Impact Of Online Education On Learning Of Undergraduate Students During Covid-19 Pandemic

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ABSTRACT

The Covid-19 crisis has prompted a significant transformation in the global educational system by introducing online education as a potent tool for teaching and learning during adverse conditions such as a pandemic. A study was conducted on undergraduate students to assess the impact of online education on their learning during the COVID-19 pandemic. Additionally, the study aimed to discern the effects of online learning on various groups of undergraduate students, including male versus female students, arts versus science stream students, vocational versus non-vocational course students, and students from rural and urban areas. The study's outcomes would aid education planners in comprehending and making necessary adjustments suitable for both teachers and students. The study involved 120 undergraduate students from Hemvati Nandan Bahuguna Garhwal University (A Central University), Srinagar-Garhwal, Uttarakhand, India. The descriptive survey method was employed, and data were collected using a Google form designed with a structured questionnaire. The results indicated that there was no significant difference in undergraduate learning between students in science versus arts streams, male versus female students, or students from rural versus urban areas. However, a significant difference was observed in the learning outcomes of vocational versus

non-vocational course students. The findings revealed that online education failed to provide complete satisfaction to both students and teachers due to issues such as technological barriers, a lack of teachers trained for online teaching, and the unavailability of customized, quality teaching materials. This study can serve as a fundamental guideline for specialists, teachers, and policymakers in formulating curricula and policies related to online education, online teaching, and the utilization of online platforms. It is recommended that online curricula be planned and revised to be systematic, analytical, logical, explorative, and practical, enabling students to adapt to new methodologies and techniques as required, whether in a pandemic or under any other circumstances. This approach can empower traditional education through online education.

Keywords: Online Education, Learning, Undergraduate Students, Covid-19 Pandemic, Crisis, and Significant

INTRODUCTION

COVID-19 emerged as one of the most significant crises and public health emergencies in human history, placing governments and policymakers in a dilemma between prioritizing education and safeguarding the lives of students. The Indian government implemented a nationwide lockdown, closing all public spaces including educational institutions, in an effort to curb the spread of the virus and prioritize public safety. To mitigate the educational losses and prevent a complete disruption of academic sessions, educational institutions swiftly transitioned to online teaching, a relatively new form of instruction.

While this transition facilitated accessibility and convenience, it also brought forth its own set of challenges, particularly in regions with limited internet access like many rural areas in India. Additionally, educators faced difficulties in tracking online attendance, addressing individual student queries, conducting descriptive exams, and effectively explaining topics without traditional classroom tools such as blackboards.

The prolonged closure of schools and universities compelled policymakers to explore alternative modes of education delivery to minimize learning disruptions. Consequently, higher education institutions were advised to adopt e-learning,

while traditional e-learning devices such as radio and television were recommended for school education.

The global trend towards remote or online learning gained momentum following the closure of educational institutions due to COVID-19. While the transition to online learning during the pandemic was successful to some extent, further research is necessary to ensure its effectiveness and quality.

IMPORTANCE OF ONLINE LEARNING

The adoption of online teaching-learning represents a novel experience for both educators and learners. Unlike traditional classrooms, online teaching offers flexibility in terms of pace, location, and timing, breaking away from the constraints of physical classrooms with predetermined schedules. Online learning has garnered attention from students, teachers, and researchers, particularly in higher education, as a means to enhance knowledge acquisition across various subjects.

Learning efficacy is a critical concern in online learning, especially in the context of the global shift towards remote education during the COVID-19 pandemic. While online learning has existed for some time, the sudden transition during the pandemic prompted researchers to evaluate its quality, effectiveness, student satisfaction, and learning outcomes.

Teachers invest significant time in preparing teaching materials for online instruction, particularly amidst the constraints of the COVID-19 pandemic where online teaching became the primary mode of content delivery. Interaction, instruction, and technology are integral aspects of online teaching, with interaction serving as a cornerstone for positive student learning outcomes.

However, the lack of immediate interaction between teachers and students poses a challenge in online learning environments. While some forms of online teaching allow for direct interaction, it often falls short compared to face-to-face interactions in traditional classrooms. Addressing learners' anxiety levels is crucial to improving the effectiveness of online learning, as interaction plays a pivotal role in collaborative learning.

