

COVID pandemic and virtual classes: a study of students from Punjab

Transition
from offline to
online learning

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Abstract

Purpose – The current corona virus pandemic had a major impact upon the health, economy and education worldwide. In India, the government as a part of the nationwide lockdown closed all educational institutions, as a consequence of which, the teaching-learning, examination and placement scenario of students were affected. UNESCO estimated that about 32 crore students have been affected in India. The adoption of an online e-learning approach tried to minimize the academic loss and stress on students. However, the online teaching transition moved on an untested and unprecedented scale in a very short span of period. The present study analyses the perception and level of acceptance of transition from offline to online learning amongst the students of higher education in Punjab.

Design/methodology/approach – The analysis was carried out by surveying 200 students of higher education from Punjab belonging to different regions. An appropriate pre-tested questionnaire was framed on Google Forms. A five-point Likert scale was employed to determine the perception of students regarding quality of audio and video lectures, instructor's content, preparation, interactivity, discussion regarding doubts and assessing likes and dislikes of students. The data were coded-decoded in SPSS by using descriptive statistics and factor analysis.

Findings – The study revealed the level of acceptance of online study among the students of higher education in Punjab. It is found that both online and offline modes of learning process have their own pros and cons. The sudden transition from regular mode to virtual mode was not an easy task for students either. The study revealed that both online and offline study modes have been accepted by students depending upon the availability of IT infrastructure as almost half of the respondents perceived online mode and the other half offline.

Originality/value – Punjab is a recognized state of northern India. In Punjab, the quality of higher education is good and students' satisfaction is always the priority of the educational institutions. At the time of the pandemic, this sudden transition from regular to virtual mode impacted education with students coming from diverse backgrounds like urban areas, rural areas, remote areas, rural-urban areas etc. So, in the light of this sudden transition, it is important to study the viewpoint of the students of Punjab. So, the present study was conducted to understand the perception of the students toward online learning during this ongoing pandemic. For this purpose, the study employed factor analysis. Application of factor analysis in this area is unique.

Keywords COVID-19 pandemic, Online learning, Technology, Cross-sectional study, Student's perception, Factor analysis

Paper type Research paper

1. Introduction

The World Health Organization (WHO) announced on February 11, 2020 the emergence of unidentified Virus, named COVID-19 from Wuhan, China in late December 2019.

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Many countries around the Globe faced unique challenges because of this pandemic (WHO, 2020). The first case of this novel corona virus was reported on January 30, 2020 (The Hindu, 2020). Since then this disease has started spreading enormously. Keeping in view the gravity of the grim situation, the Government of India imposed a countrywide lockdown on March 25, 2020.

Due to the shutdown of academic institutions, massive transformation took place in teaching-learning methods worldwide. The universities, colleges and other institutes of higher education switched to online teaching methods (Amita, 2020). The pandemic became a catalyst worldwide to search for innovative solutions to this problem. Both the teachers and students have embraced different technology platforms where students can actively participate in learning, but the practical sessions that require laboratory setting are not easy to administer.

The Government of India started various online learning platforms like National Institute of Open Schooling (NIOS), Free and Open Source Software for Education (FOSSEE), National Repository of Open Educational Resources (NROER), Study Webs of Active Learning for Young Aspiring Minds (SWAYAM), E-pathshala, Diksha and other IT initiatives E-Yantra (Robotics Education). The Ministry of Human Resource Development and the regulators like NCERT, UGC, AICTE and Directorate of Higher Education motivated the educational institutions to adopt the online approach of education. This lockdown impacted the students' learning, exam schedule, internal assessment and placement scenario that lead to increased stress among students. The online teaching approach was adopted to minimize the loss of students (Amita, 2020).

Naidu (2006) and Agariya and Singh (2012) explained in this regard that learning online was always beneficial to students, namely, interactivity, timing flexibility advantage, more retention, portability, collaborative efforts and retention in overall educational costs.

The Academic Year 2020–2021 has been challenging for the educational institutions, teachers as well as students because of COVID-19 pandemic. Due to lockdown in the country, this wave of technological drift becomes a recent development for students as well as teachers. Though e-learning is not a new concept, it has never been adopted at such a large scale for the formal mode of education earlier.

