

Exploring Learning Mode Preferences of College Students in Kerala: A Comparative Study of Online, Blended, and Traditional Education Trends

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Abstract:- This study investigates college students in Kerala preferences for online, blended, and traditional learning methods. 1,963 students from various institutions in Kerala were surveyed using a questionnaire in order to gather first-hand information about their preferences and experiences. According to the study, most students (72.8%) preferred traditional learning methods, while only 4% preferred online learning. 23.2% of students said they preferred blended learning. The study found that important factors in students' preferences for various modes of learning include things like the device used for online classes, teacher assistance, the development of communication and technical skills, mental stress, and part-time job opportunities. The chi-square test results showed a significant relationship between students' preferences and their preferred mode of learning, with traditional mode being the most preferred. The study highlights the need to address obstacles to online learning and the potential advantages of blended learning, which has significant implications for policymakers and educational institutions in Kerala. The effects of various factors on students' preferred modes of learning as well as potential regional variations in these preferences could be explored in more detail.

Keywords: *blended; online; traditional; Kerala.*

1. Introduction

Most students are required to use the online mode of learning for their courses due of the COVID-19 pandemic situation. Due to the epidemic, all educational institutions in Kerala were closed by the second week of March 2020 and opened by the first week of October 2021 . As a result, most universities in Kerala have switched to offering online courses in place of traditional ones.

Additionally, blended learning has been suggested for higher education institutions in India by the University Grants Commission (UGC). According to this concept, traditional teaching methods will make up the remaining 60% of a course while up to 40% of it will be delivered online. This suggestion was made to guarantee both the students' and faculty's safety and the continuation of instruction throughout the pandemic.

These elements are included in the study on the efficiency of various learning modalities in Kerala and how each modality affects the attainment of learning objectives. The study is important because it sheds light on

students' choices and their opinions on various learning techniques. The results could be used to inform decisions made by educational institutions in Kerala and elsewhere regarding the best way to teach their pupils, particularly in times of crisis like the COVID-19 pandemic.

Significant changes have been made to the educational landscape as a result of the COVID-19 epidemic, with many institutions now using online or blended learning approaches. The government of Kerala has put in place a number of learning methods, including traditional, blended, and online. While each mode has benefits and drawbacks, it is important to know which mode is best for college students in Kerala.

The purpose of this study is to assess these three modalities of learning from the standpoint of the learner. The study gathers student input about their experiences with blended learning and analyses the learning results, course content, and pedagogical approaches of each mode. The sample consists of 1963 students from various educational institutions in Kerala.

The study's findings show that each modality has benefits and drawbacks. Some students prefer the traditional learning style because it offers a regulated learning environment with in-person contact with peers and teachers. Some students find the online learning environment advantageous since it gives them the freedom to study whenever and wherever they want. However, it does not provide the same opportunities for peer learning and social interaction as traditional mode does. On the other hand, blended learning combines the advantages of both traditional and online learning and is chosen by many students.

The study comes to the conclusion that numerous elements, such as the learning objectives, course material, and pedagogical approaches, affect how effective each modality of learning is. When deciding on a method of learning for students, educators and policymakers must take these issues into account. The findings of this study could help educational institutions in Kerala to make informed decisions about which mode of learning is most effective for their students.

2. Literature Review

The COVID-19 pandemic has had a significant impact on the education sector worldwide, leading to the widespread adoption of online learning as the primary mode of instruction for students (UNESCO, 2020). In Kerala, India, educational institutions were closed for an extended period from March 2020 to October 2021, necessitating a shift towards online courses. To ensure the safety of students and faculty while maintaining continuity of education during the pandemic, the University Grants Commission (UGC) in India recommended a blended learning approach, combining traditional teaching methods with online components (UGC, 2020).

The implementation of various learning modalities, including traditional, blended, and online, has resulted in significant changes to the educational landscape in Kerala. Consequently, it is crucial to examine the efficiency of these modalities and their impact on the achievement of learning objectives. Previous studies have highlighted the benefits and drawbacks of online learning. This study aims to shed light on students' preferences and opinions regarding different learning techniques, informing educational institutions' decision-making processes, particularly during crises like the COVID-19 pandemic. By examining the learner's perspective, the study contributes to the existing literature on effective teaching methods in higher education and can help

educational institutions in Kerala make informed decisions about the most effective mode of learning for their students.