The challenges posed by online teaching during the COVID-19 pandemic underscore the need for teachers to adapt to technology and for students to remain focused during lectures.

Furthermore, maintaining social integration and ensuring access to necessary technological infrastructure are essential for successful online learning experiences.

In the Indian context, online classes represent a departure from traditional teaching methods and necessitate an exploration of how students and faculty perceive and experience them. Understanding these perspectives will inform necessary modifications to enhance the efficacy of online teaching and learning.

Given the significance of both student and teacher perspectives, this research aims to investigate how online classes are perceived and experienced by stakeholders across various colleges and universities in India. By identifying common challenges and concerns, educational institutions can implement strategies to improve the online learning experience for both students and teachers, thus integrating online teaching more seamlessly with traditional classroom instruction.

LITERATURE REVIEW

Several studies have explored various aspects of online learning, particularly in the context of the COVID-19 pandemic. **Adnan and Anwar (2020)** investigated the attitudes of Pakistani higher education students towards digital and distance learning. They found that limited internet access and financial constraints hindered the effectiveness of online learning, with students also expressing concerns about delayed responses and a lack of face-to-face interaction.

Baber (2020) conducted a cross-country study analyzing learning outcomes and student satisfaction during online learning in South Korea and India. The study identified parameters such as student-teacher interaction, motivation, and course structure as crucial determinants of perceived learning outcomes and satisfaction.

Daumiller et al. (2021) examined faculty members' attitudes and job burnout during the transition to online teaching, noting positive attitudes towards learning goals but negative perceptions related to job burnout, which impacted student feedback.

Olayemi et al. (2021) surveyed Nigerian undergraduate students' perceptions and readiness for online learning, highlighting both positive aspects such as readiness and

negative factors including limited access to resources and technological challenges.

Warfvinge (2021) investigated changes in student experiences during the pandemic-induced closure of higher education institutions, emphasizing the need for robust evaluation systems focusing on learning experiences rather than mere satisfaction.

Chakraborty et al. (2020) gathered viewpoints from Indian undergraduate students, revealing preferences for physical classes and suggestions for enhancing online interaction, including the use of digital tools and chat boxes.

Chung, Subramaniam, and Dass (2020) studied Malaysian university students' readiness for online learning, noting challenges such as poor internet connectivity and difficulty understanding course content.

Jena (2020) discussed the measures taken by the Indian government to facilitate education during the pandemic, along with the impacts of COVID-19 on the education system.

Chaturvedi et al. (2021) investigated the pandemic's impact on education, health, and lifestyle, revealing disruptions in daily routines and mental health issues among students in the Delhi-NCR region.

The reviewed literature underscores the challenges and opportunities associated with online learning during the COVID-19 pandemic. While online education offers flexibility and accessibility, issues such as internet connectivity, technological proficiency, and social interaction remain significant hurdles. Moreover, the pandemic has highlighted the importance of mental health support and alternative education strategies. Future research should focus on addressing these challenges to ensure the effectiveness and inclusivity of online learning.

OBJECTIVES OF THE STUDY

The present study aimed to compare the impact of online teaching across the following groups:

1. To compare impact of online teaching on learning of science and arts graduate students.
2. To analyse impact of online teaching on learning of male and female undergraduate students.

3. To explore impact of online teaching on learning of undergraduate students between rural and urban areas.
4. To study the impact of online teaching on learning of undergraduate students of professional and non-professional courses.

HYPOTHESES OF THE STUDY

The following null hypotheses were formulated for the statistical analysis of the data: -

1. There is no significant difference in the impact of online teaching between undergraduate students in the science and arts streams.
2. There is no significant difference in the impact of online teaching between male and female undergraduate students.
3. There is no significant difference in the effect of online teaching on learning between undergraduate students from rural and urban areas.
4. There is no significant difference in the effect of online teaching between undergraduate students enrolled in professional and non-professional courses.

