in the pandemic, most Afghan students performed poorly as their online classes were interrupted (Hashemi, 2021). Stevens et al. (2021) argue that even with a positive impact on the general performance of students, physical learning is more beneficial compared to virtual learning. Therefore, combining the two may be the best approach for optimal student outcomes.

Similarly, Li and Che (2022) posit that online learning during the pandemic attracted various challenges requiring a number of coping mechanisms. Through their article, the authors reveal that online learning has had a negative impact on students' performance, such as lower grades, reduced attendance and engagement, and increased psychological stress. Therefore, students are using various strategies to cope with the challenges posed by online learning (Li & Che, 2022).

Sun and Kim (2022) found that online learning had no effect on procrastination but did have a negative effect on academic performance. These authors found that task complexity was positively associated with procrastination and had a negative effect on academic performance. These findings suggest that educators should consider online learning and task complexity when designing curricula and instructional strategies (Sun & Kim, 2022). Also, Mukuna and Aloka (2020) revealed that virtual learning encountered various challenges in its operation. Some of these challenges included low or no involvement of parents in their children's homework, the failure of some students to complete work, a lack of sufficient internet access, and a lack of suitable electronic devices on which to complete schoolwork. All these challenges led to poor academic performances among students.

4. Conclusion and Recommendations

Shifting into a virtual classroom setup is a challenge for students and instructors. Thus, there is a need for an initial slow pace and prior online learning experience for easy adaptation to the new learning style.

With the given findings obtained from the study, it is concluded that several online learning strategies can affect the students' performance positively and negatively. In some cases, students' grades tend to improve during the online class setup. However, this setup also caused burn out and stress for the students. However, there are also some cases wherein students' grades lowered due to the unavailability of resources and a disruptor present in the environment.

Although universities are slowly returning to a face-to-face classroom setup, it is still advisable to continue with the virtual learning so that there is flexibility in learning. However, for this system to yield positive outcomes on students'

grades, it is expected that both the students and the instructors should be technologically and psychologically prepared. Moreover, instructors are also expected to fully utilize the available technology platforms in teaching such as Zoom, Google Meet and even Blackboard. Consequently, instructors should also be precise and clear with the medium of teaching; it was revealed in one study that students learn more when further instruction and support is provided.

This study's list of findings can be utilized as a helpful guide for both educators and students to enhance their online learning experience and process. Additionally, it can aid educators in mitigating the adverse impacts of online learning, including anxiety and stress.

Since this study is limited only to higher educational institutions, it is suggested that future research focuses on high school and elementary students. Moreover, it is also advisable to include socio-economic aspect of the students as this was not included in the current study.

One more constraint of this study is that it addresses the impact in a general sense and does not focus on a particular geographic location. To address this limitation, future research should consider selecting a specific region (e.g., North America) and evaluating its influence on student performance.

In conclusion, strategies of online learning significantly impact the performance of students. Studies have found that several aspects play a role in how well students perform in online learning environments. As such, there is a need to deeply understand these impacts. The current literature indicates an existing gap that requires researchers to delve further into understanding the significant role of these strategies in students' academic performance.

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