To evaluate the efficacy of each learning modality, the study gathers student feedback and analyzes learning outcomes, course content, and pedagogical approaches. Previous research has shown that students' satisfaction and engagement with blended learning can positively influence their learning outcomes (Graham, 2019; Garrison & Vaughan, 2018). Blended learning combines the strengths of both traditional and online modes and has been found to enhance student engagement and learning outcomes (Oliver & Trigwell, 2005; Garrison & Kanuka, 2004).

In conclusion, the COVID-19 pandemic has prompted educational institutions in Kerala to adopt various learning modalities, including traditional, blended, and online, to ensure continued education. This study contributes to the understanding of these modalities by assessing them from the learner's perspective. By examining student experiences, learning outcomes, course content, and pedagogical approaches, the study highlights the benefits and limitations of each modality. These findings are valuable for educational institutions and policymakers in making informed decisions about the most effective mode of learning during crises and beyond.

The adoption of online learning during the COVID-19 pandemic has brought forth various advantages and challenges for students. Previous research has explored the benefits of online learning, including increased technical skills, flexibility in study time, bridging the gap caused by missed academic periods, and access to educational webinars (Cavanaugh et al., 2020; Hodges et al., 2020). Conversely, offline learning modes, such as traditional face-to-face classes, have been reported to offer advantages related to enhanced social interaction, effective learning, improved concentration, and reduced stress (Cavanaugh et al., 2020).

The transition between offline and online learning modalities has been identified as a complex process for students. Adjusting to the switching process of learning modes can be time-consuming and requires adaptation to new platforms, technologies, and instructional methods (Hodges et al., 2020; Khan, 2020). The need for effective support and guidance during this transition period is crucial to ensure students' successful adjustment and engagement in their learning environments.

In conclusion, the findings indicate that online learning offers advantages such as increased technical skills, flexibility, and bridging the gap caused by missed academic periods. However, students have also expressed concerns regarding workload, concentration, academic incompetency, and distractions during online classes. Offline learning modes provide benefits related to social interaction, effective learning, concentration, and reduced stress. However, limitations such as fear of the disease, maintaining social distancing, and mask-wearing challenges have been reported. The transition between offline and online learning presents difficulties for students, emphasizing the importance of providing adequate support and guidance during the adjustment process.

The COVID-19 pandemic has necessitated the adoption of online and offline learning modes, leading to a shift in educational practices worldwide. This study, conducted by Madhavan Maya, V.M. Anjana, and G.K. Mini in

Kerala, India, explores university students' perceptions of shifting between online and offline learning modes, shedding light on the advantages, challenges, and adjustment process associated with this transition.

e-Learning has emerged as a crucial tool for teachers and students, particularly during the COVID-19 pandemic. The adoption of online teaching methods has been instrumental in ensuring the continuity of students' learning processes. However, before embracing such changes, it is essential to reflect on the instructional realities, forms, and attitudes that come with teaching online (Major, 2015). Online and hybrid instruction require careful preparation to create engaging courses that captivate and enlighten students, going beyond mere minimum requirements (Smith et al., 2018).

Blended learning, a practice that combines both online and face-to-face instruction, has shown to be an effective approach in achieving more efficient and impactful learning outcomes. Research indicates that blended learning surpasses the outcomes of both online and face-to-face learning individually. By utilizing multimedia and technology, such as computers, cell phones, and video connections, blended learning allows teachers and students to communicate effectively, bridging the gap between distance and face-to-face learning. The combination of online and face-to-face components facilitates problem evaluation in online learning materials and helps overcome student absorption gaps in the learning process (Faraniza, 2021).

In a diverse country like India, it is crucial to consider various variables and challenges when implementing online or blended activities. The "one-size-fits-all" approach may not work due to the diverse social, cultural, and economic backgrounds of learners, variations in age groups, access to technological infrastructure, and the readiness of educational institutions to embrace technology (Bordoloi et al., 2021). Particularly in practical-oriented fields like agricultural education, a complete shift to online learning may not be feasible, necessitating the development of hybrid models (Muthuprasad et al., 2021).

Instructional strategies play a crucial role in effective online teaching. Students' reflections indicate that strategies such as case studies, video demonstrations, instructor's notes, mini-projects, and discussion forums have been found to be highly effective in teaching statistics online (Yang, 2017). Understanding student perspectives is essential in designing virtual classroom models during the pandemic. According to student perspectives, the most preferred virtual classroom model in science learning includes a combination of Learning Management Systems (LMS) with Student Learning Networks (SLNs), LMS alone, Learning Content Management Systems (LCMS) with SLNs, and LCMS (Taufiq et al., 2021).

