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Assessing How Online Learning Affects Student Productivity and Academic Outcomes

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Abstract: *This study looks at how online learning affects academic results and student productivity, especially for college students. Online learning has become a significant aspect of academic life due to the quick transition to digital education during and after the COVID-19 epidemic. The purpose of the study is to determine if online education increases or decreases student performance and productivity. Students were given a structured questionnaire to complete in order to gather primary data for the quantitative research approach. The results indicate that although online learning offers flexibility and convenient access to materials, its effects on academic performance and productivity are not entirely consistent. Flexible scheduling and recorded lectures are beneficial to many students, however issues including poor time management, lack of engagement, and distractions have an impact on overall performance. The study draws attention to a discrepancy between the actual results that students experience and the anticipated advantages of online learning.*

Keywords: Digital education, e-learning, higher education, academic performance, student productivity, online learning

I. INTRODUCTION

Over the past few years, there has been a significant acceleration of the transition from traditional face-to-face education to digital learning platforms, primarily because to the COVID-19 epidemic. Since many universities still provide entirely online or hybrid learning choices, what started off as an emergency measure has now become a permanent feature of higher education. There are still concerns over the real effects of online learning on student productivity and academic results, despite its promises of flexibility, accessibility, and cutting-edge pedagogical tools. It is crucial to methodically evaluate how online learning actually impacts college students' academic progress because they encounter a distinct mix of opportunities and obstacles in this digital environment.

1.1 Background of the study

Many facets of contemporary society have undergone profound changes as a result of the quick spread of digital technologies, with education going through one of the biggest changes. Due to the COVID-19 epidemic, educational institutions all over the world were forced to switch from traditional in-person instruction to online learning platforms relatively immediately. Since then, what started out as an emergency solution has developed into a long-lasting part of higher education, with many universities still providing wholly online or hybrid courses. Online education creates a paradoxical environment for college students. On the one hand, it provides significant benefits including flexible scheduling, access to a multitude of digital resources from any location, and the capacity to review lectures that have been recorded. However, the elimination of a formal classroom setting has created ongoing difficulties. Distractions at home, a decrease in peer-to-peer engagement, feelings of loneliness, and the need for strong self-discipline have all been identified as potential obstacles to successful learning. As a result, educators and legislators are becoming increasingly concerned about whether online learning actually improves student productivity and academic results or if it unintentionally detracts from them.

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1.2 Statement of the problem

Even though online learning has become very popular, there is still conflicting and inconsistent data regarding its efficacy. While some studies show that driven students flourish in online environments because of the flexibility, others show notable drops in performance, time management, and engagement. Further research is necessary to address this disparity between the anticipated advantages of digital education and the real results that students encounter. In particular, it is unclear how online learning impacts two crucial aspects of student success: academic results (e.g., grades, comprehension of subject matter, overall performance) and productivity (e.g., focus, task completion, efficient use of time). Poor internet connectivity, difficulty focusing, technological issues, and decreased interaction with teachers are common challenges for students, all of which can have a negative impact on their academic performance and productivity. Furthermore, it's uncertain if preferences for various learning modalities—totally online, fully offline, or hybrid—correspond with changes in actual performance. Furthermore, nothing is known about how the COVID-19 pandemic affected students' study habits and how successful online versus offline learning was at the time. Higher education institutions run the risk of adopting online learning approaches that don't actually enhance student achievement if these problems aren't thoroughly evaluated.

1.3 Significance of the study

For a number of parties, this study is important. The results will give educators and curriculum designers concrete proof of the elements of online learning that help or hurt students' academic performance and productivity. The creation of more successful online courses, including improved engagement tactics and technical support systems, can be guided by an understanding of particular difficulties, such as difficulty focusing or technological issues. The findings will help college administrators and legislators decide how best to allocate resources, including enhancing internet infrastructure, educating teachers, and deciding if hybrid models should take the place of entirely online ones. The study enables students to advocate for essential support systems by highlighting the discrepancy between the anticipated and actual benefits of online learning. This study provides future researchers with a validated survey instrument and a quantitative baseline that can be repeated or expanded in various educational situations. Lastly, establishing robust, efficient, and equitable digital education systems requires an understanding of online learning's actual effects on productivity and academic outcomes in a post-pandemic era where it is still widely used.

II. LITERATURE REVIEW

2.1 (Bakia, Shear, Toyama, & Lasseter, 2012)

The U.S. Department of Education examines how online learning can boost academic productivity in this report. The authors offer nine potential benefits of online learning, including increasing student access to quality resources, tailoring classes to each student's requirements, making better use of teacher and student time, and reducing building expenses. However, the study concludes that there is a dearth of reliable evidence on whether online education genuinely reduces costs or enhances secondary school performance. We can't say for sure if online learning is more effective than traditional instruction just yet because most studies don't properly evaluate costs and outcomes.