Educational institutions in India were already the third largest online education provider with 1.3 learners as per Coursera's report (Behura, 2016). In India, approximately 400m learners used the Internet for online education (Arora, 2017). This prevailing situation leads to adoption of e-learning methods worldwide. Majority of educational institutions are exploring this online-resource-based-learning to achieve academic excellence. In this light, it is important to have an analysis of student's viewpoint toward online classes.

The present study analyzed the acceptance of online teaching among the students of higher education in Punjab. The study conducted an online survey with the help of Google Forms questionnaire that was distributed among 200 students of various higher educational institutions of Punjab. The main objective of the present study is to observe the perception and practice of the students about the transition from regular classes to online classes mode.

The paper is divided into five sections. After introducing the theme in [section 1](#); [section 2](#) reviews the literature related to present study. [Section 3](#) elaborates on data sources used and lays down the conceptual framework. [Section 4](#) is devoted to the analysis of the impact of online transition among the students of Punjab and digs out implications, inferences and other related findings. [Section 5](#) puts forth main policy implications emanating from the findings, analysis and conclusion.

1.1 Significance of study

The current corona virus pandemic has almost impacted each sphere of life. Educational institutions have been affected the most. There is a sudden shift from offline

mode to online within the blink of an eye especially in Punjab. In Punjab, students come from urban areas, rural areas, remote areas, rural-urban areas etc. So, it is required to study the student's acceptance level of e-learning.

2. Review of the literature

E-learning is not the novice context and the adoption of online teaching-learning process by Indian educational institutions has been observed as an important contributor (Mittal, 2008). The implementation of online classes' methods gained popularity in recent years. A number of universities in India provide numerous online or distance courses to the students (Beatty and Ulasewicz, 2006). E-learning activities are important for the development of any country. If the process of e-learning is planned properly then appropriate outcomes must be there. Gaikwad and Randhir (2016) explained that if e-learning is adopted properly then positive results would lead to the growth of students and development of educational institutions. This modern method of teaching-learning would be very useful for the development of the educational sector in Indian context.

Blackmon and Major (2012) highlighted that e-learning is important for teaching-learning practices. This study investigated more than 2,500 institutions by 2009 and found that around 5.6 million students were taking online courses. This qualitative research synthesis explored students' experiences with online learning and mentioned that some students were satisfied with online classes because enrolling in an online program has been very beneficial to carry out their routine jobs simultaneously. However, some of the students were not satisfied because of low self-motivation and lack of communication skills among the students. But this adoption of e-learning was never adopted for the regular or formal mode of classes earlier. This COVID-19 pandemic forced the educational institution to adopt this online teaching-learning transition to regular mode also (Kulal and Nayak, 2020). Dhawan (2020) examined the SWOC (strengths, weaknesses, opportunities and challenges) analysis of modes of e-learning during the period of COVID-19 crisis. The paper reported that online learning became the need of the hour at this time and with more focus on use of technology, it will be a successful method and can facilitate the educational process effectively.

Thomas *et al.* (2020) surveyed the medical students during COVID-19 lockdown in India. This recent study highlighted the students did not favor the online classes. The main reasons were network issues, less interaction between teachers and students, fatigue and lesser data availability. The students suggested that in order to lessen the fatigue and to improve interactions, short intervals must be given. Agha (2020), Lewis (2020) and Awasthi (2020) also stated about the several other problems faced by the students like network connectivity problems, data limits, e-resources storage problem and lack of interactions among teachers and students.

Mishra *et al.* (2000) highlighted the perception of both teachers and students on online teaching-learning methods amid COVID-19. Online teaching mode became the need of the hour that brought both institutions as well as individuals in the unfreeze stage. Due to COVID-19 outbreak, it is quite difficult to teach the classes in the regular mode by maintaining the rule of social distancing. The teachers are putting efforts to teach the students online by adopting multimodal approaches in an effective manner.

Ray and Srivastava (2020) also emphasized online study mode for the students in situation of lockdown and quarantine during pandemic. This study focused on the concept of virtual laboratories, video demonstration and simulation. It would help the students to use the e-resources well and also facilitate critical thinking among students.

Fatonia *et al.* (2020) mentioned that students preferred the online classes during this outbreak. Even though online teaching-learning method offers the students flexibility,

convenience, comfortable environment and full support from the teachers, students still prefer to join the regular classes after the pandemic.

