As the COVID-19 outbreak spread from early 2020 on, synchronous and asynchronous online learning became the predominant delivery method in the education system. This is the inaugural time that educational programs have indeed been totally given online across the state. So, this research aims to study the Indian student’s perception of synchronous and asynchronous online courses amid COVID-19. This study involved 655 responses from UG students of various Indian educational institutions. In this study, we utilized basic random sampling to gather data, and SPSS was used to analyse the data. To narrow down the enormous dimensionality, the acquired data were subjected to a factor analysis utilizing a principal component analytical method. The results of the study demonstrate that synchronous can be challenging at times and puts more responsibility on the students. Asynchronous learning also gives the learners the chance to independently investigate and explore the subjects that have been given to them. Another reason why asynchronous exercises were perceived as burdensome by students was the large number of handwritten tasks that had to be turned in quickly. The COVID-19 outbreak has indeed been difficult for both students and teachers nationwide. Yet, teachers have supported students’ use of digital learning tools. Therefore, asynchronous and synchronous online courses together have produced balanced learning.

**Keywords:** Synchronous, Asynchronous, online courses, student perception, and online learning

1. Introduction

The Internet has created a permanent influence on higher education over the last ten years or so by facilitating the remarkable expansion of online courses [Abdelmalak, M. M. M. (2015)]. A total of 76% of degree-granting universities delivered online courses in the 2016–2017 academic year, while around 50% of those same universities delivered at minimum one program totally digital. In the same scholastic year, roughly one-third of students in a minimum of one online course, and 15% of them registered in degree programs were delivered completely online [Xu, D., and Xu, Y. (2019)]. About 6.3 million students participated in online learning during the 2016 fall term, a statistic that has been rising every year. The various benefits of distance learning, such as more freedom for earning learners or those who stay in remote regions, have led to a surge in both the need for and provision of online courses and totally online degrees [Seaman, J. E., et.al, (2018)].

Additionally, the unexpected requirement for online teaching and learning brought on by the COVID-19 outbreak challenged the level of digital adaptability of educators and students worldwide. Academic institutions rapidly moved from a face-to-face style of classroom-based education to a digital method of instruction as an instant and prompt remedy to the interim shutdown of academic institutions throughout India and all over the globe due to the COVID-19 outbreak [Bao, W. (2020)].
Online learning involves “all modes of teaching and studying wherein the students and instructors are physically and temporally distanced” [Sun, A., and Chen, X. (2016)]. Online learning can be offered synchronously or asynchronously [Google, C., et.al, (2015)]. Synchronous online courses use technological resources like online broadcasts to deliver lessons and classroom activities in real-time. Students must be present at a certain time and day for synchronous education to take place. Asynchronous online courses, on the other hand, happen without real communication and comprises pre-recorded lectures, discussion forums, and emails. Asynchronous teaching is the conventional form of distribution for online courses, and it is still widely used since students can attend a program at any time and from anywhere [Watts, L. (2016)].

1.1 Research Statement

These altered educational systems made possible through web-based innovations not just remove constraints related to time, distance, and styles of learning, increasing the availability of higher education, but they also put conventional teaching and studying practice to the challenge. Every educational program must strive to deliver high-quality educational opportunities in order to guarantee the achievement of its students, instructors, and programs. Additional issues on how to create efficient teaching and studying approaches are coming up as online education develops. The emphasis of contemporary research on distance learning has switched from technologies directly to its impact on students. The most contemporary study falls into the following four classes: communication, active learning, student perceptions, and learning results. The perception of the online education course’s experiences by the students is perhaps the most crucial aspect of online education courses.

1.2 Research Objective

The aim of this research is to analyse the student’s perceptions of synchronous and asynchronous online courses with the objective to

• To analyse both positive and negative outcomes of synchronous and asynchronous online learning through bartlett and KMO assessment.
• To investigate this study with certain questions

Q1: Student community perception of online courses
Q2: What are the issues faced by students during online courses?
Q3: Do students have social interaction through online courses?
Q3: Do parents encourage their children to register for online courses?
Q4: Do students in asynchronous and synchronous classes have any feelings of irritation or stress?
Q5: Do students feel at ease taking lessons online? Is online learning superior to traditional learning?
Q6: What difficulties do students encounter when participating in live, synchronous sessions?