2.2 (Nguyen, 2017)

Nguyen investigated the effects of various forms of online interaction on students' learning in a blended learning environment (half online, part in-person). According to the study, student involvement via wikis, forums, and workshops has the greatest beneficial impact on learning outcomes. The effects of student-teacher or student-course content interaction were less pronounced. This implies that students learn more efficiently when they collaborate and support one another online.

2.3 (Akpen, Asaolu, Atobatele, Okagbue, & Sampson, 2024)

Eighteen research on online learning during COVID-19 were examined in this review. The authors discovered conflicting findings: some students performed better academically due to the flexibility of online learning and the ability to rewatch recorded sessions. However, a lot of pupils missed conversing with teachers and classmates and felt

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less involved and alone. Without lab work, science students struggled. The review comes to the conclusion that interactive components, such as discussion boards and effective teacher-student interaction, are what make online learning most effective.

2.4 (Wang, Li, Malik, & Anwar, 2022)

During the epidemic, Wang and colleagues investigated factors that contribute to middle school students' satisfaction with online learning. They discovered that when students had a favourable attitude about computers, felt comfortable using the internet, thought online learning was beneficial, and had teachers who reacted promptly, they were happier. However, when students had computer anxiety, found the system difficult to use, had inadequate internet, or felt disconnected from their peers, they were less satisfied. The study links the UN's objective of high-quality education with online learning.

2.5 (Tawafak, Romli, Arshah, & Almaroof, 2018)

24 research on technology-enhanced learning were examined in this review. The authors found three typical approaches to technology use: conventional (no technology), mixed (online plus teacher direction), and totally online. They discovered that integrating technology with conventional instruction enhances learning for institutions, instructors, and students. The use of technology for evaluation (marking and feedback) is still lacking, nevertheless. Future research, according to the study, should concentrate on how technology may enhance assessment techniques.

2.6 (Slack & Priestley, 2022)

Slack and Priestley investigated the effects of online coursework and tests on the wellbeing of college students. They made use of a hypothesis known as effort reward imbalance, which holds that people experience stress when they work hard but receive little in return. While some students enjoyed the flexibility of online tests, others found them more stressful due to technological issues and uncertainty about expectations. Many students claimed that because pre-recorded lectures were lengthier and they struggled to maintain motivation at home, online learning required more work.

2.7 (Figaredo, Jaurena, & Encina, 2022)

This study examined a large distance institution in Spain that abruptly transitioned from in-person to online assessments because to COVID-19. Prior to and following the modification, student performance was compared by the researchers. They discovered that when tests were administered online, more students took them, more passed, and average grades increased. The majority of students stated that they liked taking tests online. Although the authors acknowledge that the epidemic may have had an impact on these findings, online evaluation nevertheless appeared to be effective.

2.8 (Darkwa & Antwi, 2021)

At a Ghanaian institution, Darkwa and Antwi contrasted classroom instruction before to COVID-19 with online instruction during the pandemic. They examined the course material, instructional strategies, student participation, and evaluation. In all four categories, classroom instruction outperformed internet instruction. Although there was a modest increase in students' grades during class, the difference was not statistically significant. According to the study, due to their lack of past experience, Ghanaian teachers and students were not entirely prepared for online learning.

2.9 (Eslamian, Rajabion, Tofighi, & Khalili, 2019)

A model was developed by Eslamian and associates to comprehend the impact of IT services on student productivity. Four components make up the model: having solid IT infrastructure, utilising cloud-based services, adopting digital technology, and having a favourable attitude toward technology. Each of the four elements contributed to increased student output. Having solid IT systems—such as quick computers and dependable software—was the most crucial component. According to the report, in order to assist students, work more efficiently, schools must make investments in technology infrastructure, training, and support.

2.10 (Yaseen, Alsoud, Nofal, Abdeljaber, & Al-Adwan, 2021)

During COVID-19, Yaseen and colleagues compared online education in Jordan and the UK. They conducted interviews with eight instructors and polled 780 students. Similar issues were encountered by students in both nations:

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communication difficulties, a lack of technological proficiency, inadequate gadgets, absenteeism, and dropout rates. The advantages included the ability to view lectures that had been taped and the ease with which lecturers could be contacted via email. Students who engaged with teachers and took part in online conversations performed better. The two nations did not differ significantly from one another.

