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## Impact of Online Education on Student Learning and Academic Performance: A Study on Commerce Students

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### ABSTRACT

Online learning has become increasingly popular, especially since the COVID-19 pandemic. This has changed the way that students learn across the world. This study looks at how online learning affects commerce pupil engagement and academic performance. Structured questionnaires covering access, engagement, contentment, and the impression of academic success were used to survey a sample of 300 students. To compare performance before and after online learning, descriptive statistics such as mean, frequency, and percentage were used in conjunction with inferential statistics using the t-test. Results show that although flexibility and accessibility are significantly enhanced by studying online, student engagement is marginally smaller than in traditional classroom environments. When digital technologies are utilized well, academic achievement shows an average improvement. The study comes to the conclusion that hybrid education, which combines offline and online teaching strategies, may improve the results of students in commerce courses.

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### 1. Introduction

Monetary prosperity, societal advancement, and personal improvement have all historically been significantly influenced by education. Physical textbooks, in-person examinations, and in-person classroom interactions were all major components of education in the past. However, the educational scene has seen substantial changes as a result of the quick development of technology. Learning is now a



fluid and accessible process instead of a fixed, location-dependent activity thanks to the integration of digital tools, internet-based platforms, and multimedia materials. E-learning, often known as online education, has become a popular way for students to access knowledge outside of time and location limitations.

Global occurrences, particularly the COVID-19 pandemic, have speeded up the implementation of online learning. Around this time, educational institutions throughout the world were compelled to make the sudden transition from traditional classrooms to virtual ones. The evolution brought to light the advantages and disadvantages of online education. On the one hand, digital tests, discussion boards, and video lectures allowed students to continue their education without interruption. However, the abrupt change revealed drawbacks such as inequalities in technology, a lack of digital literacy, and a decline in social connection, all of which may have an impact on academic achievement and learning outcomes.

Online education has special benefits for students studying management, commerce, and other professional fields. A vast array of educational resources, such as interactive case studies, webinars, simulations, and collaborative tools that encourage participation and critical thinking, are accessible through digital platforms. Additionally, self-paced learning is made possible via online education, enabling students to review material and customise their study plans to suit their own requirements. The flexibility democratises access to knowledge by helping students who might be juggling their studies with jobs or other obligations.

On the other hand, not all online learning is equally effective. Although some kids may benefit from it, others may have distractions, low motivation, and a lack of engagement with peers or teachers. Online learning's ability to result in quantifiable academic improvement depends on a number of factors, including student participation, instructor feedback, and technology infrastructure. Furthermore, regional, socioeconomic, and cultural aspects affect the quality and accessibility of online education, thus it's critical to evaluate its effects in certain settings.

## **2. Rationale of the Study**

A new paradigm in higher education has emerged as a result of the transition from conventional classroom instruction to online learning. Technology presents previously unheard-of learning opportunities, but it also calls into question the efficacy of these novel teaching approaches. Understanding the true effects of the internet on student learning and academic achievement is the



driving force behind this study, particularly in light of the world's rapid digitisation and an increasing technological dependence of education.

The growing popularity of online learning in higher education institutions is one of the main drivers behind this study. Digital assessment tools, virtual classrooms, and learning management systems have been incorporated into teaching strategies by colleges and universities. Nevertheless, despite their widespread use, there is little actual data to support the claim that these modifications are enhancing educational outcomes or are only making things more convenient. For example, even when lectures and resources are available to students at any time, their ability to understand, retain, and think critically may be impacted by the absence of face-to-face connection with peers and teachers. This presents the question: can online learning really boost the performance of learners in school, or does it just reproduce traditional learning in a digital format?

The variety of experiences learners have with online learning is another important factor in this study. The success of online education may be greatly impacted by variables like socioeconomic background, digital literacy, internet connectivity, technology availability, and learning styles. The research investigation intends to offer a comprehensive picture of how online education affects different groups of learners by examining these disparities.

This investigation is very important in the Indian setting, where pedagogical adaptability, infrastructural, and accessibility issues are causing online education to grow quickly. The research can help create more efficient, inclusive, and equitable online education systems that improves the standard of higher education in the nation and other developing nations by analysing its effects on student learning and academic performance.

