International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 18s, 2025
https://theaspd.com/index.php

A Study on Challenges of Engineering Students Faced in Online Education with Special Reference to Kanyakumari District

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Abstract: *This is a study of the difficulties that engineering students in Kanyakumari District are experiencing when it came to shifting to online learning. The quantitative approach implies the collection of data on 450 students with the help of standardized questionnaires. The identified major obstacles are poor digital infrastructure, distractions in the households, and the inability to self-discipline, and male students have expressed higher levels of difficulty. The data is then analyzed with such statistical tools as t-tests, ANOVA, Pearson correlation, and others. Findings indicate that fresh students perform better and take interest in the academic programs more than the seniors, and this implies that the seniors undergo a loss of motivation with time. There is a strong positive correlation between teacher communication, classroom engagement and interaction among peers which demonstrates the need of the interactive environment of learning. Online learning can be flexible but, as well, it influences the participation and performance of students negatively. Optimization of online education in terms of engineering students is suggested in the research to be increased through the enhancement of its digital access, the integration of interactive pedagogical teaching methods, and the introduction of peer-to-peer collaboration.*

Key Words: *Online Learning for Engineering Students, Academic Performance, Student Engagement, Teacher Interaction, Challenges of E-Learning*

1. INTRODUCTION

In a world anyone can find out almost anything what they want to know. Online learning has never been more popular or effective, thanks to the internet and rapid technological advancements. While there are many benefits to online learning [1], such as accessibility, flexibility, and affordability, this is not to suggest that it is without drawbacks. Online learning can be difficult to adjust to at first, and there are some challenges that come with the territory. In this blog, explores about the various challenges experienced in online learning and provide helpful solutions to the problems that students confront in online classrooms. This way, teachers are knowing how to help troubled kids. And students are knowing what to do when encounter difficulties with online learning [2].

Online learning, or eLearning, refers to any educational activity conducted using an internet-connected device. It has gained immense popularity due to its flexibility, accessibility, and cost-effectiveness [3]. Students can learn from anywhere, at their own pace, choosing methods that suit their learning styles. Online learning includes a variety of modes, from real-time classes to self-paced lessons, making it a broad and adaptable concept [4]. Online learning is primarily classified into two types: asynchronous learning and synchronous learning

1.1 Statement of the Problems

The transition to online education has created both opportunities and challenges for engineering students. While it provides flexibility and accessibility, students in Kanyakumari District confront a number of challenges that impact their learning experience. Issues such as a lack of enthusiasm, trouble focusing, technical restrictions, and insufficient study tools all make it challenging to adjust to online learning. Furthermore, poor time management, insufficient engagement with instructors, and excessive screen time all contribute to a drop in academic performance and overall well-being. This project investigate these issues in depth and propose methods to improve the effectiveness of online education for engineering students in Kanyakumari District.

1.2 Objectives of the Study

- ❖ To identify the primary challenges encountered by engineering students in Kanyakumari District while pursuing online education.
- ❖ To investigate the effects of online learning on students' academic performance of engineering students in Kanyakumari District while pursuing online education.
- ❖ To investigate student involvement and interactions with teachers in an online learning environment.

2. REVIEW OF LITERATURE

Akhtar, S. et al. (2023) [5]. This research focuses on the online teaching and learning techniques of an engineering curriculum offered by Pakistani universities during the COVID-19 epidemic. Mushtaha, E. et al. (2022) [6]. In comparison to practical colleges, theoretical colleges appear to have a more positive assessment of user productivity, motivation, knowledge gain, and interactivity. Erlangga, D. T. (2022) [7]. This study sought to identify potential answers to students' problems in the online learning process. This survey included 25 English education students from a private university in Bandar Lampung. Khan, Z.H., et al. (2021) [8]. This research examines online teaching and learning strategies in several engineering programs offered by Pakistani institutions during the COVID-19 epidemic. Alsharhan et al. (2021) [9]. This observational study investigates obstacles experienced as a result of the sudden change to online engineering courses during the COVID-19 epidemic by surveying (quantitatively and qualitatively) students and teachers at our minority-serving school.