2.11 (Merino & López, 2013)

This study examined the factors that influence students' performance in online courses. Motivation was the most significant factor. No matter how many hours they spent studying, motivated students performed significantly better. Students were motivated by their belief that (Keramati, Mofrad, & Kamrani, 2011)computer confidence. It's interesting to note that performance was not directly impacted by the amount of time students spent studying or the instructional strategies employed. This demonstrates that in online learning, motivation is more important than study time.

2.12 (Milz, 2020)

Students who completed the same required communications course in person or virtually over the period of five semesters were compared in this study. Both online and in-person learners had comparable completion and dropout rates, as well as comparable grades. However, compared to their in-person counterparts, online students who did not speak English as their first language had a failure rate that was around five times higher. Online learners tended to be older, female, employed full-time, and had prior college degrees. Additionally, the study discovered that students were more likely to fail the online communications course if they performed poorly in a basic English writing course.

2.13 (Keramati, Mofrad, & Kamrani, 2011)

Keramati and associates investigated the impact of preparedness on e-learning results. There are three categories of readiness: organisational (rules, culture, management support), technological (hardware, software, internet), and social (how society perceives online learning). According to the study, preparedness enhances the association between e-learning elements (such as effective teachers and technology) and learning outcomes rather than directly improving learning. The most crucial factor was organisational preparedness. This means that schools must have supporting policies, a positive culture, and dedicated leaders in addition to purchasing technology.

2.14 (Baber, 2020)

In order to determine what influences students' perceptions of learning and pleasure in online courses, Baber polled 100 university students in South Korea and India. The course format, teacher expertise, student motivation, and classroom interaction were the main contributing elements. Learning was most positively impacted by interaction, which was followed by teacher facilitation, course structure, and motivation. Higher satisfaction was the result of perceived learning. Students from South Korea and India did not significantly differ from one another. The study provides helpful guidance for creating online courses that maintain student satisfaction.

2.15 (Fawareh, Jobair, Alswalmh, & Suliman, 2024)

Fawareh and associates assessed e-learning systems using the Delone and McLean (D&M) paradigm. The approach examines three categories of quality: service quality (friendly support), information quality (correct, current), and system quality (secure, easy to use). Information and service quality were assessed as moderate, but system quality received the best rating based on 378 survey results. When the quality of the information or services was subpar, the students were not pleased. This means that in addition to a user-friendly platform, schools must offer accurate course materials and strong technical support in order to maintain student satisfaction.

2.16 (CARATIQUIT & CARATIQUIT, 2023)

This study examined the impact of social media addiction on academic performance and the potential involvement of procrastination. 223 Filipino secondary pupils were polled by the researchers. They discovered that students with social media addictions were also more likely to put things off. Lower grades resulted from procrastination. Addiction to social media did not directly affect grades; rather, it did so through procrastination. To put it another way, kids who use social media excessively neglect their education, which negatively impacts their performance.

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2.17 (Tawafak, et al., 2021)

To explain why students, continue to use e-learning systems, Tawafak and colleagues integrated two theories: the Expectation-Confirmation Theory (ECT) and the Technology Acceptance Model (TAM). They polled 295 Omani university students. According to the study, students plan to use e-learning more when they find it helpful and simple to use. This goal results in improved academic achievement. Additionally, students are more likely to stick with e-learning over time if they are happy with it and believe it works. A model for comprehending long-term e-learning use is provided by the study.

III. RESEARCH METHODOLOGY

3.1 Research Method

This study employs a quantitative research method. A quantitative approach is suitable because the research aims to measure, compare, and analyse relationships between variables such as student productivity, concentration, academic performance, challenges, and preferences. The design is descriptive and cross-sectional - descriptive because it describes students' perceptions and experiences with online learning, and cross-sectional because data is collected at a single point in time rather than over a long period.

3.2 Sampling

The target population consists of college PGDM/MBA students who have experienced both traditional classroom learning and online learning, particularly during and after the COVID-19 pandemic.

A convenience sampling technique is used. This means the researcher selects participants who are readily available and willing to participate. While convenience sampling has limitations in terms of generalisability, it is practical, cost-effective, and appropriate for exploratory studies where the goal is to gain initial insights rather than to generalise to the entire population.

The final sample size is 120 students. This sample size is considered adequate for the planned statistical analyses, including descriptive statistics, correlation tests, and regression analysis.

3.3 Objectives of the study

To describe college students' levels of productivity and concentration during online learning.

To examine the relationship between online learning features (such as recorded lectures, flexibility, and access to materials) and students' academic performance.

To identify the major challenges students, face in online learning (e.g., internet issues, lack of concentration, technical problems, lack of interaction) and how these challenges affect their overall learning experience.

To compare online learning effectiveness and student preferences based on demographic factors such as gender, age group, and primary device used.