RESEARCH METHODOLOGY

This study aims to investigate the impact of online education on the learning of undergraduate students during the COVID-19 pandemic, considering demographic characteristics such as academic stream, gender, locality, and enrollment in professional or non-professional courses. To achieve this, the following research design was employed:

RESEARCH METHOD The present study utilized the descriptive survey method for data collection, with responses gathered through a specifically designed questionnaire.

STUDY DESIGN

A two-group-without-control study design was implemented due to the impracticality of selecting negative or positive controls for the study.

SAMPLE DESIGN

The sample comprised 60 undergraduate students from the science stream and 60 from the arts stream, selected from Birla campus, Srinagar-Garhwal under Hemvati Nandan Bahuguna

(A Central) University, Srinagar-Garhwal, Uttarakhand. Stratified random sampling was utilized, resulting in a total of 120 male and female students.

RESEARCH TOOLS

The study employed an online inventory of questions developed by Dr. Devendra Singh and Miss Shivani Negi, along with a demographic sheet. The self-made tool (online questionnaire) was disseminated via Google Forms to collect responses from participants.

DATA ANALYSIS AND INTERPRETATION

The collected data forms the foundation upon which the entire research framework is constructed. Data collection and interpretation serve as the core of the research process, providing essential insights. Data analysis involves examining the collected data from various perspectives to extract all possible information. Interpretation entails simplifying complex factors and reassembling them to derive meaningful insights. The significance of data analysis and interpretation is depicted in the figure below:
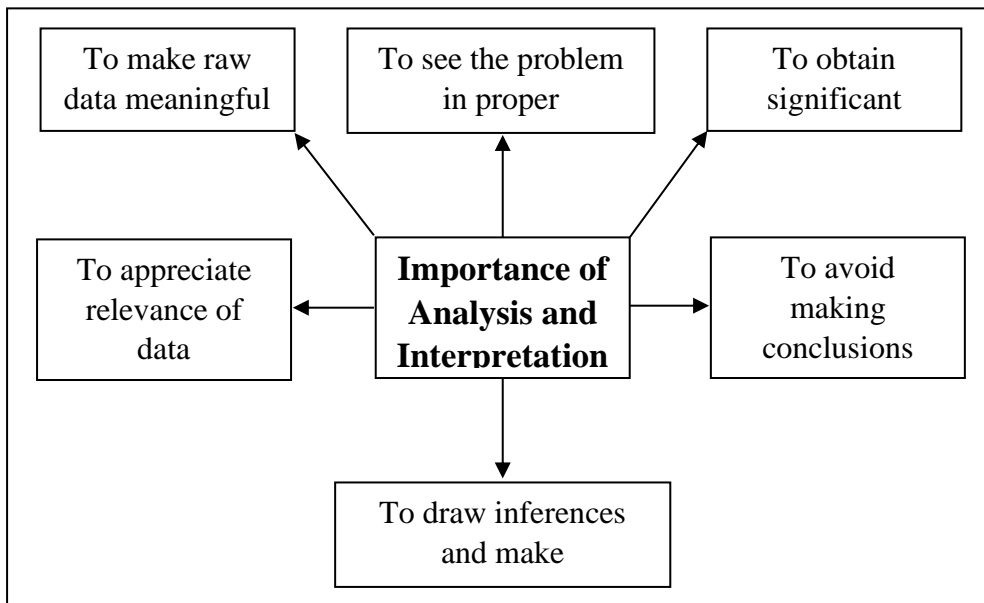

Fig.1: Importance of Analysis and Interpretation of Data in a Research

The purpose of the analysis is to succinctly summarize the complete observations to extract an answer to the research problem, while interpretation is conducted to delve into the broader significance of the findings by connecting them to existing knowledge. Analysis

serves as a preliminary step in the scientific development of the problem rather than an end in itself.