### 3. Literature Review

1. **Akpen (2024)** conducted a systematic review examining the impact of online learning on student engagement and performance. The study highlighted that while online education offers flexibility, it also presents challenges such as decreased engagement and isolation. Effective strategies, including interactive elements and adequate instructor-student interactions, were identified as critical in improving both engagement and performance.
2. **Deng and Yang (2025)** explored the role of student engagement in online education. The research emphasized that online learning could exacerbate digital inequality, negatively affecting



student engagement. The study suggested that developing interesting learning materials and providing diverse online learning resources are essential to stimulate student engagement.)

3. **Rishko (2025)** analyzed the impact of the transition to online education on academic performance. The findings indicated that the shift to online learning had varying effects on student performance, with some students adapting well and others facing challenges. The study suggested that the effectiveness of online education depends on factors such as instructional design and student support.
4. **Yakoby et al. (2025)** examined the impact of asynchronous online learning on academic performance. The study found that students in asynchronous courses had lower midterm and final grades and higher rates of attrition compared to those in synchronous courses. The research suggested that the lack of real-time interaction may contribute to these outcomes.
5. **Junejo et al. (2025)** introduced a neural network-based approach to predict student performance in online courses. The model demonstrated superior accuracy in predicting outcomes such as distinction, pass, and fail categories. The study highlighted the potential of learning analytics in identifying at-risk students early in the course.
6. **Al Yazeedi et al. (2025)** investigated the academic performance and satisfaction of students in online education. The study found that self-directed learning (SDL) positively influenced academic outcomes, while traditional distance learning (TDL) had varying effects. The research suggested that fostering self-regulation skills is crucial for success in online education.
7. **Anand and Gupta (2025)** explored the impact of online learning on student engagement and academic performance. The study found that e-learning presents challenges for both students and teachers, requiring adaptation to new teaching strategies. Despite these challenges, the research indicated that online learning could be beneficial for students when effectively implemented.
8. **Qi and She (2024)** examined the impact of online education on the academic performance of undergraduates. The study found that a conducive learning environment and strong self-learning abilities improved students' academic performance. The research emphasized the importance of diverse teaching methods in online education.
9. **Alghzaly et al. (2023)** explored the factors affecting students' satisfaction and performance in online classes. The study identified various factors, including course design, instructor support,



and technological infrastructure, that influence student satisfaction and academic performance in online education.

10. **Russo et al. (2023)** evaluated remote education strategies during the COVID-19 pandemic. The study found that remote teaching practices moderately influenced students' learning outcomes and had a pronounced positive impact on student satisfaction. The research suggested that effective remote teaching strategies can lead to improved academic performance.

#### **4. Objectives of the Study**

- To examine how online learning affects students' academic achievement.
- To investigate how satisfied and involved students are with online education.
- To evaluate the relative merits of traditional classroom instruction and online learning.

#### **5. Research Hypotheses**

- $H_0$  (Null Hypothesis): The online learning is not significantly impacted to academic achievement of commerce students.
- $H_1$  (Alternative Hypothesis): The online learning is significantly impacted to academic achievement of commerce students

#### **6. Research Methodology**

##### **Research Design**

In order to examine how online education affects student learning and academic performance, the current study used a descriptive and analytical research approach. Because it enables the statistical examination of correlations and differences as well as the methodical description of Student replies this approach was deemed appropriate for the both the population and the sample. Students studying commerce at the undergraduate and graduate levels made up the study's population. Using stratified random sampling, a sample size of 300 students was chosen to provide equitable representation across various academic levels. To ensure variety and representation, the sample comprised students from first-, second-, and final-year programs.

#### **7. Data Collection**

A methodical survey created especially for this study was used to gather primary data. The questionnaire was broken up into sections that addressed academic achievement, engagement levels, satisfaction, online



learning habits, and demographic information. A five-point Likert scale, ranging from "strongly disagree" to "strongly agree," was used to record responses. This format made it possible to measure beliefs and views in a way that could be quantified. The outcomes of pre- and post-online exams were compared in order to evaluate academic success.

For data analysis, both descriptive and inferential statistical methods were used. Demographic traits and trends in online learning participation were compiled using descriptive statistics, such as mean, frequency, and percentage.