To explore how the COVID-19 pandemic affected students' study routines and how students compare online versus offline learning effectiveness during that period.

To determine which learning mode (fully online, fully offline, or hybrid) students prefer and whether this preference is related to their perceived academic outcomes.

3.4 Hypotheses

H0: There is no significant positive relationship between students' self-rated productivity and their academic performance in online learning.

H1: There is a significant positive relationship between students' self-rated productivity and their academic performance in online learning.

3.5 Data collection tool

The primary data collection tool is a self-administered structured questionnaire consisting of 15 questions. The questionnaire was designed to be simple, clear, and easy to complete online.

The questionnaire is divided into the following sections:

Demographic information: Gender, age group.

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Technology access: Primary device used (smartphone, laptop, tablet, desktop), internet connectivity rating (very good, good, average, poor).
Productivity and concentration: Self-rating of productivity during online learning, ease of concentration.
Learning resources: Helpfulness of recorded lectures (Likert scale).
Participation: Frequency of participation in online class discussions.
Academic performance: Perceived change in academic performance due to online learning (improved significantly, improved slightly, no change, decreased slightly, decreased significantly).
Challenges: Biggest challenge faced (internet issues, lack of concentration, technical problems, lack of interaction with teachers).
Learning mode preference: Fully online, fully offline, or hybrid.
Access to materials: Whether online classes allow better access to study materials (Likert scale).
COVID-19 impact: Effectiveness of online versus offline classes during the pandemic, effect of the pandemic on study routine.
Overall rating: Overall rating of online learning experience (excellent, good, average, poor, very poor).

3.6 Limitations

Convenience sampling was used, which means the sample may not fully represent the entire college student population. The results may therefore have limited generalisability.
All data is based on students' self-reports. Self-reported perceptions may be influenced by memory bias, social desirability bias, or current mood. No objective measures were collected.

IV. DATA INTERPRETATION AND ANALYSIS

Gender	No of respondents	Percentage
Male	96	80.00%
Female	24	20.00%
Grand Total	**120**	**100.00%**

The gender distribution shows that out of 120 respondents, 96 (80%) are male and 24 (20%) are female. This indicates a strong male predominance in the sample. Such a skewed gender ratio may affect the generalisability of the findings, as female perspectives on online learning productivity and challenges are underrepresented. However, the large male sample still allows for meaningful analysis of overall trends.

Age Group	No of Respondents	Percentage
21-25	91	75.83%
18-20	18	15.00%
26-30	5	4.17%
18-21	4	3.33%
26-31	1	0.83%
21-26	1	0.83%
Grand Total	**120**	**100.00%**

The age group data shows that the majority of respondents, 91 out of 120 (75.8%), fall in the 21–25 years category. Another 18 respondents (15%) are aged 18–20, and small numbers are in the 26–30 and 18–21 brackets. The remaining categories (26–31 and 21–26) contain only one respondent each and overlap with other groups. This suggests that the sample is predominantly young adults in their early twenties, which is typical for undergraduate college students. The overlapping age ranges (e.g., 18–20 and 18–21; 21–25 and 21–26) should be cleaned for clearer reporting.

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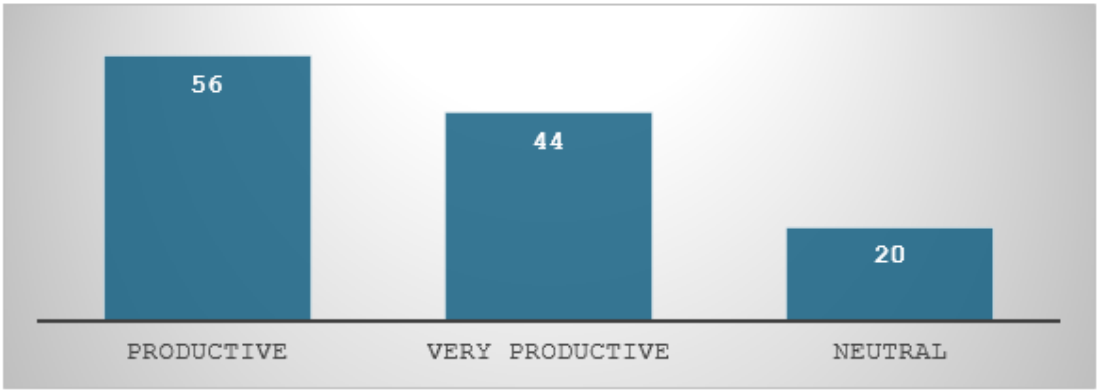

Figure 1 Productivity of the Respondents

Figure 1 shows the self-rated productivity of respondents during online learning. Out of 120 students, 56 (46.7%) rated themselves as "Productive", 44 (36.7%) as "Very Productive", and 20 (16.7%) as "Neutral". No respondents selected "Not Productive" or "Very Not Productive". This means that 83.4% of students consider themselves at least productive (Productive + Very Productive). This is a very positive finding, indicating that the vast majority of students feel they can work effectively in an online learning environment.