From all these related studies, it has been observed that there is a future need to explore the factors that impact online education from the viewpoint of students.

3. Database and methodology

3.1 Study design

The study is an attempt to seek online feedback of the students regarding this transition. For this purpose, data were collected with the aid of structured questionnaires (in Google Forms) drawn online from 200 students of various higher educational institutions of Punjab from October 13–30, 2020. The questionnaire was also circulated among other students by using the technique of snowball sampling.

3.2 Designing of questionnaire

The questionnaire was designed with open-ended, close-ended and Likert-scale questions. The questionnaire consisted of three sections. The first section included the details regarding the socio-demographic details of the respondents. The second section explored the information regarding online classes attended by the respondents, duration of classes, types of devices, applications and platforms used by students. The third section examined the students' perception toward online classes. A five-point Likert scale was employed to determine the perception of students regarding quality of audio and video lectures, instructors' content, preparation, interactiveness, discussion regarding doubts and assessing likes and dislikes of students. The responses were categorized such as strongly disagree, disagree, neutral, agree and strongly agree. A Likert scale was used to rate various statements by respondents to elicit a degree of agreement or disagreement about stimulus objects (Malhotra *et al.*, 2006).

3.3 Statistical analysis

The reliability of the questionnaire was checked by deploying Cronbach's alpha method. The data were analyzed with the help of SPSS software. The advantages, disadvantages and level of acceptance of online teaching-learning practice were analyzed by using descriptive statistics and factor analysis.

An online survey was conducted to know about the view-point of the students. After obtaining the data from the survey, factor analysis was implied on the data. The results were tabulated and analyzed to produce the results. Exploratory factor analysis is a data reduction tool used to define the unidimensionality of the factors explaining the perception of the students amid this pandemic. Factor analysis is a statistical procedure which helps to identify the principal directions in which data vary, by transforming a set of variables that captures the largest amount of information common to all the statements. It involves calculation of a correlation matrix of dataset to maximize the variance and minimize the redundancy (Krishnan, 2010).

The first factor is calculated such that it accounts to the greatest possible variance in the data set by choosing large values for the weights $a_{11}, a_{12}, \dots, a_{1p}$, so as to prevent the weights from being calculated with the constant that their sum of squares is 1. The second factor is calculated in the same way with the condition that it is uncorrelated with the first principal component and explains the maximum in the residual variances and so on (Leech *et al.*, 2014). So, the exploratory factor analysis is a method for exploring the factors from the number of statements according to the factor loadings. The correlation coefficients between the principal factors and the variables are called the factor loadings. It means variation in each variable explained by the factor is loadings (OECD, 2008).

The model of factor analysis for the present study is as follows:
In present study,

$$X_1 = \beta_{1(0)} + \beta_{1(1)}F_1 + \beta_{1(2)}F_2 + \dots \dots \beta_{1(8)}F_8 + e_1$$

$$X_2 = \beta_{2(0)} + \beta_{2(1)}F_1 + \beta_{2(2)}F_2 + \dots \dots \beta_{2(8)}F_8 + e_2$$

$$X_{30} = \beta_{30(0)} + \beta_{30(1)}F_1 + \beta_{30(2)}F_2 + \dots \dots \beta_{30(8)}F_8 + -e_8$$

X_1, X_2, \dots, X_{30} are the 30 variables representing statements that were asked from the students.

F_1, F_2, \dots, F_8 are the 8 components extracted.
 β_{12} is the loading of variable X_1 on factor F_2 .

3.4 Ethics approval

Before conducting the study, the consent of the participants was taken in advance that the data information provided by them will be a part of study. They were made aware of the aims, benefits and implication of the study. The respondents were assured of confidentiality, security and anonymity of information, and consent was obtained from the respondents. The data were collected through the Google Forms and response rate was 100% and there was no duplication as all students were allowed to fill only one form.

4. Results

This section explains the results of the present study on the basis of details obtained from the 200 questionnaires surveyed. The data were encoded-decoded first, and then it was analyzed using SPSS version 21. The questionnaire was formulated in three sections, as already stated in the previous section. The results related to each section are explained below separately.