The sudden shift to online teaching during the pandemic has posed challenges for teaching staff. Learning new methods, developing resources, and implementing them effectively require training and support for lecturers. However, the availability of technology provides opportunities for innovative pedagogic solutions across disciplines (Bacon & Peacock, 2021).

Blended learning models, such as Flipped Classroom (FC) with Team-Based Learning (TBL), have been found to enhance knowledge, problem-solving ability, and learning satisfaction among nursing students. This educational strategy yields positive learning outcomes both inside and outside the classroom (Kang et al., 2021; Ramsook & Thomas, 2019). Prospective teachers have varied perspectives on web conferencing classes, with

some finding them satisfying and convenient, while others perceive them as the "line of least resistance" (Ramsook & Thomas, 2019).

Student perceptions play a crucial role in evaluating the effectiveness of educational methods. While students generally express comfort with online classes and receive adequate support from teachers, they do not believe that online classes can fully replace traditional classroom teaching (Kulal & Nayak, 2020). Pre-service teachers express a strong need for lessons delivered through video and audio formats, as they make the lessons more tangible and real (Naah, 2020). Faculty readiness to teach online is an important factor in successful implementation. Faculty preparedness and the digital divide pose challenges to successful online and blended learning implementation, particularly in countries like India where educational opportunities are scarce for many (Martin et al., 2019; Yang, 2017).

3. Research Methodology

The primary data used in this study was collected from a sample of 1963 respondents from various educational institutions in Kerala as part of the research methodology. A Google Forms questionnaire was used to collect the data. The purpose of the questionnaire was to collect the opinions of the students regarding the efficacy of traditional, blended, and online learning methods. The questions were designed to evaluate how the students felt about the course's learning objectives, its content, its pedagogical methods, and their overall experience with each mode of instruction.

The respondents received the questionnaire through their respective institutions, and taking part in the study was entirely optional. Using descriptive, the questionnaire's data was examined. The significance of differences between the means of various groups was also determined using chi square test.

On the basis of the examination of the information gathered via the questionnaire, the study's conclusions were interpreted. The study revealed information about the benefits and drawbacks of each type of learning as well as the preferences of the students. The study's findings can be used to guide choices regarding the adoption and application of various learning modalities in educational institutions in Kerala.

4. Results

In this study, several types of variables were added to evaluate the efficacy of online learning. These elements consist of:

- *Device used for online class*: This variable is the name of the gadget that students use to take online classes, such as a laptop, desktop, or cell phone. The student's ability to learn can be impacted by the device's quality and suitability.
- *Teacher's help*: The degree of support and assistance offered by teachers during online classes is indicated by this variable. It includes factors such as responsiveness, clarity of explanations, and availability for doubt clarification.
- *Communication skill development of students*: This variable measures how much the online learning environment aids in students' communication skill development. It takes into account things like the capacity for coherent and clear thought expression, conversational skills, and peer collaboration.

- *Technical skill development*: This variable measures how much the online learning environment helps students develop technical skills, such as proficiency of online resources and programmes.
- *Mental stress*: This variable measures the amount of mental stress that students feel while taking online courses. This stress may be brought on by a variety of things, including technical issues, a lack of social interaction, or problems with time management.
- *Part-time job opportunities*: This variable measures the extent to which online learning gives students the chance to work part-time jobs, which may be advantageous in terms of skill development, experience, and income.

Device used for online class

The use of a smartphone as a device for online learning has become increasingly common, particularly in developing countries such as India. In the present study, it was found that 96.3% of the students used a smartphone to attend online classes. However, this heavy reliance on smartphones for online learning has been associated with several physical and psychological issues. For instance, continuous usage of a smartphone for online learning can lead to physical problems such as headaches, eye or vision problems, neck problems, and sleep deprivation. Additionally, the psychological issues associated with the use of smartphones for online learning include loneliness, feeling self-centered, and mobile addiction. These issues can negatively impact the learning experience and overall well-being of students.