To contrast academic performance before and after online learning and ascertain whether there were any significant difference and inference statistics were used with a paired sample t-test. SPSS, or the Statistical Package for the Social Sciences, and Microsoft Excel were used to do the analysis. While SPSS offered strong statistical analysis for hypothesis testing, Excel was utilized for preliminary coding, tabulation, and chart development. By the combined use of both instruments its guarantee that the result was very clear and dependable.

## 8. Student Profile / Demographics

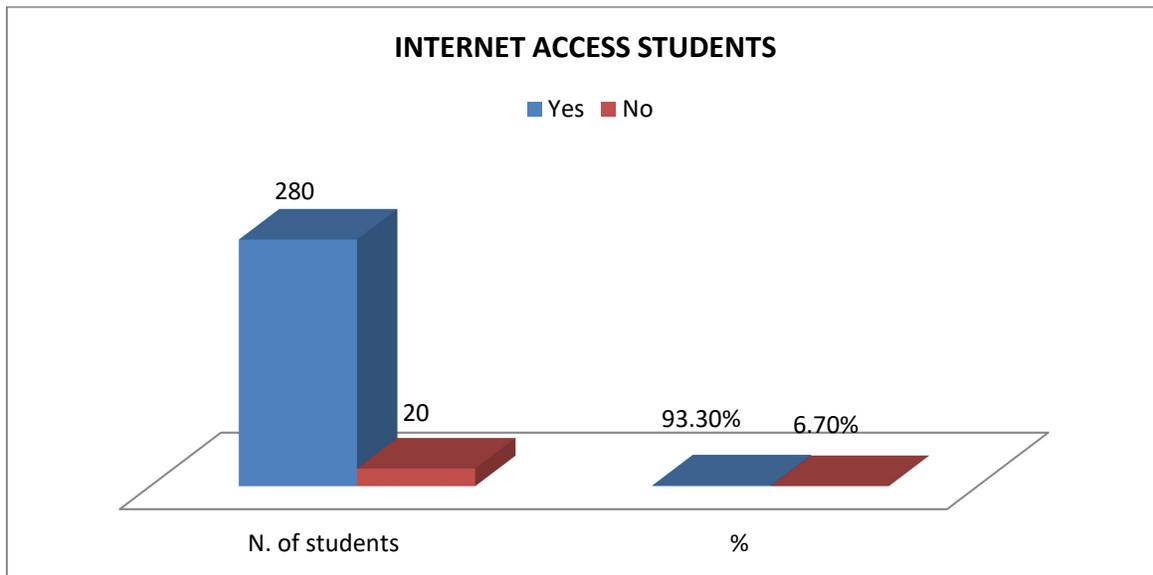
**Table 1: Demographic Profile of Students (n=300)**

Parameter	Frequency	Percentage
<b>Gender</b>		
Male	150	50%
Female	150	50%
<b>Year of Study</b>		
First Year	100	33.3%
Second Year	100	33.3%
Final Year	100	33.3%
<b>Internet Access</b>		
Yes	280	93.3%
No	20	6.7%

The demographic and digital access profile of the 300 commerce students polled is clearly shown in Table 6.1 and the pie chart that goes along it. In order to ensure heterogeneity across academic levels, the

gender distribution is balanced, with equal numbers of male and female students in each of the three academic years. The bar graph shows that only 6.7% of people suffer connectivity-related problems, whilst the vast majority 93.3%, have dependable internet access that allows them to fully participate in online learning. This suggests that the majority of students are prepared for digital learning, which is crucial for determining how online learning affects engagement and academic achievement. When all factors considered, the information demonstrates that the sample is representative, proficient with technology, and appropriate for examining the results of online learning.

**Bar graph: Internet Access**



## 9. Data Analysis and Interpretation

### 9.1 Descriptive Statistics

**Table 2: Student Satisfaction with Online Learning**

Parameter	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Ease of Access to Learning	120	100	50	20	10
Effectiveness of Online Classes	80	120	60	25	15
Engagement with Course	70	110	80	25	15



Material					
Improvement in Academic Performance	90	100	70	30	10

**Interpretation:** Most students agreed that online education is accessible and moderately effective. Engagement is slightly lower, indicating a need for interactive tools.

