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Research Article

Comparative Analysis of Online and Traditional Classroom Instruction in Higher Education

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ABSTRACT

This study compares the online classroom education with the traditional classroom education of post-secondary education. Online learning is a recent trend in recent years, particularly at the time of the COVID-19 pandemic, which boosted the introduction of remote learning. Even though online learning is more convenient and accessible, some concern still exists regarding the issue of student engagement, interaction, and academic outcomes compared to those of the traditional classroom. This study will have a comparative discussion of online and traditional learning platforms systematically in the context of academic performance, student participation, and satisfaction. It was a mixed-methods study, which included quantitative (study of academic performance data (grades, test scores, completion rates, etc.) and qualitative surveys and interviews to determine the level of student engagement and satisfaction. The sample was comprised of 200 students of the university pursuing online and traditional courses. Statistical analysis, such as T-tests and ANOVA, was performed, and significant variation in academic performance was found, with the traditional classroom students having high performance in comparison to the online learners. Besides, online learners also reported that there was less interaction and engagement, even though they valued asynchronous learning. The study has found that online education is flexible, but classroom education is superior regarding offering student engagement as well as academic performance.

Keywords: Online Education, Traditional Classrooms, Student Engagement, Academic Performance, Higher Education.

1. Introduction

One of the most significant educational transformations that occurred in the last several decades in the change of higher education is online learning. Online learning is more flexible than ever since the course material and lectures are delivered in the form of internet-based programs that allow students to receive education materials irrespective of geographical location and time constraints (Kamraju et al., 2024). This flexibility may be particularly beneficial to non-traditional students, who may work, have family concerns, or other obligations (Johnson et al., 2022). However, this model has raised the issue of whether the lack of face-to-face contact will be able to impact the education results of the students, their social life, and the overall education experience (Fabian et al., 2022).

The conventional classroom learning, with its follow-up of the developed schedule, immediate feedback, and in-person communication, is still valued as allowing focusing on the interaction with students, as well as the social dimension of the learning process (Photopoulos et al., 2023). Face-to-face communication also contributes to developing a sense of belonging; students are motivated and able to discuss in real-time, thereby resulting in the academic success and happiness of students (Tinto, 2017). However, despite all these advantages, online learning has been increasing at an unprecedented rate, and owing to its growing popularity during the COVID-19 pandemic, there was a need to reevaluate the relative advantages of the two routes of teaching. More than ever, the need to compare the studies that contrast online and traditional learning based on objective academic outcomes and subjective interaction is present (Jaggars and Xu, 2016).

Though there are studies that have shown that online courses are capable of providing a similar or higher academic outcome in instances of effective design, there are those that point to the problem of student

engagement, isolation and absence of individual feedback in internet-based courses. One of the studies, conducted by Means et al. (2013), states the fact that online education can be as efficient in delivering the content as long as the course design is concentrated on active learning and incorporates synchronous interaction. Contrary, as has been noted in research by Bolliger and Martin (2021) that online learning may adversely impact peer-to-peer learning, which is imperative in skill development of critical thinking and academic motivation. These problems were also aggravated by the recent COVID-19 pandemic, where most institutions of higher education switched to online courses without a sound idea regarding the long-term effects of the transition on the learning outcomes (DeCoito and Estaiteyeh, 2022).

The differences in communication with the students in a normal and online classroom are effectively reported (Nagarajan et al., 2024). The articles indicate that face-to-face instruction leads to increased levels of interaction as well, including attending classroom discussions, group work and personal contact with the instructors more frequently (Hood et al., 2021). Online learners have been found to deplore reduced levels of interaction with peers and instructors, and this may cause the feeling of isolation and reduced academic satisfaction (Shim and Go, 2025). Online learners do enjoy the flexibility that comes along with asynchronous learning, but they also lament the lower rates of it. This distinction raises serious questions about how online courses ought to be structured in a manner that fosters interaction and engagement and still creates the flexibility that online education promises (McCarroll and Hartwick, 2022). Comparative research is necessary as it will provide a more holistic picture of the effectiveness of online education, especially in the field of higher education (Ullum, 2022). In an illustration, where research might have shown that online learning is not effective in engagement, different research has made an incidence that when the online course is formulated right to incorporate the component of collaborative learning, a community can be formed (Dixson, 2010). This relative investigation will address a significant gap in the current knowledge and will provide recommendations to the educational practice and policy that are evidence-based (Olivet et al., 2016).