2. Review of Literature

Investigations have sought to understand why students exhibit warmer or colder perceptions regarding two types of distant learning (synchronous or asynchronous) in previous studies and have outlined the components that contribute to these perspectives.

2.1 Synchronous Online Courses

Numerous studies have been conducted on how students approach this matter, and as was already mentioned, social communication is one of the main reasons why students prefer hybrid synchronous learning environments. Clark, C., et.al, (2015), who made the argument that relations between students and teachers were important determinants of student happiness and had an effect on learning, backed it up. Secondly, convenience and
adaptability can be listed among the advantages of a synchronous manner. According to Wang, Q., et.al, (2018) research, students preferred synchronous learning’s adaptability because it gave them more opportunities to engage in the classes from any location and on any platform. This comfort and adaptability encouraged more involvement in online courses.

Despite the abovementioned advantages, Wang, Q., et.al, (2018) also noted in their paper that certain synchronous learning method features were unpopular with students. They have drawn attention to how important tech-related issues are. To give an example, one of the respondents claimed he lacked the required equipment and an internet connection. Additionally, the technology utilized for this form of learning may provide difficulties, such as communication lags or a lack of data security. These elements might affect how students view this form of instruction. Lawless, C, (2018) concerns the social existence part as a drawback of this modality while Wang, Q., et.al, (2018) identify technical components of the issues. In other terms, rigid schedules for learning might indeed be detrimental since they may prevent students from seamlessly connecting to the system simultaneously.

2.2 Asynchronous Online Courses

An overview of contemporary research on the asynchronous style of distant learning is provided in this subsection. It might be said that the majority of the study has examined the elements influencing student satisfaction in terms of seminal insights are considered.

Asynchronous online courses give learners more flexibility because they don't require to be on the internet simultaneously and can work at their own speed. Since they can study at any moment and from any place in an asynchronous online course, learners can also work at their preferred speed. Furthermore, in this type of educational setting, kids frequently engage in worthwhile education and improve their capacity for self-direction [Brieterton, S., et.al, (2016)]. Students have the chance to completely convey their ideas and go into considerable depth when interacting asynchronously through online conversation platforms. Students also experience more relaxation and freedom to express their opinions on an asynchronous online conversation platform [Lowenthal, P., et.al, (2017)].

The lack of instant social engagement in this kind of asynchronous online course setting causes certain students to think before responding, while others become irritated while waiting for other individuals to react. Additionally, there aren't many opportunities for students to talk to their teachers and classmates in real time or get rapid feedback [Pinto-Llorente, A. M., et.al, (2017)].

3. Materials and Method

3.1 Research Population

The secondary data was gathered from students who enrolled in online courses during the pandemic. N=655 responses were submitted, with 59.7% of the female and 39.5% of the male responses comprising UG students, on average. The most of students enrolled in undergraduate programs at various Indian educational institutions are between the ages of 17 and 21.

3.2 Research Data Collection and Analysis

Students’ overall perceptions about synchronous and asynchronous learning in online courses were asked in the survey. After a thorough literature analysis, important variables were hand-selected, and they were then transformed into questions to build the questionnaire. The three-point Likert scale comment is obtained with a fair distribution of "agree," "neutral," and "disagree." The researchers are able to achieve a sufficient range of replies due to this scaling choice. There is a chance that the replies may be biased if the scale choices are increased above 5 or 7. A Likert's three-point scale has indeed been applied going forward. Simple random sampling was employed to gather the data, and SPSS version 26 was used to analyse the results. Employing Cronbach's alpha, the dependability of the collected data was evaluated. If the reliability value is greater than 0.7, which is deemed to be significantly positive and acceptable for moving forward. Additionally, the information gathered is a representation of what students went through throughout the lockdown, and there was a good variety of replies.
As a result, the data are regularly distributed and reflect the accessibility of data collecting, and the population that the samples are derived.