In alignment with the aim of this study, the analysis and interpretation of the data are presented as follows:
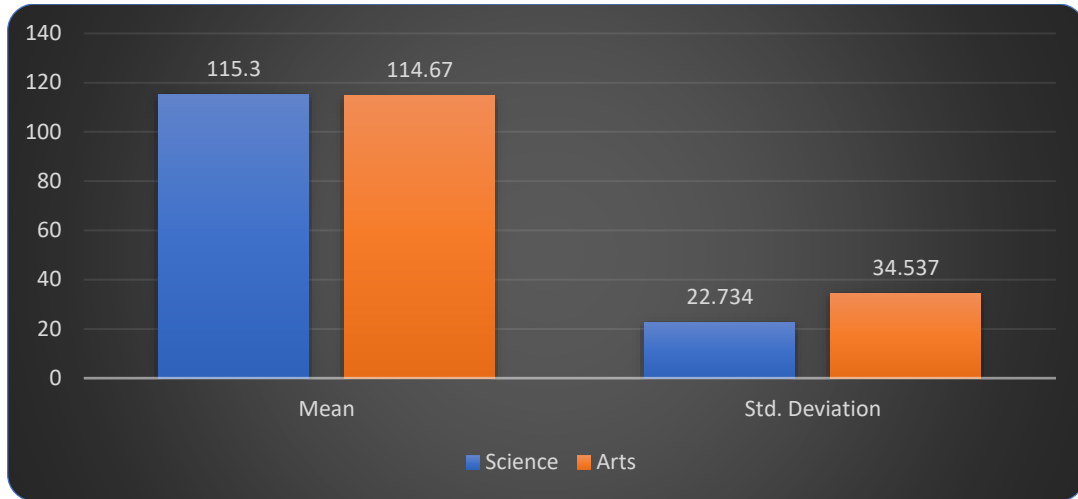
Objective-1: To compare the impact of online teaching on learning of science and arts graduate students.

In pursuit of the aforementioned objective, mean values, standard deviations (S.D.), and t-values have been calculated for undergraduate students in both the science and arts streams. The data analysis is presented in the table below.

TABLE-1: Mean, S.D., and t-value for under-graduate students of science and arts stream

Impact of Online Education learning of under-graduate students	Subject Stream	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
	Science	89	115.3	22.734	0.115	117	0.908

Various parameters for the t-test, aimed at comparing the differences between streams, are provided in Table 4.1. The mean values for undergraduate students in the science and arts streams were 115.30 and 114.67, respectively, with standard deviation values of 22.734 and 34.537, respectively. The t-value calculated between both groups was 0.115, which was deemed insignificant at the 0.05 level of confidence. Therefore, it can be concluded that no significant difference existed between undergraduate students in the science and arts streams regarding the impact of online learning. In other words, students in both streams exhibited similar learning outcomes through online education, with no notable distinction between science and arts undergraduate students.

Graph-1: Showing the result of under-graduate students of science and arts stream

Objective-2: To analyze the impact of online teaching on learning of male and female undergraduate students.
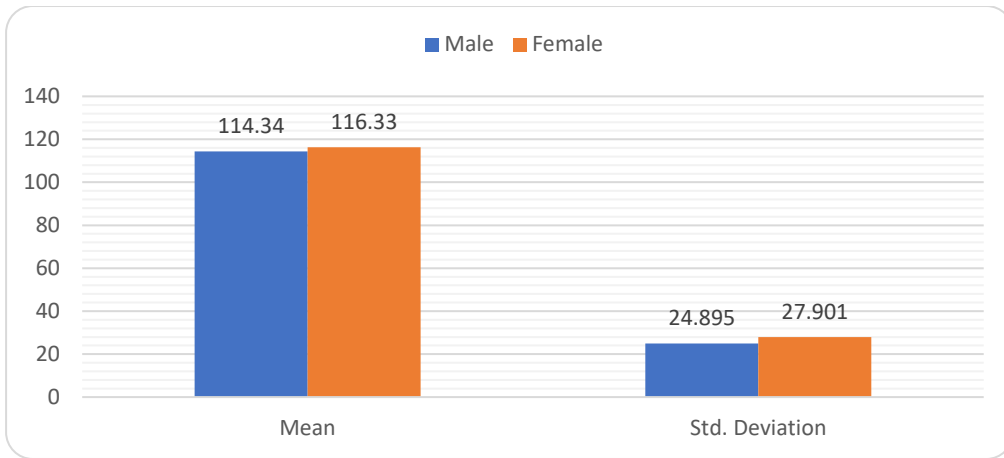
In line with objective no. 2, mean values, standard deviations (S.D.), and t-values were calculated for undergraduate male and female students, and are presented in Table 4.2 below:

TABLE- 4.2: Mean, S.D., and t-value for male and female under-graduate students

Impact of Online Education the learning of under-graduate students	Gender	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
	Male	71	114.34	24.895	-0.408	117	0.684

Based on the data presented in Table 4.2 above, it is evident that the calculated mean values for undergraduate male and female students were 114.34 and 116.33, respectively, with corresponding standard deviation (S.D.) values of 24.895 and 27.901, respectively. The t-value for both groups was determined to be -0.408, which is not statistically significant at the 0.05 level of confidence. Therefore, it can be concluded that the difference in the impact of online education between male and female undergraduate students was negligible. This suggests that the influence of online education on the learning outcomes of undergraduate male and female students was not

noteworthy, and both genders demonstrated similar levels of learning through online learning methods.

Graph-2: Showing the mean values of male and female under-graduate students

Objective-3: To explore the impact of online teaching on learning of undergraduate students of rural and urban areas

Continuing with objective no. 3, mean values, standard deviations (S.D.), and t-values were computed for undergraduate students from rural and urban areas. The data analysis is presented in Table 4.3 below:

TABLE-3: Mean, S.D., and t-value for under-graduate students of rural and urban area

Impact of Online Education the learning of under-graduate students	Locality	N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
	Urban	64	112.75	25.606	-1.082	117	0.282

Table 4.3 indicates that the mean values of undergraduate students from rural and urban areas were 112.75 and 117.93, respectively, with corresponding standard deviation (S.D.) values of 25.606 and 26.521, respectively. The t-value between both groups was -1.082, which was deemed insignificant at the 0.05 level of confidence. Therefore, the null hypothesis was upheld, suggesting that there was no significant difference in the impact of online education between undergraduate

students from rural and urban areas. This implies that students from both rural and urban areas learned equally from online teaching, and the disparity in the impact of online education on the learning outcomes of rural and urban undergraduate students was negligible.
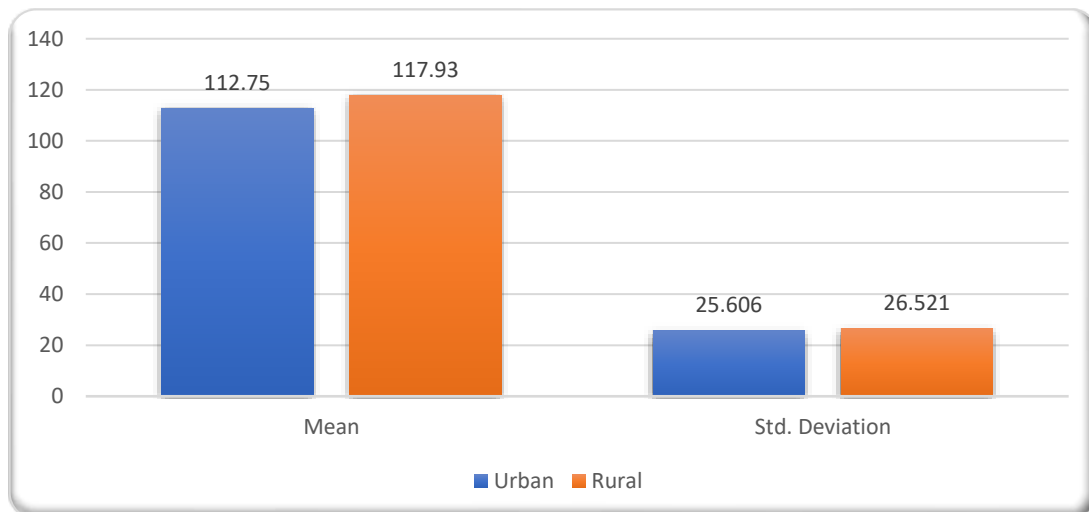
Graph-3: Showing the result of under-graduate students of urban and rural area

Objective-4: To study the impact of online teaching on learning of undergraduate students of professional and non-professional courses

In relation to the objective no. 4, the mean values, standard values (S.D.) and t-values were calculated for under-graduate students of professional and non-professional courses and data analysis has been represented in the table 4.4 below: -

