



# PERCEPTION OF STUDENTS FOR ONLINE LEARNING DURING THE COVID 19 BREAKDOWN- A FACTOR ANALYSIS APPROACH

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**Abstract:** Role of ICT in education is commendable from the very beginning. But the recent scenario has actually made it important for the countries facing covid19 pandemic to enhance this facility for their students. Several Edu-tech platforms are playing their role effectively to facilitate online learning with the collaboration of teacher and the students. But it will only lead to better result if the students are actually learning during this process. Hence, it becomes very important to know the perception of the students for online learning. This research article highlights the major factors affecting the student's experience of online learning. For this questionnaires are filled by 110 students and responses collected are analysed using principle component analysis. As a result we came across major four factors effecting the perception of students towards online learning and also Covid 19 has significant impact on the number of students engaged in online learning.

## INTRODUCTION

Today everything is going through a huge transformation and this is because of information technology that has changed the way of doing the work. The generation 'Z' is having supersonic brains and understands technology in a much better way than their parents and grandparents. They are active learners not the passive that is why they participate in class and enjoy interactive learning process. India on this account reflects largest younger population in the world and that is why known as young country. This urged eminent educationists and policy makers to invest in education sector with their innovative and contemporary policies like happiness curriculum, CCE and others. Online learning is the most frequent among all of these. Covid19 pandemic has also affected the trend of students shifting to e-learning but there are several factors that influence the perception of students towards these online learning platforms. Current research paper addresses this question and is segmented in five sections. First section introduces the topic and provides a brief meaning of online learning. Second section outlines review of literature and third section describes research methodology. Fourth section covers the interpretation part and last comes conclusion.

**Keywords:** Online learning, ICT, Covid 19 etc.

## Section II

### REVIEW OF LITERATURE

Online learning is the form of education in which the learners and the educators are engaged in the process of learning using computers through internet. It is well established learning paradigm which has both theoretical and practical appeals (*Shai Shalev- Shwartz, 2012*). It is also known as E-learning, blended learning or virtual learning. The major advantage of this is the flexibility and convenience they offer. Online learning aims to deliver effective instruction that takes into consideration the motivational factors involved in the learning process (*Cocea, M., & Weibelzahl, S. 2010*). It is normally a used criteria of providing education in developed countries like USA where about 22% students pursue their studies through online mode and opt for online courses. In developing countries also the trend is changing and in India the adoption rate of internet services is quite higher than the other nations which highlights that online learning is rooting its existence in the developing countries also.

*Bolliger & Wasilik (2009)* in their study came up with the factors influencing "Faculty Satisfaction with Online Teaching and Learning in Higher Education". The research was mainly based on the data collection instrument to analyse the factors affect satisfaction of faculty in

the online environment. For the purpose of the study a sample of 122 respondents were considered. They were provided by a complete questionnaire by logging into a secure server. For the analytical study, the statistical assumptions i.e. Sample Size Adequacy, Outliers, linearity, Multicollinearity and Singularity had been checked along with Factor Analysis. The study concluded that students and teachers are two pillars of quality in online education. If students' outcomes are positively highly correlated with faculty satisfaction then, administrators have to pay attention to faculty satisfaction, because there may be an interaction effect. *Anna.Ya Ni (2013)* in the study "The Effectiveness of Classroom and Online Learning". The impact of learning environments in relation to learning outcomes has constantly been explored and attempts to identify the link between online interaction and student performance. Hereby, stated that greater online interaction was not significantly associated with higher performance of students achieving passing grades. For the purpose of the study, to compare student performance in online and face to face classes 152 respondents were considered for the study. For the analytical study, the correlation statistical method was taken into consideration. The results of the study stated that student performance may be less threatening and the quality of interaction may be increased in online classes. *Fedynich et al. (2015)* in their study "The Perception of graduate students on Online Learning". Emphasized on the importance of student needs and perception should be considered central in designing, developing and delivering online courses. The descriptive study involved an analysis of 249 graduate students' perspectives on online instruction. Findings from the study indicated that interaction between students and with the instructor has an utmost impact on online learning and their satisfaction. The analysis none of the less showed that instructor's role was identified as being vitally important to student's satisfaction. *Kim et al. (2005)* the purpose of the study was to gain insight into the "Perception of MBA Students towards Online Learning". The present study is the data collection instrument to analyse the perception of the benefits and challenges in online learning and their suggestion for improving the quality of the online program. The present study reports the results of a case study in which 100 students were enrolled. For the analytical study, a mixed – method research design was employed to investigate both qualitative and quantitative perspectives. The study concluded that the results of correlation analysis revealed that student's satisfaction with online courses was positively correlated with variables i.e.  $p < .05$ . The students exhibited positive attitude toward the online learning environment in general. *Singleton et al. (2004)* this study was designed to investigate the "Learner's Perception of Online Learning". This surveyed was to identify helpful components and perceived challenges based on their online learning experiences. The review focuses on learner's perspective of strengths and weaknesses related to online learning. The purpose of the study was to investigate the components of online learning environment considering 76 respondents, who have successfully filled and submitted the questionnaire. The study concludes that most learners agreed the course design and majority of the participants identified the online learning components as comfortable and helpful. *Robinson & Hullinger (2008)* the purpose of the study was to gain insights into the "New Benchmark in Higher Education in Online Learning". The research was mainly based on the data collection instrument to analyze the relationship between student engagement and online learning. For the purpose of study 201 respondents were considered and administered by questionnaire related their experiences online learning environment. This study uses variety of different scales and even scores were converted to a 10- point numeric scale. This study concluded that online students reported higher levels of engagement, active and collaborative learning, and enriching educational experience. *Muilenburg & Berge (2005)* in their study reports the exploratory factor analysis that determined "The Students Barriers to Online Learning". This study was aimed to seek out barriers, issues and success factors from the student's perspective that may affect the learning outcomes. For the purpose of the study 1056 survey respondents were provided by questionnaire, and Factor Analysis was implied for the analytical study, along with ANOVAs and POST – HOC pair wise comparison was conducted. This study concluded that learning in the online classroom environment due their lack of technical skills and academic skills are very obstacles to learning online. *Ashong & Commander(2012)* conducted study to gain insights into the "Impact of Ethnicity and Gender on Perception of Online Learning". For the purpose of this study 120 students were enrolled and these respondents were presented a dual format measure that allows students to rate "actual" online environment and "preferred" online environment. The research data analysed through calculating means and standard deviations again ANOVA, follow –up tests to the MANOVA. This study concluded that indicative of highly positive perceptions of online learning across ethnicity and gender; additionally reinforce the need to consider prior and current online perception of students towards online learning. *Wang et al. (2013)* the purpose of this study was to examine the "Relationship among Students Characteristics Self-regulated Learning, Technology, Self-Efficacy and Course Outcomes in Learning. For the purpose of the study 256 respondents participated, completed questionnaire. For the analytical study the researchers used structural equation modeling to examine relationship among various variables. The study concluded that the institutions should provide user- friendly online learning platforms.