3.3 Analysis of Factors

The survey tool is made with both the advantages and disadvantages of synchronous and asynchronous online courses in mind. Each and every one of the question statements employed reflects an asynchronous or synchronous learning strategy. Factor analysis has indeed been utilized to minimize the dimensions due to their high quantity. Employing the principal component approach, each positive and negative sentence was subjected to factor analysis individually. The KMO and Bartlett analyses and their outcomes were examined prior to removing components. Bartlett’s test of sphericity calculates the sample sufficiency, which ranges from 0 to 1, wherein greater than 0.5 is deemed adequate, and KMO calculates the sample significance, which ought to be less than 0.05. The essential factors are classified depending on the factor analysis result for negative statements, and an appropriate label has been assigned.

Factor 1: online courses are exhausting
Factor 2: Frustrating and Insecure
Factor 3: Involves more responsibilities

The full set of components has been sorted and assigned an appropriate label depending on the factor analysis result for positive sentences. The sentence was omitted if the loading factor for two of the statements was less than 0.5.

Factor 1: Student-based and efficient
Factor 2: Collaborative and adaptable

4. Result and Discussion

Table 1: Bartlett and KMO analysis outcomes of positive and negative sentences

<table>
<thead>
<tr>
<th>Bartlett and KMO analysis</th>
<th>Positive sentences</th>
<th>Negative sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sphericity analysis of Bartlett</td>
<td>0.912</td>
<td>0.911</td>
</tr>
<tr>
<td>Sampling adequacy measure of KMO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-square approximation</td>
<td>2709.70</td>
<td>2806.73</td>
</tr>
<tr>
<td>Df</td>
<td>91</td>
<td>105</td>
</tr>
<tr>
<td>Significance</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 2: Negative statements rotated component matrix

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>During my online courses, I have experienced a slow</td>
<td>0.62</td>
<td>0.05</td>
<td>0.08</td>
</tr>
<tr>
<td>network and technological issues. (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel my education is being hampered by an absence</td>
<td>0.58</td>
<td>0.41</td>
<td>0.005</td>
</tr>
<tr>
<td>of face-to-face communication with the instructor and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>being unable to ask my queries with the instructor. (A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor supervision concerns make it difficult for</td>
<td>0.57</td>
<td>0.09</td>
<td>0.43</td>
</tr>
<tr>
<td>students to study online (S)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Due to variances in time and place, students face challenges to plan group assignments with their teammates (A)  

<table>
<thead>
<tr>
<th>Statement</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Due to variances in time and place, students face challenges to plan group assignments with their teammates (A)</td>
<td>0.57</td>
<td>0.28</td>
<td>0.09</td>
</tr>
<tr>
<td>I put off doing my assignment mostly because I don't fully comprehend what I've been educated (A)</td>
<td>0.56</td>
<td>0.29</td>
<td>0.07</td>
</tr>
<tr>
<td>Due to the minimal communication and absence of exposure on campus, my enthusiasm and academic achievement have deteriorated (S and A)</td>
<td>0.53</td>
<td>0.42</td>
<td>0.071</td>
</tr>
<tr>
<td>Since I cannot communicate with my friends during online courses, I feel lonely. (S and A)</td>
<td>0.52</td>
<td>0.15</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Table 3: Positive statements rotated component matrix

<table>
<thead>
<tr>
<th>Positive Statements</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online courses are as efficient as offline courses. (S)</td>
<td>0.78</td>
<td>0.09</td>
</tr>
<tr>
<td>I feel the online setting is a student-based method. (S)</td>
<td>0.75</td>
<td>0.14</td>
</tr>
<tr>
<td>Online courses offer the chance for collaborative studies. (S)</td>
<td>0.594</td>
<td>0.302</td>
</tr>
<tr>
<td>Due to their adaptability, online courses are a better method of education. (S)</td>
<td>0.469</td>
<td>0.467</td>
</tr>
<tr>
<td>In an online course, I have the chance to do some self-exploration, I am competent in embracing responsibility for my education (A)</td>
<td>0.196</td>
<td>0.636</td>
</tr>
<tr>
<td>Participation in an online course is pleasant for introverted or insecure students (S)</td>
<td>0.155</td>
<td>0.628</td>
</tr>
<tr>
<td>Since there are no time or location restrictions and they are extremely adaptable, online courses can accommodate more notable individuals.</td>
<td>0.176</td>
<td>0.567</td>
</tr>
</tbody>
</table>