4.1 Socio-demographic details

In the first section the socio-demographic details of the students such as age, gender, class and nature of educational institutions have been analyzed.

Table 1 presents the distribution of students according to the age. A major share of students, i.e. 115 (57.5%) students, was from the age group of 15–20 years. It has been found that 81 (40.5%) students belong to the age group of 20–25 years and 4 (2%) students come under the category of 25 and above.

Table 2 exhibits the statistics regarding the sex composition of the students. Out of 100% data, 60% students were female and 40% were male.

Table 3 shows the educational level of the students. The majority of the sampled respondents enrolled were in bachelor's degree category, i.e. 155 (77.5%), followed by 37 (18.5%) students from masters and above and 8 (4%) students were in diploma courses.

It is evident from Table 4 that 128 (64%) students belong to aided educational institutions and 72 (36%) belong to government educational institutions.

Age-groups	Frequency	Percent
15–20	115	57.5
20–25	81	40.5
25 and above	4	2.0
Total	200	100.0

Table 1.
Age wise classification
of students

4.2 Information regarding online classes

The second section examined the information regarding usage of online teaching-learning tools, duration of the classes, devices used and online application used for teaching by teachers.

Figure 1 presents the online teaching-learning tool employed by educational institutions. As shown in diagram, majority of educational institutions in Punjab preferred live video conferencing tool (37%), online teaching applications (31%) followed by using the social media without streaming (10%), through video recording, e-learning platform (7%), audio recordings (5%) and social media via live streaming (3%).

The next question asked to the students was about the duration of classes. Figure 2 highlights that students attended classes, in order of importance; that is more than 4 hr/day (47%), 2–4 hr/day (22%), 1–2 hr/day (10%) and less than 1 hr/day (21%).

Figure 3 highlights that the majority of students (94%) used smart phones to attend their online classes and the remaining 6% of students used laptops/personal computers for the classes.

Table 2.
Distribution of sampled students according to the gender

Gender	Frequency	Percent
Male	80	40.0
Female	120	60.0
Total	200	100.0

Table 3.
Distribution of students as per educational level

Classes enrolled	Frequency	Percent
Diploma	8	4.0
Bachelor's degree	155	77.5
Masters and above	37	18.5
Total	200	100.0

Table 4.
Category of educational institution

Type of educational institution	Frequency	Percent
Government	72	36.0
Aided	128	64.0
Total	200	100.0

Online Teaching Tools

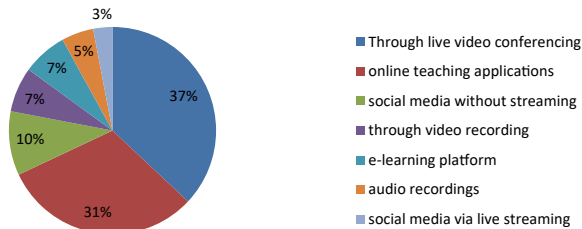


Figure 1.
Online teaching-learning tools

The next section of this segment explains the platform/application used for attending online classes. The majority of students, i.e. 74% attended online classes by using Zoom application, followed by 40% using Google Classroom, 26% via WhatsApp, 5% used Webex, 4% used YouTube and 7.5% used other platforms like Cisco, Teams etc (see Figure 4).

4.3 Student's perception

The main objective of the present study was to know the opinion of the students about their knowledge, perception and preference toward e-learning. This section revealed the perception of students toward online classes.

Table 5 shows that 101 (50.5%) students liked the online/virtual classes and 99 (49.5%) students did not like the online mode of classes and instead preferred face to face interactive classes.

The first step was to check the reliability of the items by applying Cronbach's alpha method. Cronbach's alpha is scale reliability test, used to check the internal consistency. The values hover between zero and one, and closer the value nearing one, better it is. Any value of