The design of online education can differ significantly, and the factors that have the greatest impact on the effectiveness of the online learning are the course design, the presence of the instructor and student regulation (Miao and Ma, 2022). It is documented that the trend of online classes, including the use of active learning models, clarity, and frequent instructor feedback, could make it equally effective as the classroom setting (Shambour and Abu-Hashem, 2022). However, the courses with practical assignments or with the necessity to cooperate in person have lower levels of performance as compared to online courses, which also reminds us of the necessity of course-related focus (Caprara and Caprara, 2022). Thus, the study aims to analyze in what circumstances online teaching can be as successful and even more successful than traditional learning and in what circumstances it is not possible.

Objectives of the Study

1. To compare the results of the performance of students in online classroom and traditional classroom settings, in terms of academic performance (grades, test scores and completion rates) in higher education.
2. To compare and determine the degree of student involvement, degree of interaction, and degree of satisfaction of the online and conventional learning platforms.

2. Methodology

2.1 Study Design

The study employed a combination methodology to give a comprehensive picture of online and traditional classroom-based learning in the institutions of higher education. The quantitative aspect was meant to measure the outcomes of the academic performance of students in both teaching situations. The qualitative component tried to draw an inference of the emotions, engagement and experiences of students and teachers. Using statistical and thematic analysis, the study not only served the purpose of evaluating the measurable differences in performance but also established the elements that contributed to the attitude of the students and the teachers, towards the effectiveness of each teaching method. This was a combination of approaches, which offered an equal approach to the subject, both in objective performance measures and subjective experiences.

2.2 Population and Sample

The study sample was a sample of students in undergraduate programs in the university, and the sample was selected according to the different academic fields, thus giving a broad picture of the educational practice. The questionnaire was conducted on 200 students, who included 100 online students and 100 traditional classroom students. To select the sample, a stratified random sampling technique was used, as this ensures that a representative sample of the different demographics, such as age, gender, and academic background, is selected. This was carried out to have a balanced sample, since it may have assisted in the generalization of the findings, as it would have represented the general population of the students. In addition to this, the teachers under both teaching methods participated in interviews to give details on the teaching methods and interaction with students.

2.3 Data Collection Methods

The study was done on the respondents of university students who are undertaking undergraduate programs, and the respondents used in the research were spread across various academic fields to have an extensive perspective on the education practices of the students. The survey was carried out among 200 students (100 students who are enrolled on online courses and 100 students in classes). The sampling was done using a stratified random sampling method to ensure that the sample used is representative of different demographics such as age, gender and academic background. This was to ensure that a balanced sample is taken, which will incorporate the more significant student body, and hence the findings will be more generalized. In addition, the two instructional mode teachers were also interviewed to give information related to teaching methods and communication with the students.

2.4 Variables

The independent variable was the mode of instruction that was used in this study and was categorized into two modes, namely online and traditional classroom instruction. Student performance, which was measured through the use of student grades, test marks, and completion rates, student engagement, which was measured through the rate of participation and self-reported degree of engagement, and the perceptions of the students and the instructors, which were measured with surveys and interviews, were the dependent variables. These variables were important in the research into the influence of different modes of instruction to the learning outcomes, interest and satisfaction. These measurements would have enabled the study to create some valuable differences between these two instruction methods and their usefulness in enhancing educational achievements.

2.5 Data Analysis Techniques

The statistical test that will be applied in analyzing quantitative data will be t-tests, ANOVA and regression analysis to transform the performances of students in online and traditional classes to examine their performance levels. These strategies will help in establishing the high level of differences in academic performance and whether the type of education can influence the academic performance of the students. Qualitative data analysis will be done through thematic analysis, and it will involve coding of responses of interviews and focus groups in order to identify common themes in relation to engagement, satisfaction, and perceived effectiveness of the instructional methods. The quantitative and qualitative analysis combination will provide a complete picture of the differences and the similarities between the online and the traditional learning experience, which will be significant to the educators and policymakers.