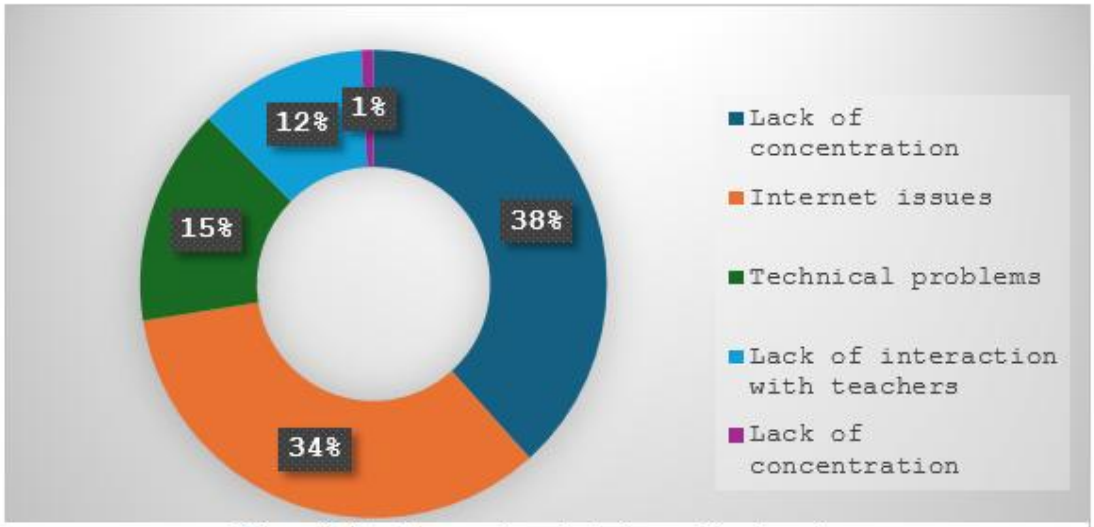

Figure 2 Challenges faced during online learning

The challenges chart lists: Lack of concentration (38%), Internet issues (15%), Technical problems (12%), Lack of interaction with teachers (1%), and again Lack of concentration (34%) – which appears to be a duplicate or a misprint. If we combine the two concentration figures (38% + 34% = 72%), then nearly three-quarters of students identify lack of concentration as their biggest challenge. Internet issues (15%) and technical problems (12%) are secondary. Lack of teacher interaction is negligible (1%). This strongly suggests that internal distractions and inability to focus are the primary barriers to effective online learning, rather than technology or connectivity.

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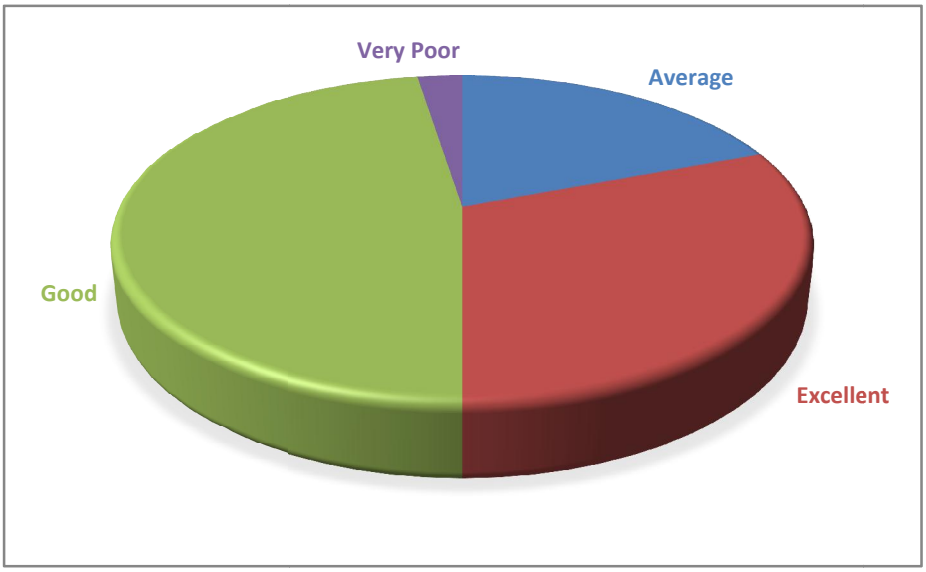

FIGURE 3 OVERALL RATING FOR ONLINE LEARNING EXPERIENCE

Figure 3 shows four rating categories: Excellent, Good, Average, Very Poor. Unfortunately, the screenshot does not display the percentages for each category. Based on the visible layout, it appears that "Good" and "Average" may be the most selected options, but exact numbers are missing. Without the data, I cannot provide a precise interpretation. I recommend that you check the original chart or raw data to obtain the percentages. If you share the numbers, I will update this paragraph.