Duration of Classes

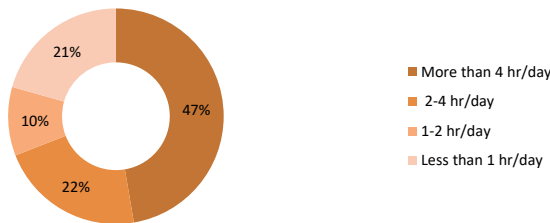


Figure 2.
Duration of classes

Devices Used

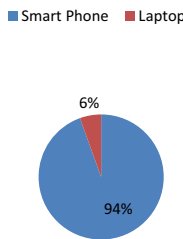


Figure 3.
Devices used to attend online classes

Platform/Online Applications Used

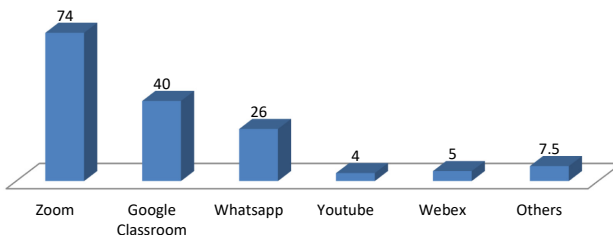


Figure 4.
Online platform used to attend the classes

Cronbach's alpha below 0.70 is considered poor, between 0.70 and 0.79 good, between 0.80 and 0.89, the reliability is considered to be better, and any value more than 0.90 is considered to be the best (Cronbach, 1951).

In present study, the range of 26 items is 0.804, considered to be better scale as shown in Table 6.

After checking the reliability of scale, the next step was employing factor analysis on the 30 statements. For this purpose, a five-point Likert scale was adopted to determine the observations of the students regarding clarity of audio and video quality, instructor's preparation, content, interactiveness, discussion on doubts, advantages, disadvantages, likes and dislikes toward online classes. A five-point Likert scale categorized responses into strongly disagree, disagree, neutral, agree and strongly agree were used.

Tables 7–9 represent the factor analysis to extract the factors that impacted the online class interface. Kaiser-Meyer-Olkin (KMO) examined the partial correlations between the variables and Bartlett's test measured coefficient correlations (Chadha and Chadda, 2020).

Table 7 shows KMO of factor analysis. KMO measure at 0.897; indicates a good measure in Table 7. The values of KMO between 0.8 and 0.9 are considered great. Bartlett's test is significant, when p value is 0.000 (Field, 2009).

Table 5.
Preference of the students

Opinion	Students	Percentage
Yes	101	50.5
No	99	49.5
Total	200	100.0

Table 6.
Cronbach's alpha reliability statistics

Cronbach's alpha	Cronbach's alpha based on standardized items	No. of items
0.804	0.806	30

Table 7.
KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.897
Bartlett's test of Sphericity	Approx. Chi-Square	1049.153
	df	190
	Sig	0.000

Table 8.
Total variance explained

Components	Total	Initial Eigen values	
		% Of variance	Cumulative %
1	7.904	25.575	25.575
2	4.866	14.522	40.097
3	4.093	13.810	53.907
4	2.585	9.878	63.785
5	2.416	7.466	71.251
6	1.185	4.926	76.177
7	1.110	4.080	80.257
8	1.084	3.420	83.677

Note(s): Extraction Method: Factor Analysis

Factor no	Factors	Statements	1	2	3	4	5	6	7	8
1	Instructor's competency	Asking random questions Asking to type in chat box Ask the students to summarize the class Ask to keep video on	0.954 0.911 0.876 0.786							
2	Accessibility	Teachers' preparation Quality of content taught Discussion of doubts	0.868 0.849 0.830							
3	Instructiveness	Interactions Clarity of audio Clarity of video/image Easy access to online materials			0.826 0.774 0.721					
4	Effectiveness	Learning at own pace Ability to record the meeting Information was well presented				0.751 0.738 0.609				
5	Personal problems	Reducing interaction with teachers Poor learning environment at home Social isolation					0.810 0.713 0.700 0.659			
6	Technical problems	Problem in choosing best source to retrieve information Electricity problem Lack of adequate technical skills Poor internet connectivity problem Lack of sufficient data						0.977 0.873 0.845 0.797 0.667		
7	Inefficiency of learner	Visual fatigues Auditory fatigue Lack of self-discipline Lack of motivation							0.827 0.797 0.693 0.665	
8	Expanding expediency	More retention power of students Staying home with comfortable surrounding Flexibility in timings Learn at leisure								0.883 0.793 0.737 0.703

Note(s): Extraction Method: Factor Analysis
Rotation Method: Varimax with Kaiser Normalization
Rotation converged in 10 iterations

Table 9.
Rotated component
matrix

[Table 8](#) reveals the division of the total variance among the components. In [Table 8](#), the eight principal factors have Eigenvalue greater than 1. An Eigenvalue is a measure of explained variance and is useful for a factor. These eight factors highlighted more than 83.67% of the variation among the thirty variables.