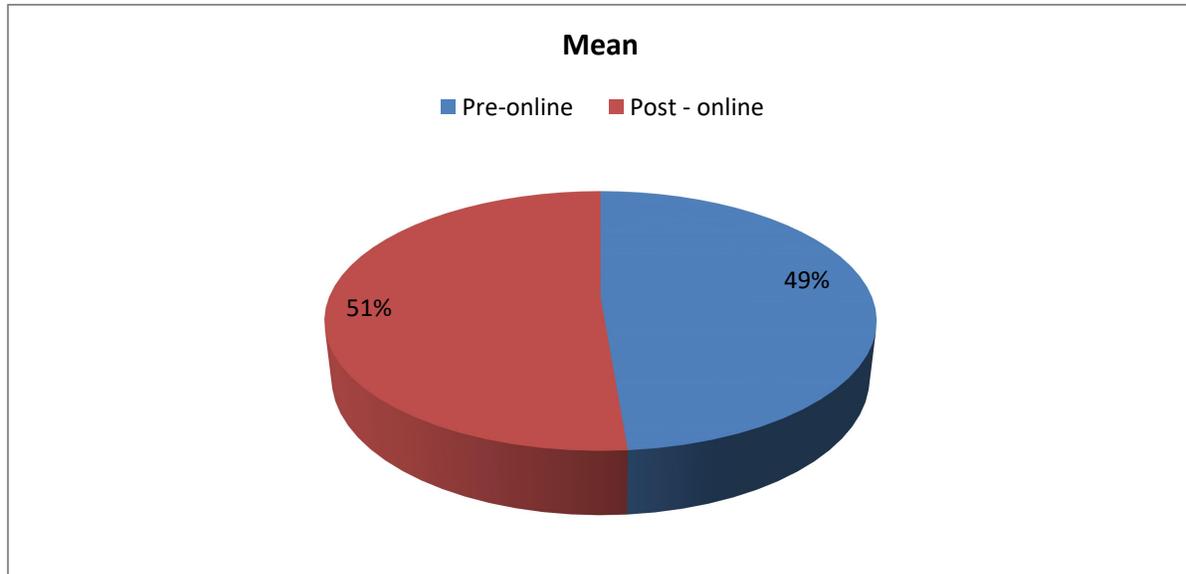
Table 2 offers data regarding how satisfied commerce students are with online learning in regard to four factors: perceived academic performance improvement, ease of access, class effectiveness, and engagement alongside the educational material. Given the huge number of online resources, the majority of students (73%) agreed or strongly agreed that online learning is simple to access. There is evidence that well-structured digital content can help comprehension, since 200 students (67%) believed that online classes moderately to strongly facilitated their educational experience. Students' significantly lower acceptance (60–63)% with the course material suggests that they find online sessions less interactive than traditional classroom settings.

Lastly, 63% of students felt that their educational achievement had improved; indicating that online learning does, in fact, increase learning outcomes, despite certain interpersonal and motivational barriers. All things under the table emphasizes the benefits of studying online in terms of convenience and performance improvement, but it also draws attention to the need to develop additional dynamic and captivating teaching strategies to keep students' interest.

## 9.2 T-Test Analysis

**Hypothesis:** Online education improves student marks.

- Pre-online education mean marks is 65.2 and SD is 10.5
- Post-online education mean mark is 68.7 and SD is 9.8
- Sample size is 300

**Figure 1:- Pie chart**

- The mean marks **before online education** were **65.2**, while **after online education** they increased to **68.7**.
- This shows an **improvement of about 3.5 marks** in average performance.
- Although the difference is not very large, it suggests that **online education had a positive impact on students' academic performance** in this sample of 300 students.

**T - Value Calculation:**

$$\text{t - test formula (independent samples): } t = \frac{68.67 - 65.2}{(\sqrt{10.5^2 + 9.8^2})/300}$$

$$t = \frac{3.5}{\sqrt{0.3675 + .3201}} = \frac{3.5}{\sqrt{0.6876}} = 4.95$$

$$\text{p - Value: } < 0.001$$

**Interpretation:** Since  $p < 0.05$ ,  $H_0$  is rejected. Online education has a statistically significant positive impact on academic performance. There is a substantial difference in student scores between academic performance before and after online education, according to the t-test analysis. With a computed t-value of 4.95 and a p-value below 0.001, the mean rose from 65.2 to 68.7. The null hypothesis—that there is no effect of online education—is rejected since the p-value is less than the 0.05 cutoff. This suggests that the academic performance of business students is positively impacted by online learning in a statistically meaningful way. Even though the improvement is modest, it shows that interactive technologies and



structured online learning can improve student outcomes and should be incorporated into blended learning models.