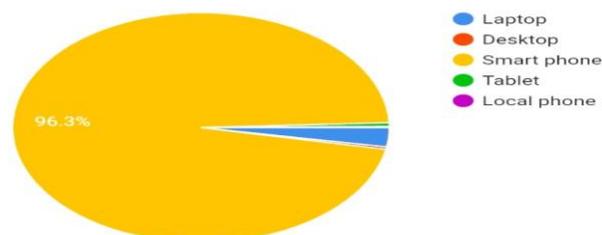


Figure 1: Device used for online class

Therefore, it is important to consider the physical and psychological effects of smart phone usage when implementing online learning programs. Educational institutions should explore ways to mitigate the negative effects of smart phone usage, such as encouraging breaks during online classes, promoting healthy use of technology, and providing support for mental health and well-being.

Teacher's help

The bubble diagram presents an analysis of the level of teacher support and assistance provided to students during online classes. According to the diagram, 44% of teachers help the students in the online mode, while 19.8% of teachers cannot provide assistance to students, and the remaining teachers moderately help the students.

The Covid-19 pandemic situation has forced teachers to use online mode without any preparation, which may have contributed to the limitations in their performance. Many teachers are using YouTube videos, Google Classroom, and recorded audios through Whats App and Telegram to conduct online classes.

Based on the analysis of the bubble diagram, it is recommended that teachers should improve their technical skills and apply them to online mode to improve their performance. This recommendation is supported by prior research which highlights the importance of technical skills in online teaching and learning. Moreover, research suggests that teacher support and assistance are important predictors of student satisfaction and success in online learning.

In summary, the bubble diagram analysis highlights the need for teachers to improve their technical skills and provide better support and assistance to students during online classes. This can contribute to the overall effectiveness of online mode of learning and improve the learning experience for students.

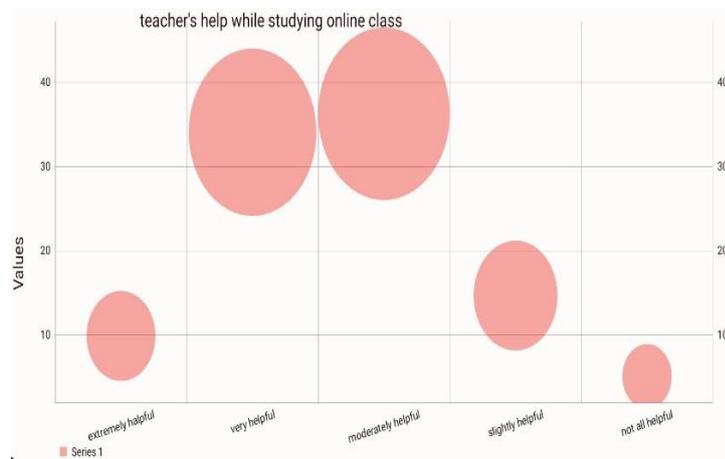


Figure 2: Teacher's help

Communication skill development of students

Here, a bar diagram was used to visualize the results of the study on the effectiveness

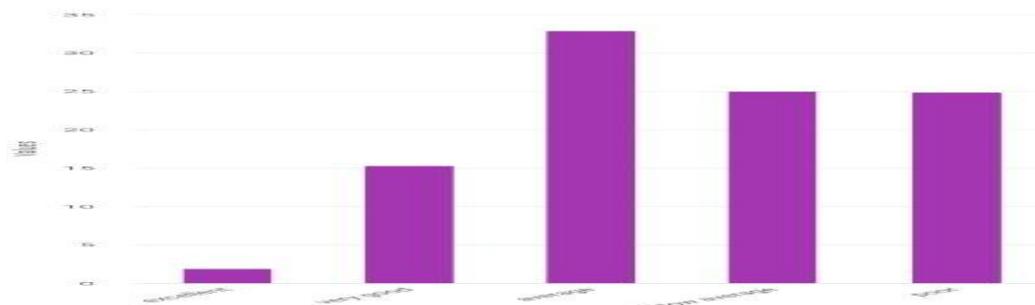


Figure 3: Communication skill development of students

of online learning. The diagram revealed that communication skill development was poor among students studying online. According to the data, 49.9% of students reported that their communication skills were very poor with the online system, while only 17.2% reported having very good communication skills in the online mode. The remaining students had neutral opinions about their communication skills in online mode.