[Table 9](#) displays the rotated component matrix. This matrix reveals the loadings for each item on each rotated factor. There are 30 statements that are loaded on 8 factors namely instructor's competence, accessibility, instructiveness, effectiveness, personal problems, technical problems, lack of motivation and expanding expediency.

4.3.1 Key factors. The analysis revealed that students preferred online education as compared to regular classes during pandemic. The positive factors of preferring online education was teacher's competency, accessibility, instructiveness, effectiveness; expanding expediency and the factors like personal problems, technical problems and lack of motivation, however, hinder the priorities of students toward online education.

4.3.1.1 Factor 1: Instructor's competency. As per [Table 9](#), four statements were loaded on this factor, namely, asking the students' random questions, type in a chat box, to summarize the class content and by keeping the video on. All these statements are related to ensure the active participation of students by the teachers. Hence, teachers were putting more effort into teaching through online classes. This proper feedback mechanism ensured that corrective actions could be taken by the teachers when required. [Dooly and Sadler \(2020\)](#) and [Beilstein et al. \(2020\)](#) mentioned that teachers supported students by setting up the supportive environment and also provided students with online classroom practice in these crucial circumstances.

4.3.1.2 Factor 2: Accessibility. E-learning has increased the accessibility and availability of online resources among both educators and learners. This factor consists of statements like teacher's preparation, quality of content taught and discussion upon doubts. Teachers are preparing well with good knowledge of content, i.e. theoretical as well as practical aspects and also try to take up the doubts of students online. Students stated that teachers also take up their doubts even after the online classes. Teachers adopted an interactive approach for online teaching-learning practice which enabled a constructive and pragmatic component to online education. It also focused on dealing with the problems of routine teaching practice. This value added knowledge enhanced the student participation ([Baker and Watson, 2014](#); [Luo et al., 2017](#)).

4.3.1.3 Factor 3: Instructiveness. The teachers have coped well with the digital environment and also learned this new method of teaching. Because of this pandemic, teachers also get the opportunity to learn and gain knowledge about different apps and platforms. The use of technology, to impart the academic content to students effectively and efficiently, works as an addition to previously existing knowledge of teachers. This factor is inclusive of statements like interactions among teachers and students, clarity of audio and video/images. This ensures the quality education being provided to the students. Few studies like [Ducan and Barnett \(2009\)](#), [Daniel et al. \(2016\)](#) and [Alabbassi \(2018\)](#) explored the issues related with learning aspects and technology. These studies stated that technology acted as a medium to impart the education among students effectively and efficiently. Proper knowledge must be provided to both teachers and students to use the online apps and platforms by the institutions, so that the flow of imparting uninterrupted online education can be carried on properly.

4.3.1.4 Factor 4: Effectiveness. The online mode of learning improves the effectiveness among the students as well as teachers. This factor loads the statements like easy access to online materials, learning at one's own pace, ability to record meetings and well-presented lectures by teachers, hence, named effectiveness. This mode of education is very easy to carry anytime and anywhere. The online resource-based-learning is perceived as a positive factor in achieving the learning-motive of the students. The e-learning approach enabled the teachers

to interact and teach the students with more responsibility, so that effective e-learning must be adopted. The designing and planning are the core elements to creating an effective environment (Bozkurt and Sharma, 2020).

4.3.1.5 Factor 5: Personal problems. With the advantageous version of the online-resource-based learning, it has some limitations also. The next factor included statements like decreasing interaction with teachers, poor learning environment at home and social isolation. This lockdown has also increased the household's chores which led to a poor learning environment. Students also miss their peer groups and face to face interaction with their teachers. The concept of blended education will be helpful as it has potential to enrich the experience of e-learning among students (Singh, 2020; Amita, 2020).