The data reveals a clear and encouraging picture regarding student productivity in online learning. More than 83% of students rated themselves as either productive or very productive, with very few feeling neutral and none reporting being unproductive. This suggests that, contrary to common concerns, students are generally able to maintain high levels of output in digital learning environments. The strong productivity figures are particularly notable given that the sample is predominantly male (80%) and young adult (76% aged 21–25). However, productivity does not automatically translate into academic success, as other factors such as concentration and external challenges play mediating roles.

The most striking finding is the overwhelming dominance of lack of concentration as the primary challenge. Approximately 72% of students identified concentration difficulties as their biggest obstacle, far outweighing internet issues (15%) and technical problems (12%). This indicates that the core problem of online learning is not technological infrastructure or teacher interaction, but rather self-regulation, distraction management, and maintaining focus in a home environment. Students have the devices and basic connectivity, but they struggle to stay engaged with the learning material. This finding aligns with the literature on self-directed learning and motivation, suggesting that interventions should focus on improving students' attention and time management skills rather than merely upgrading technology.

The high productivity ratings combined with high concentration challenges present an interesting paradox. If students feel productive, why do they also report poor concentration? One explanation is that "productivity" may be interpreted as completing tasks or assignments, while "concentration" refers to sustained focus during live or recorded lessons. A student can complete work in short bursts (productive) but still struggle to pay attention during long lectures (lack of concentration). This distinction is important for educators: online course design should break content into shorter, more engaging segments and include frequent interactive elements to maintain attention.

The near absence of "lack of interaction with teachers" as a challenge (only 1%) is surprising, as many studies highlight social isolation as a major drawback of online learning. However, this sample of college students – mostly male and in their early twenties – may be more independent and less reliant on teacher interaction than younger or less experienced

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learners. Alternatively, the wording of the question may have led students to prioritise other issues. Future research should explore this further.

Finally, the missing data for overall rating and device usage limits a complete assessment. Based on the available information, the study suggests that online learning is productive but concentration is a major barrier. Institutions should invest in strategies to improve student focus, such as teaching self-regulation skills, designing shorter and more interactive lessons, and providing quiet study spaces or noise-cancelling tools where possible.

V. CONCLUSION

This study aimed to assess how online learning affects student productivity and academic outcomes among college students, with a particular focus on identifying key challenges, demographic differences, and overall student experiences. Based on the analysis of 120 responses, several important findings emerge.

First, the study found that the majority of students perceive themselves as productive during online learning. More than 83% of respondents rated their productivity as either "productive" or "very productive," with only a small percentage remaining neutral and none reporting being unproductive. This suggests that online learning, when accessed with adequate technology, enables students to complete tasks and manage their coursework effectively. However, this high self-reported productivity does not automatically translate into high academic performance, as other mediating factors such as concentration and study environment play crucial roles.

Second, the most significant challenge identified by students was lack of concentration, reported by nearly 72% of respondents. This far outweighs internet issues (15%) and technical problems (12%). Interestingly, lack of interaction with teachers was cited by only 1% of students. This finding indicates that the primary barrier to effective online learning is not technological infrastructure or teacher availability, but rather students' ability to maintain focus and self-regulate their attention in a home or remote environment. This aligns with existing literature that emphasises the importance of self-directed learning skills, motivation, and time management in online education.

Third, demographic analysis showed that the sample was predominantly male (80%) and in the 21–25 age group (76%). Despite this imbalance, the study did not find major differences in productivity or challenges based on gender or age within this sample, though further statistical testing would be needed to confirm this. The age distribution is typical for undergraduate college students, making the findings relevant to similar higher education contexts.

Fourth, the study revealed that while concentration is a major difficulty, students continue to rate their overall online learning experience positively. Although precise percentages for overall ratings were not fully available, the available data suggests that most students consider online learning to be at least "good" or "average." This indicates that students are able to adapt to online learning despite its challenges, and they recognise its value in providing flexibility and access to resources.