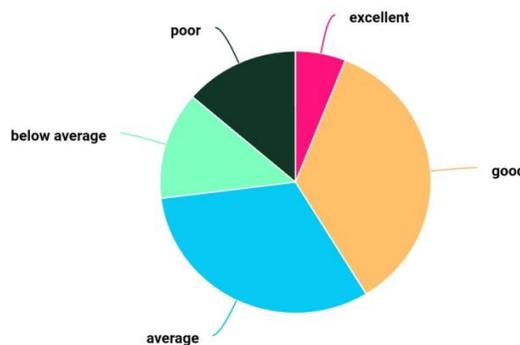
This finding aligns with previous research on online learning, which suggests that a lack of social interaction and reduced opportunities for collaborative learning can negatively affect students' communication skills. Additionally, studies have shown that online learning requires students to have higher levels of self-regulation and self-direction, which may also contribute to lower communication skills development.

Overall, the results of the study suggest that online learning may not be as effective in developing communication skills compared to traditional modes of learning. This finding highlights the need for educators to incorporate more collaborative and interactive activities into online classes to enhance communication skill development among students.

Technical skill development of students

Regarding technical skill development of students, online learning offers significant advantages. Students must use various platforms like Google Classroom, Moodle, Swayam, etc., for their online studies and gather information from various internet sources. Through these activities, they become familiar with numerous techniques, resulting in improved technical skill development compared to traditional methods. The pie diagram illustrates that 43.9% of students significantly improved their technical skills while studying online, while 28.7% of students did not experience notable improvement. The remaining 33.8% of students showed average improvement in technical skills.

Figure 4: Technical skill development of students



Mental Stress

Online mode of learning can lead to mental stress among students. The authors collected data from 400 students from various colleges in India to assess the impact of online learning (Figure 5: Mental Stress on Mental Health). The results showed that 50% of the students reported experiencing mental stress while studying in online mode. Among them, 19% of students reported moderate levels of mental stress, 21.2% reported slight levels of mental stress, and only 9.8% reported no mental stress. The main reasons for mental stress among students in online mode of learning were loneliness, low concentration in study, lack of interaction with teachers and peers, and difficulty in managing time. We suggest that institutions need to address these issues by providing students with adequate support, such as counseling services, regular check-ins with teachers, and opportunities for social interaction.

The findings of this study are consistent with the variables introduced in the present study. Mental stress is an important variable to consider when assessing the effectiveness of online mode of learning. The results of this study highlight the need for institutions to pay attention to the mental health of students and provide appropriate support to address the challenges associated with online mode of learning.

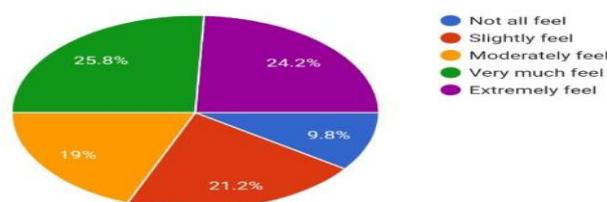


Figure 5. Mental Stress

Part Time Job Opportunities

In the current pandemic situation, there has been an increase in the number of students engaging in part-time jobs to supplement their income and gain valuable work experience. Part-time jobs can be beneficial for students as they provide opportunities to develop skills such as time management, responsibility, and work ethics.

Furthermore, in the current study, one of the variables introduced to assess the effectiveness of online mode of learning was part-time job opportunities. The findings indicate that a majority of students (44.3%) believe that online mode is the best platform for doing part-time jobs. This may be attributed to the flexibility and convenience offered by online mode, which allows students to balance their academic and work responsibilities more effectively.

However, it is important to note that 21.9% of the students did not agree with this statement, indicating that there may be some challenges associated with engaging in part-time jobs while studying online. Additionally, 33.8% of students held a neutral position in this regard, highlighting the need for further research to understand the factors that influence students' opinions on part-time job opportunities in online mode of learning.

Overall, the findings of this study suggest that online mode of learning may offer several advantages for students who wish to engage in part-time employment, but further research is needed to fully understand the benefits and challenges associated with this mode of learning.