3. Results

3.1 Presentation of Data

The quantitative analysis demonstrated that the outcomes of students in terms of their performance differ significantly in online and traditional classroom settings. The students in the traditional classroom outperformed the online students in exams and other tasks; their average grade was 85% as compared to 78% with online students. The difference between the performances is quite high, especially on those subjects that require more face-to-face communication and practical work. The qualitative data collected in terms of student and instructor responses revealed that there were certain themes related to engagement and interaction. Traditionally, classroom students were also discovered to be more participative and to interact directly with the instructors. Whereas, online students argued that online education provided the long-overdue flexibility, but there was a problem with the absence of personal interaction and contact with teachers.

The difference in academic performance of the students enrolled in the traditional and online classes is significant, and as illustrated in Table 1, there is a significant difference in performance. The students of the traditional classroom achieved better results in all measures taken, including mean grades, performance in tests as well and completion rates, as compared to those of the online students. The reason is evidenced here by the fact that interpersonal communication and instant feedback in conventional classrooms matter in enhancing academic performance.

Table 1: Comparison of Average Performance Outcomes Between Online and Traditional Classroom Students

Instruction Mode	Mean Grade (%)	Test Scores (%)	Completion Rate (%)
Traditional Classroom	85	87	90
Online Classroom	78	75	82

3.3 Engagement and Interaction

The results of student engagement and interaction are very varied using the two teaching methods. Students studying in traditional classrooms participated more in in-class discussion, group work, and in-person communication with instructors. At the same time, an average of 80% of group discussions were made up of the conventional classroom attendees compared to 50% of group discussions made up of virtual discussion

attendees. In addition, teachers in the traditional settings noticed that real-time feedback and the degree of involvement in lectures were improved. Online students, on their part, mentioned the flexibility of asynchronous discussions as one of the good attributes of their experience, though they claimed to be lacking immediate responses from their instructors. These dissimilarities of engagement refer to the fact that higher interactions seem to be better with physical presence in traditional classrooms.

The comparison of the engagement levels of traditional and online students in terms of group discussion, peer interaction, and instructor interaction, represented in Table 2. The traditional classroom learners were more proactively engaged in all kinds of interaction, which means that physical presence is more prone to greater participation and engagement.

Table 2: Engagement Levels in Traditional vs. Online Classroom Settings

Instruction Mode	Group Discussions (%)	Peer Interaction (%)	Instructor Interaction (%)
Traditional Classroom	80	75	85
Online Classroom	50	45	55

3.4 Visual Aids

The information given in the visual form gives clear patterns of academic performance and involvement. The level of engagement represented by a pie chart illustrates that 70% of the students who attended traditional classrooms completed group discussions compared to 45 % online students. The additional student satisfaction is also divided in another graph, where 65% of the traditional classroom learners stated that they were very satisfied with the course format, whereas 55% stated the same concerning online learners. These visual aids help to capture the differences between the internet and a real classroom setting since they give a vivid image of the numbers and favour the statistical findings of academic performance and participation.

Visual comparison of the degree of satisfaction of the traditional and online students is shown in Figure 1. The traditional classroom students are more contented, particularly with the level of high contentment, which indicates that face-to-face learning is a better way of learning.

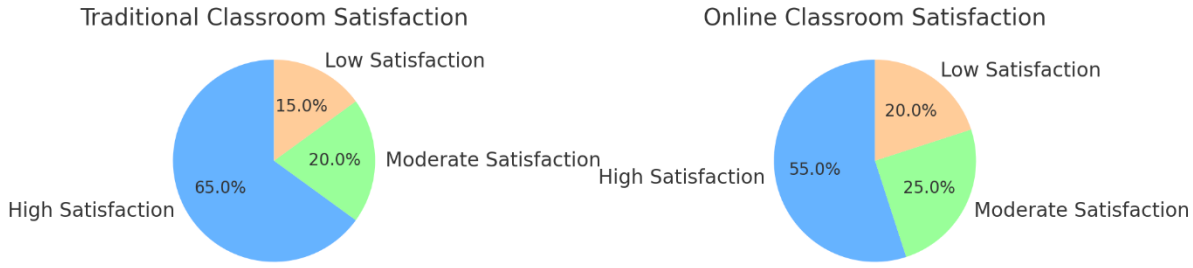

Figure 1: Pie Chart of Student Satisfaction Levels in Both Modes

4. Discussion

The findings of the research of the present study can be highly applicable in the exploration of the efficiency of online and traditional classroom education in higher education. The reason behind this can be justified based on the nature of face-to-face education, where it is possible to receive timely feedback, communicate directly with teachers and have a relaxed conversation, which is critical in enhancing the educational process. The disadvantages of online students were the lack of real-time interaction and the number of opportunities to study interactively.