4.3.1.6 Factor 6: Technical problems. The use of technology in education infuses the classroom worldwide with digital learning methods and tools. But it also comes with some limitations. This factor loaded the statements like problems in choosing the best source due to flooding of resources, electricity problems, poor Internet connectivity and limited data access. It is a technical difficulty that creates the obstacles in effective teaching. Amita (2020) highlighted that learners faced various difficulties such as electricity problems, poor Internet connectivity problems and limited data usage. The proper balance between offline and online mode should be struck.

4.3.1.7 Factor 7: Lack of motivation. The statements like visual fatigues, auditory fatigues, lack of self-discipline and social isolation were deposited on this factor. Students lacked motivation as this online education mechanism also has certain drawbacks. It resulted in more mental stress and increased sleep disorders among teachers and students. It has more time-consuming classes as compared to regular classes. Students become deprived of many factors because of social isolation. There is a lack of social interaction, owing to which social life also suffered. Amita (2020) and Singh (2020) also mentioned that the more interactive sessions, continuous and active participation of both teachers and students must facilitate the purpose of online education.

4.3.1.8 Factor 8: Expanding expediency. This factor includes the statements like more solid contents, staying home in a comfortable environment, classes at flexible timings and learning with leisure. Increased use of online classes also provides easiness among the students. Because of recordings and materials availability to students, it also added to their retention power. It also offers convenience and flexibility to students. Volery and Lord (2020) mentioned that e-learning provides teachers-students, a whole new canvas to learn formal education electronically. It expanded the access, alleviating the capacity constraints and also served as a catalyst for the educational institutions for this massive transformation. This potential e-learning platform imparted lifelong learning among the students.

The present study followed the varimax method of orthogonal rotation. But to observe the association among the factors, the present study applied a direct oblimin method of oblique rotation. Table 10 reveals the correlation results among the eight factors. No prominent association found between the factors. The coefficient of correlation hovered from -0.228 to 0.329 , indicates the negligible and weak degree of correlation among factors.

Moorhouse (2020) and Zhang *et al.* (2020) explained about the problems and difficulties associated with online teaching as both teachers and students were inexperienced with the online platforms and infrastructure used for teaching. The teachers were not so proficient with this digitalization because of lack of working knowledge and limited resources and information (Huber and Helm, 2020).

Bozkurt and Sharma (2020) and Murphy (2020) highlighted the institutional efforts to provide training to teachers, so that; this pandemic should not hamper the teaching-learning process. This effective online-resource-based-learning must focus on an optimal pedagogical approach, appropriate use of tools and technology and accurate and relevant assignments to aim for achieving certain learning outcomes (Carrillo and Flores, 2020).

Table 10.
Component correlation
matrix

Components	Instructor's competency	Accessibility	Instructiveness	Effectiveness	Personal problems	Technical problems	Inefficiency of learner	Expanding expediency
Instructor's competency	1.000							
Accessibility	0.039	1.000						
Instructiveness	0.284	-0.089	1.000					
Effectiveness	0.224	-0.109	0.244	1.000				
Personal problems	-0.228	-0.111	-0.170	-0.177	1.000			
Technical problems	-0.056	-0.027	-0.014	-0.043	0.068	1.000		
Inefficiency of learner	-0.147	0.329	-0.138	-0.118	0.017	-0.003	1.000	
Expanding expediency	-0.160	-0.083	-0.038	-0.121	0.160	0.129	-0.056	1.000

Note(s): Extraction Method: Principal Component Analysis
Rotation Method: Oblimin with Kaiser Normalization

This offline to online transition has led to more advancement both in education as well as the technology sector, opening up new horizons and new platforms for teachers and students and also increased the accessibility of online materials and resources for this digital educational system (Singh, 2020). This technology drifts to teachers and learners with more proficiency to use computers and the Internet.

The main strength of online-resource-based-learning is flexibility, convenience and interactivity. Like two sides of a coin, online education has its own advantages and disadvantages. Some students prefer online classes whereas some give priority to regular classes. The suggestions were also invited from the students to increase the effectiveness of online classes. It was stated by the participants that proper monitoring and follow up must be there to make online class as effective as offline class.