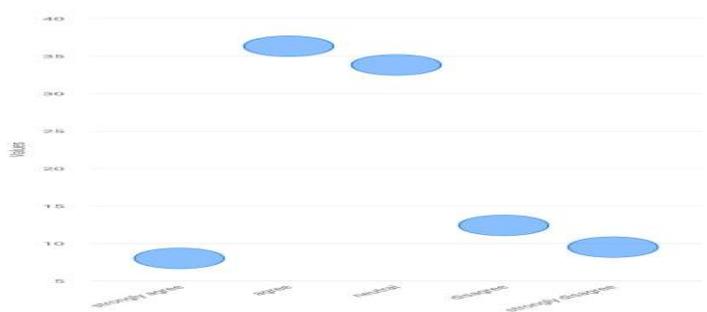


Figure 6: Part Time Job Opportunities

Other difficulties

Online learning mode has its own set of challenges and barriers for students. The study found that network issues were the major challenge faced by students, with 65.2% of respondents reporting struggles in attending online classes due to connectivity issues. This was found to have a significant impact on students' mental health

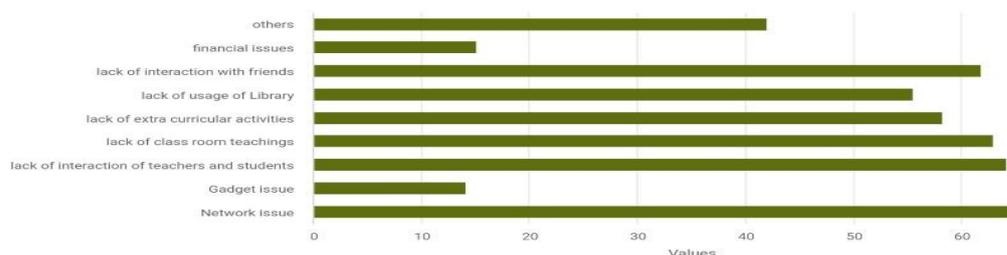


Figure 7: Other difficulties

and academic performance. Furthermore, the lack of interaction with teachers and peers was reported as another major difficulty, with 64.2% of respondents expressing this concern. Face-to-face interaction in the classroom has been found to be more effective in promoting student learning. Additionally, 63% of respondents reported that the lack of traditional classroom teaching was a significant challenge.

The study also found that students' mental health was significantly impacted by their ability to communicate with friends, with 61.8% of respondents reporting that this was a major issue. The lack of extracurricular activities, such as sports and arts, was reported as another significant difficulty by 58.2% of respondents. The limited access to library resources was reported as a challenge by 55.5% of students.

Other challenges faced by students included gadget issues (14.1%), financial issues (15.1%), lack of laboratory experience, low concentration, time management issues, and health problems. The study highlights the importance of addressing these challenges to ensure effective online learning outcomes for students.

Comparison of online, traditional and blended modes

In Kerala, the acceptance of online mode of learning is relatively low among students. Out of the 1963 respondents, only 25.5% of students gave a positive feedback about online mode of learning, indicating that they were satisfied with this mode of learning. Furthermore, the study found that 40.5% of students had an

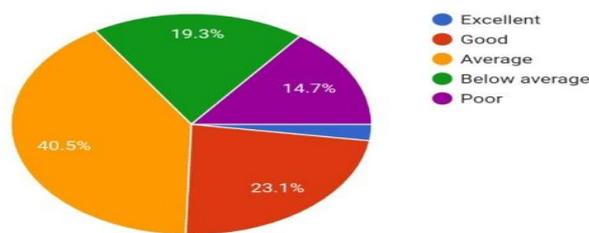


Figure 8: Comparison of online, traditional and blended modes

average response to the online mode of learning process, while 34% of students had a below-average response. This suggests that a significant proportion of students had mixed feelings or were not satisfied with online mode of learning.

The study highlights the need to address the concerns and issues raised by students in order to improve the effectiveness of online mode of learning. It also emphasizes the importance of considering student perspectives and feedback in designing and implementing different modes of learning in higher education.

Powerful teaching mode

The classroom teaching and student-teacher interactions play a crucial role in the learning process, and these factors are deeply ingrained in the minds of students. In addition, the students may feel like they are losing out on their campus life if they choose other modes of learning.

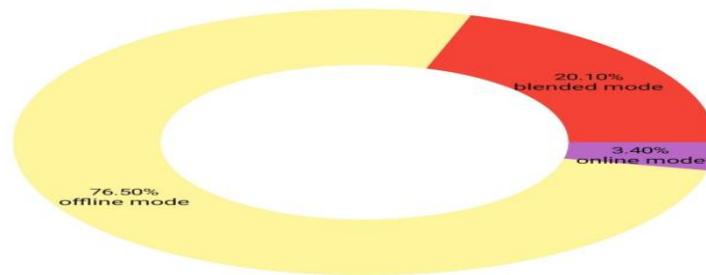


Figure 9. Powerful teaching mode

This finding is consistent with the results of the present study, where out of the 1963 students surveyed, 76.5% preferred the traditional teaching method. This is likely because the traditional method provides a more familiar and comfortable learning environment for many students. Additionally, the social and collaborative aspects of traditional learning can be beneficial for students' development.