3. METHODOLOGY

The study employs a quantitative research design, which enables numerical data collecting and statistical analysis to reveal patterns and linkages.

3.1. Research Design

This study employs a quantitative research methodology to examine the difficulties encountered by engineering students in Kanyakumari District when pursuing online education. The study also looks into the effects of online learning on academic achievement, engagement, and teacher-student interactions.

3.2. Sample Size

The intended audience consists of engineering students from several colleges in Kanyakumari District. To assure representation during the four-year study period, a stratified random sample procedure is adopted. The ultimate sample size is 450 students, with 270 men (60%) and 180 women (40%).

3.3 Data Collection

Primary data is collected using a structured questionnaire, which included both closed-ended and Likert-scale questions to measure students' experiences with online learning. The questionnaire focused on: Challenges encountered, Impact on academic achievement, Student contact and participation.

3.4 Data analysis

The demographics are summarized using descriptive statistics; t-test of independence is used to investigate gender differences, ANOVA is utilized to see the difference in academic performance in relation to the year of study, and Pearson correlation analysis is used to determine the relationship between engagement, teacher communication, and peer interaction.

4. ANALYSIS AND INTERPRETATION

Table 1 shows the gender breakdown of the study's respondents. Out of the total 450 responders, 270 (60.0%) are men and 180 (40.0%) are women. This suggests that the majority of the engineering students taking part in the study are male.

Table 1: Gender Distribution of the Respondents

Gender	Frequency	Percent
Male	270	60.0

Female	180	40.0
Total	450	100.0

(Source: Primary Data)

Table 2 displays the distribution of respondents by year of study, with second-year students (40.0%) having the highest representation, followed by first-year students (30.0%), third-year students (20.2%), and fourth-year students (9.8%). The prevalence of lower-year students (70%) shows that they are more engaged with or influenced by online learning issues.

Table 2: Year of the Study of the Respondents

Year of Study	Frequency	Percent
1st Year	135	30.0
2nd Year	180	40.0
3rd Year	91	20.2
4th Year	44	9.8
Total	450	100.0

(Source: Primary Data)

H_0: *Engineering students in Kanyakumari District do not face significant challenges while pursuing online education.*

The results produced by the t-test show that there is gender difference in the experience of challenges in online learning among engineering students in the Kanyakumari District. Males also indicated greater technical problems, distractors, health and motivation issues than females. These statistically significant differences are backed with high t -value, F -value as well as p-value of (0.000).

H_0: *Online learning has no significant impact on students' academic performance.*

ANOVA results show that online learning has a significant impact on students' academic performance across multiple years of study, as indicated by p-values (0.000) for all assessed parameters. First-year students reported the highest mean grades, attention span, involvement, and feelings of isolation, whereas scores decreased in subsequent years, with fourth-year students having the lowest values.

5. FINDINGS, SUGGESTIONS AND CONCLUSIONS

It is apparent in the research that male learners experience more issues with online learning than females do particularly where it comes to access to technology, distractions, health and motivation. As the results indicating a strong positive relationship between teacher communication, classroom engagement and peer interaction are observed, the impact of instructor involvement should not be overlooked. Institutions are encouraged to expand digital infrastructure, facilitate interactive instructions, improve mental health, and embrace the blended learning systems in order to improve outcomes.

5.1 CONCLUSION

According to the study, engineering students in Kanyakumari District encounter a number of issues in their online education, including poor internet connectivity, numerous diversions at home, health concerns as a result of excessive screen time, and difficulties maintaining self-control. It also emphasizes that characteristics such as gender and year of study have a substantial impact on students' learning experiences, altering academic achievement, attention span, and engagement. A important message is the necessity of teacher communication in maintaining student engagement and encouraging peer connection. To improve online education, universities should prioritize improving digital infrastructure, designing structured and engaging learning environments, and using interactive teaching methods. Encouraging student participation in conversations, group activities, and providing timely feedback can all improve learning results. By addressing these difficulties and fostering an engaged and supportive online learning culture, engineering students can benefit from a more effective and enriching educational experience.

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