TABLE-4: Mean, S.D., and t-value for under-graduate students of professional and non-professional courses

Impact of Online Education the learning of under-graduate students	Course	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
	Non-professional	51	121.08	26.953	3.812	2.149	117	0.034

According to Table 4.4, the calculated mean values for undergraduate students in professional and non-professional courses are 121.08 and 110.84, respectively, with corresponding standard deviation (S.D.) values of 26.953 and 24.688,

respectively. The t-value between both groups was determined to be 2.149, which was significant at the 0.05 level of confidence. Therefore, in this case, the null hypothesis is rejected, indicating a significant difference in the impact of online education on the learning outcomes of undergraduate students in professional and non-professional courses. This suggests that online learning affects students in professional and non-professional courses differently, with a notable distinction based on course type.
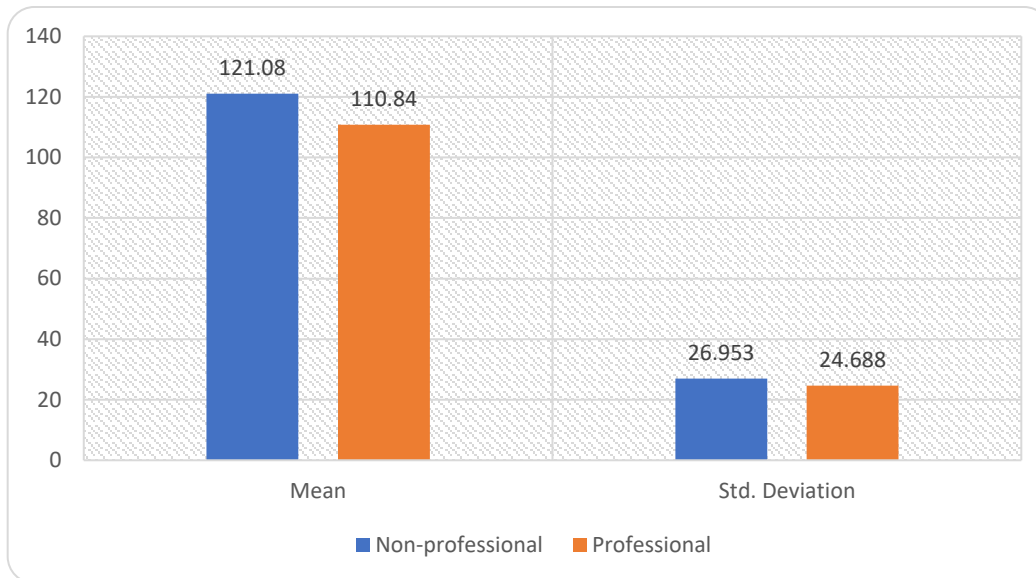
Graph-4: Showing the result of under-graduate students of professional and non-professional courses

Based on the above discussion and analysis, it can be concluded that the impact of online learning on the learning outcomes of undergraduate students, whether in science vs. arts, male vs. female, or urban vs. rural settings, was similar. There was no significant difference between these groups in terms of online learning effectiveness. However, online learning influenced the learning outcomes of undergraduate students in professional and non-professional courses differently. There was a significant difference in the learning outcomes of students in professional and non-professional courses during online learning.

FINDINGS OF THE STUDY:

Objective 1: To study the impact of online teaching on the learning of under-graduate students of science and arts stream

Regarding the subject-stream comparison, the t-value between both groups of undergraduate students in science and arts streams is calculated as 0.115, which is insignificant at the 0.05 level of significance. However, a comparison of mean values

suggests that students in the science stream have demonstrated a more positive attitude towards online education compared to those in the arts stream.

Findings indicate that students in the arts stream expressed dissatisfaction with online lectures and explanations due to a lack of gestures and live connectivity from teachers. These findings align with those of **Akyıldız (2020)**, who also noted that students feel isolated due to the absence of interaction and communication in online learning environments. Furthermore, students struggle with adapting to traditional educational habits and class manners in online classes. Additionally, challenges such as missing important announcements, coping with multiple assignments, and managing time are commonly faced by students in online education.