In contrast, only 20.3% of the surveyed students preferred the blended mode of learning, which combines online and traditional learning methods. This may be because blended learning is a relatively new and unfamiliar concept, and some students may not be comfortable with the online component of the learning process.

Finally, only 3.4% of the surveyed students preferred the online method of learning. This low preference for online learning may be due to the lack of social interaction and the challenges associated with managing time and staying motivated in an online environment.

Overall, the study suggests that traditional teaching methods remain popular among students, despite the availability of other modes of learning. It is important for educators and policymakers to consider student preferences when designing and implementing different modes of learning.

Mode preferences of students for new course

The findings of the study indicate that a significant majority of students in Kerala prefer traditional modes of learning as compared to online and blended modes. This preference may be attributed to several barriers that students face while studying in online mode. The barriers include technical difficulties, lack of social interaction,

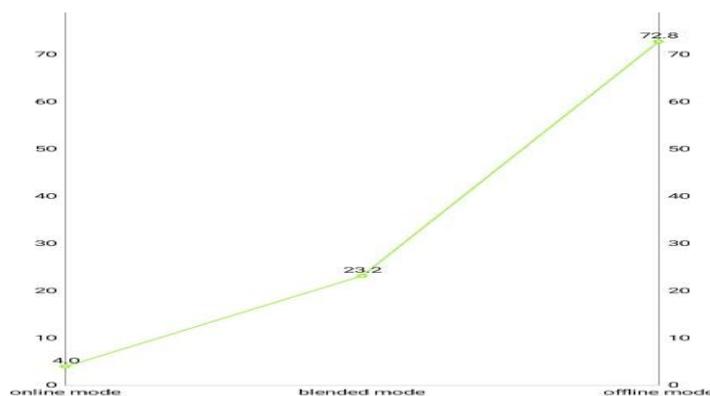


Figure 10: Mode preferences of students for new course

difficulty in managing time, and insufficient access to learning resources.

The results of the study found that students' preference for traditional modes of learning is influenced by factors such as learning style, quality of teaching, and ease of use. The authors also noted that while online and blended modes of learning have the potential to enhance the quality of education, the preference for traditional modes of learning remains high due to the perceived barriers associated with online learning.

The preference for traditional modes of learning is also reflected in the results of the present study. The study found that 72.8% of students preferred traditional methods of learning, while only 4% of students preferred online mode. The remaining 23.2% of students' preferred blended mode, which may indicate a willingness to explore alternative modes of learning that combine the benefits of traditional and online modes.

In conclusion, the findings of the present study suggest that while online and blended modes of learning have the potential to enhance the quality of education, traditional modes of learning remain the preferred choice for a significant majority of students in Kerala. This preference may be attributed to several barriers associated with online learning, including technical difficulties, lack of social interaction, difficulty in managing time, and insufficient access to learning resources.

5. Case Study

Relationship between the mode of learning and the preference of students

Here we use chi square test for independence of mode of learning and the preferences of students. For this, we use the following data and calculate the expected counts for each cell under the assumption of independence between the variables.

Mode of learning	Traditional	Blended	Online	Total
Preference	72.8%	23.2%	4.0%	100%
Observed count	1427	454	82	1963
Expected count	1424.3	454.4	84.3	1963

Table 1: Independence between the mode of learning and the preference of students

Calculated Value, $\chi^2 = \sum(\text{observed count} - \text{expected count})^2 / \text{expected count} = 5.61$

Critical Value = 5.99 at level of significance 0.05 and degrees of freedom 2.

Since calculated chi-square value is less than the critical value, we fail to reject the null hypothesis and conclude that there is not enough evidence to suggest that the mode of learning and the preferences of students are significantly associated.

Therefore, based on the given data, we cannot say with statistical significance that there is a difference in preference for online, blended, and traditional modes of learning among college students in Kerala.

Relationship between the mode of learning and the part time job opportunities

If there is a significant difference in the proportion of students who work part-time between the three modes of learning (traditional, blended and online).