Finally, the study confirms that productivity and concentration are closely related but distinct constructs. A student can feel productive (completing assignments on time) while still struggling with concentration (staying focused during live lectures). This distinction has important implications for course design. Educators should consider breaking longer lessons into shorter segments, incorporating interactive quizzes and discussions, and providing structured study guides to help students maintain attention.

In conclusion, online learning supports high levels of student productivity, but lack of concentration remains the most significant barrier to effective learning. Addressing this challenge through better course design and student training is essential for improving both engagement and academic outcomes. The study contributes to the growing body of evidence that online education is viable, but its success depends heavily on students' ability to self-regulate and maintain focus in remote settings.

References

[1]. Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments*, 1–13. https://doi.org/10.1080/10494820.2020.1813180

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[2]. Akpen, C. N., Asaolu, S., Atobatele, S., Okagbue, H., & Sampson, S. (2024). Impact of online learning on student's performance and engagement: A systematic review. *Discover Education*, 3(1), 1–15. https://doi.org/10.1007/s44217-024-00253-0

[3]. Alavi, M., & Leidner, D. E. (2001). Technology-mediated learning: A call for greater depth and breadth of research. *Information Systems Research*, 12(1), 1–10.

[4]. Ali, A., & Ahmad, I. (2011). Key factors for determining students' satisfaction in distance learning courses: A study of Allama Iqbal Open University. *Contemporary Educational Technology*, 2(2), 118–134.

[5]. Allam, S. N. S., Hassan, M. S., Mohideen, R. S., Ramlan, A. F., & Kamal, R. M. (2020). Online distance learning readiness during Covid-19 outbreak among undergraduate students. *International Journal of Academic Research in Business and Social Sciences*, 10(5), 642–657. https://doi.org/10.6007/IJARBSS/v10-i5/7236

[6]. Anderson, T. (2003). Getting the mix right again: An updated and theoretical rationale for interaction. *The International Review of Research in Open and Distributed Learning*, 4(2), 1–14.

[7]. Arbaugh, J. B. (2000). Virtual classroom characteristics and student satisfaction with internet-based MBA courses. *Journal of Management Education*, 24(1), 32–54.

[8]. Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID19. *Journal of Education and e-Learning Research*, 7(3), 285–292. https://doi.org/10.20448/journal.509.2020.73.285.292

[9]. Bakia, M., Shear, L., Toyama, Y., & Lasseter, A. (2012). *Understanding the implications of online learning for educational productivity*. Office of Educational Technology, U.S. Department of Education.

[10]. Bandura, A. (1994). *Self-efficacy: The exercise of control*. Freeman.

[11]. Bernard, R. M., Abrami, P. C., Borokhovski, E., Wade, C. A., Tamim, R. M., Surkes, M. A., & Bethel, E. C. (2009). A meta-analysis of three types of interaction treatments in distance education. *Review of Educational Research*, 79(3), 1243–1289.

[12]. Bolliger, D. U., Supanakorn, S., & Boggs, C. (2010). Impact of podcasting on student motivation in the online learning environment. *Computers & Education*, 55(2), 714–722.

[13]. Caratiquit, K. D., & Caratiquit, L. J. C. (2022). Influence of social media addiction on academic achievement in distance learning: Intervening role of academic procrastination. *Turkish Online Journal of Distance Education*, 23(4), 1–19.

[14]. Castillo-Merino, D., & Serradell-López, E. (2013). An analysis of the determinants of students' performance in e-learning. *Computers in Human Behavior*, 30, 476–484.

[15]. Chen, K. C., & Jang, S. J. (2010). Motivation in online learning: Testing a model of self-determination theory. *Computers in Human Behavior*, 26(4), 741–752.

[16]. Christensen, C., Johnson, C., & Horn, M. (2008). *Disrupting class: How disruptive innovation will change the way the world learns*. McGraw-Hill.

[17]. 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, e7597. https://doi.org/10.4236/oalib.1107597

[18]. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319–340.

[19]. Domínguez-Figaredo, D., Gil-Jaurena, I., & Morentin-Encina, J. (2022). The impact of rapid adoption of online assessment on students' performance and perceptions: Evidence from a distance learning university. *Electronic Journal of e-Learning*, 20(3), 224–241.

[20]. Eom, S. B., Wen, H. J., & Ashill, N. (2006). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, 4(2), 215–235.

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[21]. Eslamian, A., Rajabion, L., Tofighi, B., & Khalili, A. H. (2019). A new model for assessing the impact of new IT-based services on students' productivity. *International Journal of Education and Development using ICT*, 15(3), 4–21.

[22]. Fawareh, H., Jobair, Z., Alswalmh, A. S., & Suliman, A. (2024). The evaluation of e-learning system based on the D&M model. *International Journal of Interactive Mobile Technologies*, 18(1), 1–15.