Objective 2: To study the impact of online teaching on the learning of male and female under-graduate students

Regarding gender comparison, the t-value between both groups of male and female students is calculated as -0.408, which was found to be insignificant at the 0.05 level of significance. However, a comparison of mean values suggests that female students have demonstrated a more positive attitude towards online education compared to male students.

Findings indicate that male students were more frustrated attending online classes due to experiencing various physical problems. Female students also experienced discomfort in online classes due to the unpredictable class schedules, leading to stress and anxiety as they struggled to balance household chores with their studies. However, the level of anxiety was lower among female students compared to male students, as male students found online education to be boring and exhausting.

Similarly, a study by **Selvaraj (2021)** also confirmed that 44% of learners found it difficult to adapt to online learning and experienced mental and/or physical discomfort. Physical discomforts included headaches, eye strain, back and neck pain, and changes in eyesight due to prolonged screen time. Mental issues included lack of motivation, anxiety, feelings of isolation, boredom, and stress.

Objective 3: To study the impact of online teaching on the learning of under-graduate students of rural and urban area

In relation to locality, the t-value between both groups of rural and urban areas is calculated as -1.082, which was found to be insignificant at the 0.05 level of significance. However, a comparison of mean values showed that students from rural areas have demonstrated a more positive attitude towards online education compared to students from urban areas.

Findings revealed that students from rural areas did not expect the educational system to reach them amid the pandemic. However, the efforts of educational institutions to include them in the online educational system have given them a sense of satisfaction. This finding is supported by **Paudel (2021),** who suggested that the availability of a stable internet connection at the workplace, time management skills, and learner autonomy in terms of space and time were able to produce a positive impact of online education. Additionally, the sense of satisfaction derived from being taught during adverse conditions motivates students towards effective learning.

Objective 4: To study the impact of online teaching on the learning of under-graduate students of professional and non-professional course

The t-value between professional and non-professional courses was calculated as 2.149, which was significant at the 0.05 level of confidence. A comparison of mean values indicates that students in non-professional courses have shown a more positive attitude towards online education compared to students in professional courses.

Findings revealed that students in professional courses required skill training and practical exposure to develop professional skills, which online education was seen to have failed to provide. As a result, a significant level of dissatisfaction was found among students in professional courses.

CONCLUSION:

Based on the findings of the study, it is evident that there is no significant difference between undergraduate students from rural and urban areas, arts and science streams, as well as between male and

female students. Therefore, the related null hypotheses "There exists no significant difference in the impact of online teaching on undergraduate students from rural and urban areas" and "There exists no significant difference in the impact of online teaching on undergraduate students from science and arts streams" are both accepted.

However, there is a significant difference between students in professional and non-professional courses. Consequently, the related null hypothesis "There exists no significant difference in the effect of online teaching on students in professional and non-professional courses" is rejected.

Furthermore, there was no significant difference observed between male and female undergraduate students. Thus, the corresponding null hypothesis "There exists no significant difference in the impact of online teaching on male and female undergraduate students" was accepted.

EDUCATIONAL IMPLICATIONS

1. The study's findings indicate that undergraduate students are not entirely satisfied with online education. Particularly, significant dissatisfaction and issues have been identified among students in professional courses, as the lack of skill training through online education poses a barrier to meeting the requirements of these courses.

2. This study serves as a motivational guideline for specialists, teachers, and policymakers in formulating curriculum and policies related to online education, teaching methods, and the utilization of online platforms.

3. The study results will guide policymakers in crafting education policies that prioritize students' needs by ensuring the delivery of quality and satisfactory online education.

4. To optimize outcomes, teachers should enhance their proficiency in utilizing diverse online platforms and tools. This would help bridge the gap between theoretical

knowledge and practical application within the curriculum.

5. Given the study's revelation regarding dissatisfaction with the practical knowledge aspect of online education, educators and curriculum planners must identify the shortcomings in online education. Consequently, online curriculum should be systematically revised to imbue it with analytical and logical elements, fostering exploration and practicality. This ensures that students can readily adapt to new methodologies and techniques, whether in pandemic scenarios or other circumstances, thereby empowering traditional education through online platform.

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