The results of this study are in correlation with several other past findings in comparison to other literature. According to Nafis and Nasri (2024), the traditional classroom would be likely to yield higher student satisfaction and academic achievement than online classes. Similar to the case, Marco-Fondevila et al. (2022) have emphasized the role of face-to-face interaction in enhancing success among students, particularly in courses where interactive and team-based learning should be considered. Such conclusions are reasonable in the research, as students in standard classrooms were more satisfied and interested in the sample. On the contrary, according to the results of the study, such as the one conducted by Lee (2024), online education can also be equally efficient in the scenario when a well-constructed one is implemented. Similar to these findings, the study concludes that online education is convenient and flexible, which is highly appreciated by students and is provided by this type of education in a manner that allows students can balance their work and personal life. However, this flexibility comes at the cost of a decreased level of engagement, which correlates with the work of Rotar (2022), who found that online students feel isolated, and it makes them less successful in their education. Also, Garces et al. (2024) studies posit that effective online learning should be realised with the help of the creation of high-quality courses that support the active learning process and provide the student and the

teacher with the possibility to communicate, which is affirmed in this research and indicates that the effectiveness of online learning can be enhanced by the possibility to learn in real-time and receive the feedback that is personal and individual. Kumari et al. (2021) also found that in a traditional classroom, participation of the students and community building are generally increased, and in the case of online learning, it is usually accompanied by the feeling of detachment, which is also problematic in the research.
Such findings have far-reaching implications for teachers, colleges and the government. The traditional classroom trainers might like to embrace more interactive and participatory methods utilized in the online classes, such as discussion boards, peer feedback, and group projects. The approaches could add more interaction and satisfaction among the students in the physical learning areas. In order to minimize the absence of engagement, one can provide synchronous learning with the help of live discussions or virtual office hours, which will be able to more personalized feedback and result in higher satisfaction and performance among students. Institutions should also invest in professional development programs for instructors so that they can be well-positioned to develop and deliver good online courses to improve student interaction and academic performance.

However, there are several limitations to this research that are to be considered. The sample is too narrow and includes only two institutions and two disciplines; a bigger sample, including more than two institutions and disciplines would make sense as a means of getting an overall representation of how online and traditional classroom instruction varies. In the study, also, self-reported data were utilized, which is subject to bias.
Further research should be undertaken to establish the effectiveness of online and traditional education in the long term in terms of student success, retention, and engagement. The other research problem that may be investigated is the role of technology in facilitating student engagement in the virtual and real world. Due to the continuous changes in digital tools and digital platforms, more opportunities for enhancing engagement, collaboration and personalized learning in both forms of instruction may be developed.

5. Conclusion

The study unveils the relative effectiveness of web-based and traditional classroom instruction in tertiary schooling. A greater level of interactivity, instant feedback and peer cooperation that is present in the conventional classroom are useful in enhancing performance on student performance and making the learning more enjoyable. In fact, online learning, which is flexible and convenient, has certain problems of student engagement, interaction, and community feeling that affect academic performance. However, it is necessary to add that online education has potential given that it is strategically planned. Online and traditional delivery methods have their strong points, and blended learning methods can possibly offer a good solution. Additionally, the study emphasizes the significance of institutions in the development of online courses that facilitate interaction with learners, involve a stream of communication, and provide frequent feedback from the instructors. Although even today, when the sphere of higher education continues to evolve, there is a high probability that assimilation of different types of instruction will become a daily practice. The research will be beneficial as it can enlighten teachers, schools, and policymakers to develop effective pedagogical practices that will support the needs of the current diverse body of students in order to have fair and meaningful learning experiences in both online and traditional learning environments.

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