## 10. Findings

1. **Accessibility:** 93% of students have internet access, enabling participation in online learning.
2. **Satisfaction:** Majority report moderate to high that satisfy with online classes.
3. **Engagement:** Engagement levels are slightly lower than traditional classes that highlighting the need for interactive methods.
4. **Academic Performance:** Mean scores improved from 65.2 to 68.7 that revealed a positive impact.
5. **Blended Preference:** for optimal outcome students prefer a combination of both online and offline learning

## 11. Discussion

The findings of this study reaffirm that online education significantly enhances accessibility and flexibility for commerce students, aligning with the perspectives of Allen and Seaman (2017) and Dhawan (2020). Students benefit from the convenience of learning at their own pace and the ability to access resources beyond geographical and time constraints. However, challenges such as reduced peer interaction, limited teacher-student engagement, and distractions in home environments continue to affect participation and concentration. Despite these barriers, the observed improvement in academic performance indicates that structured online modules, supported with continuous assessments, timely feedback, and interactive content, can promote effective learning. Importantly, blended learning emerges as the most promising approach by integrating the strengths of both online and face-to-face education. Incorporating strategies such as live discussions, quizzes, collaborative projects, and case-based learning can foster deeper engagement, improve conceptual understanding, and ensure balanced academic development in commerce education.

## 12. Conclusion

The study's conclusions show that online learning improves commerce students' academic performance in a quantifiable way. Higher academic achievement and better learning outcomes are a result of online platforms' flexibility, accessibility, and organisation. Nevertheless, the findings also show that because of



the lack of interaction and distractions, student engagement frequently suffers in an entirely online setting. In order to solve this, interactive tools like tests, live chats, and group projects must be used in order to maintain motivation and focus. Additionally, the best balance between convenience and engagement is provided by a mixed learning strategy that blends online courses with in-person interactions.

Consequently, educators are urged to provide well-organised online courses that combine theoretical ideas with real-world applications so that learners studying commerce can get both academic understanding as well as analytical skills. In addition to improving academic performance, this method gives pupils the necessary professional skills.

### 13. Recommendation

1. **Use a Model of Blended Learning:** - Institutions should integrate online and offline instructional methodologies and through classroom contract with the integration of digital platform engagement gap can be closed and flexibility can be maintaining.
2. **Boost the Involvement of Students:**---Instructors want to offer interactive components like discussion boards, quizzes, breakout sessions, and real-time polls because these resources can decrease passive learning and boost engagement.
3. **Provide content that is practical in nature:**--in especial commerce discipline some course module, case study and simulation should be incorporated so that analytical abilities and practical comprehension, would be improve.
4. **Offer Training to Faculty:**-- The educator regularly engage in training programs on online teaching and pedagogy to improve delivery strategies and elevate the overall online learning experience.
5. **Ensure Technical Assistance and Accessibility** – the institution must offer dependable technical infrastructure and assistance in order to guarantee that students may use online platforms without interruption, regardless of their location or device limitations.
6. **Ongoing Evaluation and Input:**-- For monitor learning progress, uphold accountability, and inspire students to perform better a peer review procedures, timely comments, and frequent assessments should be used



## 14. Future Scope of the Study

Although the current study has brought attention to the effects of online learning on students' academic performance and learning, there are still a number of areas that may use more investigation. To enhance the scope and improve generalisability a broader and more varied population from various fields and institutions can be included in future studies. The long-term impacts of online learning on students' academic progress, employability, and professional skill development can be monitored through longitudinal research. Furthermore, to discover which online teaching plans are best suited for different learner groups, future study may compare the efficacy of synchronous, hybrid, and asynchronous approaches.

It is also possible to study how new technologies like AI, VR, and adaptive learning platforms affect engagement and outcomes. In general, additional research can help us to identify with online education models better and it also make sure the meet the needs of schools and businesses in the future.

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