Teachers all over the world made an extraordinary effort with the aid of the Internet to teach their students to learn from home. The deadly corona virus forced the institutions to adopt the online mode and accept the technology to which they were reluctant to change earlier. This catastrophe showed the educational institution the productive side of e-learning. The large number of students interacted at flexible time periods. The main problem is related to quality assurance. There must be improved infrastructure to provide unhindered services to make online education successful to the fullest (Dhawan, 2020). COVID-19 has become a mechanism for educational institutions globally to explore for more innovative solutions in a relatively shorter time period (Kumar, 2020).

More such innovative systems will grow in India over the next few years because of the adoption of online education. These online players will move toward the blended innovative and inclusive educational solutions. To make online-resource-based teaching-learning practice more effective, we need to focus on using technology more efficiently and effectively. The merits and demerits need to be weighted properly about using online platforms to facilitate education. This current pandemic forced the educational institutions to adapt to this sudden transition and both teachers and students faced some difficulties with their online methods. This recent opportunity also brought the number of constraints and challenges for both teachers and students as well.

5. Conclusion

The Government made all efforts to prevent the spread of the corona virus pandemic. Among other steps, the government suspended classroom teaching and started promoting e-learning platforms. This online teaching-learning approach becomes the constructive and advantageous method to achieve academic excellence. The educational institutes and universities have adopted this e-learning platform to impart the education. Through the adoption of online teaching, an attempt has been made to minimize the loss of students and stress among students. Approximately 90% of the teachers and students had converted their classrooms to online mode during the present time. Remaining 10% students were not meeting online classes because of poor Internet connectivity and absence of smart phones as they belonged to poor families. Moreover, this sudden transition from regular mode to virtual classes was not easy for students as well as teachers.

The present paper observed the perception of students of higher education in Punjab on the sudden online transition amid the pandemic. The survey was conducted on 200 students from different regions of Punjab, through a comprehensive and well-trained questionnaire. This questionnaire covered 30 statements related to online education. The study adopted factor analysis method to identify the various factors. The positive factors of preferring online education is instructor's competence, accessibility, instructiveness, effectiveness; expanding expediency; and the factors like personal problems, technical problems and lack of motivation hinder the priorities of students toward online education.

In a nutshell, we can conclude that both online and offline modes of teaching-learning process have its own pros and cons as per needs of the students. In the light of above discussion and from the viewpoints of learners, following policy implications can be derived in this context:

- (1) At the outset, students must be trained about the usage of the various modes of e-learning platform.
- (2) Teachers need to boost up the morale of students during the period of COVID-19 and should create their interest toward online learning by building a personal connection with them.
- (3) Monitoring of the students must be done and students should be encouraged to actively participate in the e-learning process by providing them the opportunities to share their opinions.
- (4) A reliable and well-structured infrastructure and technical support must be provided to teachers as well as students.
- (5) The study highlighted the fact that blended mode of both online and offline teaching be used for effective and efficient teaching-learning process (almost half of the respondents prefer online mode whereas the other half opted for offline).

In Punjab, there is a need to improve the infrastructure facilities, development of accessibility of the Internet in remote areas and improve Internet connectivity. The learner-centered approach should be followed to ensure the active participation of the students. The online process of imparting education comes with many advantages but facilitating the regular mode of teaching is not fully replaceable in Punjab. There is a need to adopt both the systems and also corrective measures should be taken to overcome the obstacles of both online and offline mode of education.

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6. Please rate the following:

S.No	Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Asking Random Questions					
2	Interactions					
3	Asking to type in Chat box					
4	Ability to record the meeting					
5	Staying Home with comfortable surrounding					
6	Discussion of Doubts					
7	Ask the students to summarise the class					
8	Lack of self-discipline					
9	Ask to keep video on					
10	Teachers' Preparation					
11	Poor learning environment at home					
12	Lack of Motivation					
13	Quality of Content taught					
14	Easy Access to online materials					
15	Reducing interaction with teachers					
16	Social Isolation					
17	Clarity of Audio					
18	Learning at own pace					
19	Problem in choosing best source to retrieve information					
20	Electricity Problem					
21	Lack of sufficient data					
22	Lack of adequate technical skills					
23	Information was well presented					
24	Poor Internet Connectivity Problem					
25	Clarity of Video/ Image					
26	More retention power of students					
27	Flexibility in timings					
28	Learn at leisure					
29	Visual fatigues					
30	Auditory Fatigue					

15. Any Recommendation

- _____
- _____
- _____
- _____
- _____