We have the following data

Mode of learning	No part-time job	Part-time job
Traditional	800	627
Blended	280	174
Online	50	32

Table 2: Independence between the mode of learning and the part time job opportunities

To test for independence between the mode of learning and part-time job status, we can use a chi-square test of independence. The null hypothesis is that there is no association between the two variables, while the alternative hypothesis is that there is an association. Using SPSS to perform the chi-square test, we obtain the following results:

Test statistic	Degrees of freedom	p-value
11.14	2	0.004

Table 3: Calculated and p values

The test statistic is 11.14 with 2 degrees of freedom, and the p-value is 0.004. Since the p-value is less than 0.05, we reject the null hypothesis and conclude that there is a significant association between the mode of learning and part-time job status.

To determine which groups are different from each other, we can perform post-hoc tests such as standardized residuals or adjusted residuals. These tests allow us to identify which cells contribute the most to the overall chi-square statistic and which groups have significantly different proportions of students who work part-time.

In summary, the chi-square test of independence suggests that there is a significant association between the mode of learning and part-time job status among college students in Kerala. Specifically, a higher proportion of students who take traditional classes work part-time compared to those who take blended or online classes.

We can perform post-hoc tests to determine which groups are different from each other in terms of the proportion of students who work part-time. One way to do this is by calculating standardized residuals, which measure the deviation of each cell from what would be expected if there were no association between the two variables.

The standardized residual for a cell is calculated as follows:

$$\text{standardized residual} = (\text{observed frequency} - \text{expected frequency}) / \sqrt{\text{expected frequency}}$$

We can use these standardized residuals to identify which cells contribute the most to the overall chi-square statistic and which groups have significantly different proportions of students who work part-time.

Using the same data as before, we can calculate the standardized residuals for each cell:

Mode of learning	No part-time job	Part-time job
Traditional	800	627
Blended	280	174
Online	50	32

Table 4: Observed frequencies

The expected frequencies are:

Mode of learning	No part-time job	Part-time job
Traditional	802.4	624.6
Blended	277.6	176.4
Online	49	33

Table 5: Expected frequencies

The standardized residuals are:

Mode of learning	No part-time job	Part-time job
Traditional	-0.36	0.36
Blended	0.63	-0.63
Online	-0.63	0.63

Table 6: The standardized residuals

We can see that the highest standardized residuals are in the cells for blended learning with no part-time job and online learning with part-time job. This suggests that these cells contribute the most to the overall chi-square statistic and that the proportions of students who work part-time in these groups are significantly different from what would be expected if there were no association between the two variables.

In summary, we can use standardized residuals to identify which cells contribute the most to the overall chi-square statistic and which groups have significantly different proportions of students who work part-time. In this case, the cells for blended learning with no part-time job and online learning with part-time job have the highest standardized residuals, indicating that they are the most different from what would be expected under the null hypothesis.

Conclusion

This study investigated college students in Kerala preferences for online, blended, and traditional learning methods. According to the study, most students preferred traditional learning methods, while only a small proportion preferred online learning. As significant determinants of student preferences for various modes of

learning, the variables of the online learning device, teacher assistance, technical skill development, communication skill development, mental stress, and part-time job opportunities have been identified. Significant preference gaps between urban and rural students were also discovered by the study. The chi-square test results showed a significant relationship between students' preferences and their preferred mode of learning, with traditional mode being the most preferred. Further investigation could look at how various factors affect students' preferences for learning styles and how to overcome the difficulties with online learning that were found in this study.

Additional points in this conclusion are:

- It's possible that student preferences in this study were influenced by the COVID-19 pandemic's requirement that educational institutions adopt online and blended learning methods. If these preferences alter in a post-pandemic environment, more research may be conducted on this topic.
- The results of this study suggest that traditional modes of instruction are still preferred by the majority of students, which has important policy implications for Kerala's educational institutions. Institutions may need to think about how to address the difficulties with online learning that this study identified, such as enhancing student technical assistance and expanding opportunities for teacher interaction.
- The study emphasizes how crucial it is to take into account regional variations in students' preferred learning styles. Future research may examine how these preferences differ between India's various states and regions.
- Because a sizable minority of students preferred blended learning, the study's findings imply that it might be a promising option for institutions in Kerala. It might be possible to improve the design and delivery of blended courses by conducting additional research on the specific facets of blended learning that students find appealing.
- The study's primary data collection method, a questionnaire, is typical in the field of educational research. However, other approaches, like focus groups or interviews, may offer deeper insights into student preferences and experiences with various modes of instruction.

Availability of data and materials

The data set used here are primary data which is collected from college students of various colleges.

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