Figure 1: Perception of students on increase in improvement in online learning

This research assessed asynchronous and synchronous online course learning based on student's perceptions as they were reflected in negative and positive results amid the COVID-19 catastrophe. The investigation revealed to the investigators that the majority of students attend private universities and have access to technology. This is due to the fact that synchronous and asynchronous approaches to teaching and learning have just recently been adopted by a small number of reputable educational establishments. Government universities and a small number of commercial universities that are not technologically savvy have not placed much emphasis on a balanced educational method.
We came to the conclusion that the COVID-19 outbreak prompted students to take online courses when they realized that about 69.8% of the students had never taken an online course prior to the COVID-19 issue. The biggest popular form of technology utilized by students to join online courses was their smartphones, where they claimed that network access was enough for attending classes. Nearly 78% of moms and dads also encouraged their children to enrol in online courses. Numerous reasons were given, including lack of funds, technological difficulties, health challenges, and the need to prioritize family obligations over supporting their children's online education. In order to understand more about synchronous and asynchronous learning approaches, our research also posed open-ended queries. We have gotten a range of replies from the analyses and the open-ended queries. Certain comments are quite favourable to asynchronous and synchronous online learning, stating that it is adaptable, time-saving, and efficient. On the contrary, a small number of participants claim that online courses are not adaptable because it lays obligations on students, adds stress, and make them feel insecure. Few students noticed that slow learners—those who are visually, audibly, or both impaired—were not given enough focus by their teachers. They added that in order to divide tasks into smaller portions and present them to students with greater clarity, teachers must design exercises and undertake special training.

To find out the perception of student populations thought of multiple open online courses (MOOCs), we addressed similar queries. We deduced from their answers that Byjus, Coursera, Khan Academy, Udemy, and Edx were the five top popular e-learning sites in India, with 51.1% of users choosing Coursera over all other sites to enroll in MOOC courses. The asynchronous technique, in which students learn independently without the assistance of a tutor, includes MOOCs as well. Few queries required various replies; thus, we defined the various reply categories and conducted a frequency analysis to determine the student percentage replies. For a variety of factors, most students choose synchronous over asynchronous learning. Students claim that synchronous learning gave them the ability to encourage themselves by using their research abilities to examine and comprehend an idea in a methodical way.

5. Conclusion

This research was done to determine student's perspectives on asynchronous and synchronous online courses. Online courses are now acting as a new magic solution during a pandemic. The study's conclusions indicated that the results of online courses, both synchronous and asynchronous, are extremely exhaustive, placing additional responsibility on students and leading to feelings of irritation and insecurity. Online courses, on the other hand, are student-based, giving students more freedom to collaborate to improve class efficacy. As a result, the students' perspectives and responses have varied. We conclude that most academic establishments are making their greatest and best attempts for the welfare of the students.

Students must comprehend these attempts and put in just as much attempt to succeed. Both synchronous and asynchronous methods have advantages and disadvantages. Students must, nevertheless, balance their async and sync coursework. Being a developing country, India has not fully experienced technological innovation, and only a few rural areas have access to fundamental online learning. Asynchronous and synchronous education approaches are relatively novel ideas that require clarification. From now on, in the days to come, there ought to be an equilibrium between the two strategies. Future researchers will have a wide range of chances, but while synchronous education is going well, it's also critical to encourage students to participate in asynchronous activities. Additionally, future studies on teachers' perceptions of online courses can be conducted since it is equally crucial to examine teachers' mentalities during the epidemic.

Acknowledgements

Funding
This research did not receive any specific grant from funding agencies in the public.

Authors' contributions
All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.
Declaration of Conflicts of Interests
Authors declare that they have no conflict of interest.

Data Availability Statement
The database generated and/or analysed during the current study are not publicly available due to privacy, but are available from the corresponding author on reasonable request.

Declarations
Author(s) declare that all works are original and this manuscript has not been published in any other journal.

Reference