### Section III RESEARCH METHODOLOGY

The concerned study is based on primary data collected from random sample of 110 students. The data is collected by questionnaire having ordinal scale (five point likert scale is used). After collecting the data the analysis is done on the basis of Principle Component Matrix (Factor Analysis). Also the impact of Covid 19 on the frequency of students using online learning is also highlighted.

## Section IV INTERPRETATION

Before the major interpretation following are the demographics about the data collected via questionnaires:

- **Gender**

	Frequency	Percent	Valid Percent	Cumulative Percent
male	39	35.5	35.5	35.5
female	71	64.5	64.5	100.0
Total	110	100.0	100.0	

- **Age**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 20 or under	56	50.9	50.9	50.9
Valid 21 to 30	54	49.1	49.1	100.0
Total	110	100.0	100.0	

- **Qualification**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Below Graduate	53	48.2	48.2	48.2
Valid Graduate	26	23.6	23.6	71.8
Valid Post Graduate	29	26.4	26.4	98.2
Valid Others	2	1.8	1.8	100.0
Total	110	100.0	100.0	

- **Area**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rural	28	25.5	25.5	25.5
Valid urban	82	74.5	74.5	100.0
Total	110	100.0	100.0	

### IMPACT OF COVID 19 ON ONLINE LEARNING:

- The pandemic of corona virus has made everything to come on standstill. Education across the world has also faced a big threat because of current status of lockdowns in most of the countries. Schools and colleges have been shut. Various entrance exams have been postponed. As per UNESCO Report on corona virus effect on education highlights that around 32 crore students in India (
- The problem comes in way is the infrastructure as per the recent report of TRAI only half of the country population is having access to the decent standard of internet and moreover all educational institutions are not well enough to deliver education online. This represents a problematic situation in front of us.
- But the positive side is that the students who are having all the needed things required and especially a smart phone with internet connectivity are happy and contented with the quality of education because they feel that they can engage in more better way by using these platforms.
- Moreover, the current study also reveals that the number of students using online platform for learning have significantly increased after the Covid 19 breakdown. this is revealed by following table:

	No. of students using online platform (pre Covid era)	No. of students using online platform (Covid era)	% Change
USING	74	106	39.19
NOT USING	36	04	88.88
TOTAL= 110	110	110	

BYJU'S sees 6 million new students: BYJU'S has registered an increase of 150 per cent in the number of new students on the app after the nationwide lockdown was placed in India. Over 6 million new students have started using this app in March 2020. All such trends display that the students are gradually turning their traditional learning habits to the modern online learning practices.

#### ANALYSIS OF DIFFERENT FACTORS AFFECTING THE PERCEPTION OF STUDENTS FOR ONLINE LEARNING:

For extracting the factors that majorly describes the perception of the students towards online learning, principle component matrix has been used which is also known as factor analysis. The questionnaire having 24 questions is prepared and filled by the respondents marking responses on five point likert scale. Following are the results:

- **Test of Reliability:** Before starting with the dimensions reduction technique reliability test 'Cronbach's Alpha' is applied to check that whether the questions are reliable with the dimension needed to be checked. Following are the results:

#### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.832	.825	20

The Cronbach's Alpha value is .832 which indicates a high level of internal consistency for our scale. The value of Cronbach's Alpha is greater than 0.7 which indicates that the data is consistent and reliable for running Factor Analysis.