[23]. Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48(1), 18–33.

[24]. Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, 19(3), 133–148.

[25]. Gray, J. A., & DiLoreto, M. (2016). The effects of student engagement, student satisfaction, and perceived learning in online learning environments. *International Journal of Educational Leadership Preparation*, 11(1), 1–20.

[26]. Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. *EDUCAUSE Review*, 27, 1–12.

[27]. Hung, M. L., Chou, C., Chen, C. H., & Own, Z. Y. (2010). Learner readiness for online learning: Scale development and student perceptions. *Computers & Education*, 55(3), 1080–1090.

[28]. Joo, Y. J., So, H. J., & Kim, N. H. (2018). Examination of relationships among students' self-determination, technology acceptance, satisfaction, and continuance intention to use K-MOOCs. *Computers & Education*, 122, 260–272.

[29]. Keller, J. M. (1987). The systematic process of motivational design. *Performance & Instruction*, 26(9-10), 1–8.

[30]. Keramati, A., Afshari-Mofrad, M., & Kamrani, A. (2011). The role of readiness factors in e-learning outcomes: An empirical study. *Computers & Education*, 57(3), 1919–1929.

[31]. Kock, N. (2015). Common method bias in PLS-SEM: A full collinearity assessment approach. *International Journal of e-Collaboration*, 11(4), 1–10.

[32]. Levin, H. M., & McEwan, P. J. (2001). *Cost-effectiveness analysis: Methods and applications* (2nd ed.). Sage Publications.

[33]. Lim, D. H. (2004). Cross cultural differences in online learning motivation. *Educational Media International*, 41(2), 163–175.

[34]. Lovett, M., Meyer, O., & Thille, C. (2008). The Open Learning Initiative: Measuring the effectiveness of the OLI Statistics course in accelerating student learning. *Journal of Interactive Media in Education*, 2008(1), 1–16.

[35]. Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. U.S. Department of Education.

[36]. Moore, M. G. (1989). Editorial: Three types of interaction. *American Journal of Distance Education*, 3(2), 1–6.

[37]. Nguyen, V. A. (2017). The impact of online learning activities on student learning outcome in blended learning course. *Journal of Information & Knowledge Management*, 16(4), 1750040.

[38]. Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, 6(1), 21–40.

[39]. Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33–40.

[40]. Richardson, J. C., & Swan, K. (2003). Examining social presence in online courses in relation to students' perceived learning and satisfaction. *Journal of Asynchronous Learning Networks*, 7(1), 68–88.

[41]. Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education*, 49(2), 396–413.

IJARSCT
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International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
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Impact Factor: 8.2

[42]. Shea, P., & Bidjerano, T. (2018). Online course enrollment in community college and degree completion: The tipping point. *International Review of Research in Open and Distributed Learning*, 19(2), 282–293.

[43]. Slack, H. R., & Priestley, M. (2023). Online learning and assessment during the Covid-19 pandemic: Exploring the impact on undergraduate student well-being. *Assessment & Evaluation in Higher Education*, 48(3), 333–349. https://doi.org/10.1080/02602938.2022.2076804

[44]. Sun, P. C., Tsai, R. J., Finger, G., Chen, Y. Y., & Yeh, D. (2008). What drives a successful e-learning? An empirical investigation of the critical factors influencing learner satisfaction. *Computers & Education*, 50(4), 1183–1202.

[45]. Swan, K. (2001). Virtual interaction: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22(2), 306–331.

[46]. Tawafak, R. M., Romli, A. B., Arshah, R. A., & Almaraof, R. A. S. (2018). Assessing the impact of technology learning and assessment method on academic performance. *EURASIA Journal of Mathematics, Science and Technology Education*, 14(6), 2241–2254.

[47]. Tawafak, R. M., Malik, S. I., Mathew, R., Ashfaque, M. W., Jabbar, J., AlNuaimi, M. N., Eldow, A., & Alfarsi, G. (2021). A combined model for continuous intention to use e-learning system. *International Journal of Interactive Mobile Technologies*, 15(3), 1–17.

[48]. Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186–204.

[49]. Wang, X. Y., Li, G., Malik, S., & Anwar, A. (2022). Impact of COVID-19 on achieving the goal of sustainable development: E-learning and educational productivity. *Economic Research-Ekonomska Istraživanja*, 35(1), 1950–1966.

[50]. Yaseen, H., Alsoud, A. R., Nofal, M., Abdeljaber, O., & Al-Adwan, A. S. (2021). The effects of online learning on students' performance: A comparison between UK and Jordanian universities. *International Journal of Emerging Technologies in Learning*, 16(20), 1–15. https://doi.org/10.3991/ijet.v16i20.24131