- **Item Statistics**

	Mean	Std. Deviation	N
@1 Online teaching leads to adequate communication between students and teachers.	2.98	1.165	110
@2 In online teaching discussion is possible.	2.70	1.162	110
@3 Online teaching makes learning course material better.	2.72	1.142	110
@4 In online teaching there is difficulty in non-verbal communication.	3.67	.910	110
@5 In online classes you need competent technology.	3.84	.963	110
@6 In online classes' access to email makes it easier to communicate with teachers.	3.12	1.115	110
@7 It is comfortable responding to questions by email.	2.79	1.134	110
@8 Online teaching helps improving technical skills.	3.09	1.177	110
@9 Online teaching has an interesting screen design.	2.95	1.164	110
@ 10 It is fun to use the online learning apps.	3.01	1.121	110
@ 11 Online learning apps take short time to learn.	2.95	1.252	110
@ 12 I am comfortable communicating electronically.	3.25	1.094	110
@ 13 I am comfortable with written communication.	3.26	1.106	110
@ 14 Online learning presents data in a meaningful way.	3.10	1.092	110
@ 15 Online learning provides wide range of learning options.	3.43	.903	110
@ 16 In online teaching queries are held in timely manner.	2.87	1.041	110

@ 17 Learning through online apps are more complex.	3.57	1.079	110
@ 18 Online teaching lacks adequate time to revise online classes.	3.73	1.116	110
@ 19 Developing online learning can be complicated.	3.52	.974	110
@ 20 In online teaching absence of face to face interaction is disadvantage for students.	3.71	1.168	110

• **Test Of Applicability –**

The test of applicability before applying the factor analysis it is very important to check because it satisfies that whether the factor analysis can be applied to the data. For this KMO and Barlett's test is used.

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.852
Approx. Chi-Square	1597.937
Bartlett's Test of Sphericity Df	190
Sig.	.000

Kaiser - meyer – olkin (KMO) – KMO test shows the adequacy of the sample size. The Kaiser Meyer Olkin measure of sampling adequacy is an index used to examine the appropriateness of factor analysis. The value of KMO is more than 0.7 i.e. 0.852 which shows that the sample size is adequate and good for running the factor analysis. Barlett's Test of Sphericity- Barlett's Test shows the correlation in the data. The Null Hypothesis is that there is no correlation in the data. Whereas the alternate hypothesis is that there is correlation in the data. The Sig. value is less than 0.5, which shows that the null hypothesis is rejected, meaning thereby that there is correlation in the data and the data is appropriate for running the factor analysis.

**Communalities**

	Initial	Extraction
@ 1 Online teaching leads to adequate communication between students and teachers.	1.000	.547
@2 In online teaching discussion is possible.	1.000	.851
@ 3 Online teaching makes learning course material better.	1.000	.866
@ 4 In online teaching there is difficulty in non-verbal communication.	1.000	.629
@ 5 In online classes you need competent technology.	1.000	.410
@ 6 In online classes' access to email make it easier to communicate with teachers.	1.000	.596
@ 7 It is comfortable responding to questions by email.	1.000	.568
@ 8 Online teaching helps improving technical skills.	1.000	.596
@ 9 Online teaching has an interesting screen design.	1.000	.692
@ 10 It is fun to use the online learning apps.	1.000	.612
@ 11 Online learning apps take short time to learn.	1.000	.629
@ 12 I am comfortable communicating electronically.	1.000	.889
@ 13 I am comfortable with written communication.	1.000	.884
@ 14 Online learning presents data in a meaningful way.	1.000	.712
@ 15 Online learning provides wide range of learning options.	1.000	.584

@ 16 In online teaching queries are held in timely manner.	1.000	.627
@ 17 Learning through online apps are more complex.	1.000	.648
@ 18 Online teaching lacks adequate time to revise online classes.	1.000	.539
@ 19 Developing online learning can be complicated.	1.000	.515
@ 20 In online teaching absence of face to face interaction is disadvantage for students.	1.000	.613

Extraction Method: Principal Component Analysis.

### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.834	39.170	39.170	7.834	39.170	39.170	4.755	23.777	23.777
2	2.573	12.866	52.036	2.573	12.866	52.036	3.669	18.343	42.120
3	1.372	6.860	58.896	1.372	6.860	58.896	2.851	14.257	56.378
4	1.227	6.133	65.030	1.227	6.133	65.030	1.730	8.652	65.030
5	.925	4.623	69.653						
6	.843	4.215	73.868						
7	.727	3.637	77.505						
8	.630	3.148	80.653						
9	.555	2.775	83.428						
10	.552	2.758	86.186						
11	.533	2.663	88.849						
12	.414	2.069	90.918						
13	.406	2.029	92.947						
14	.340	1.700	94.647						
15	.316	1.580	96.226						
16	.281	1.403	97.629						
17	.242	1.211	98.840						
18	.197	.985	99.825						
19	.019	.094	99.919						
20	.016	.081	100.000						

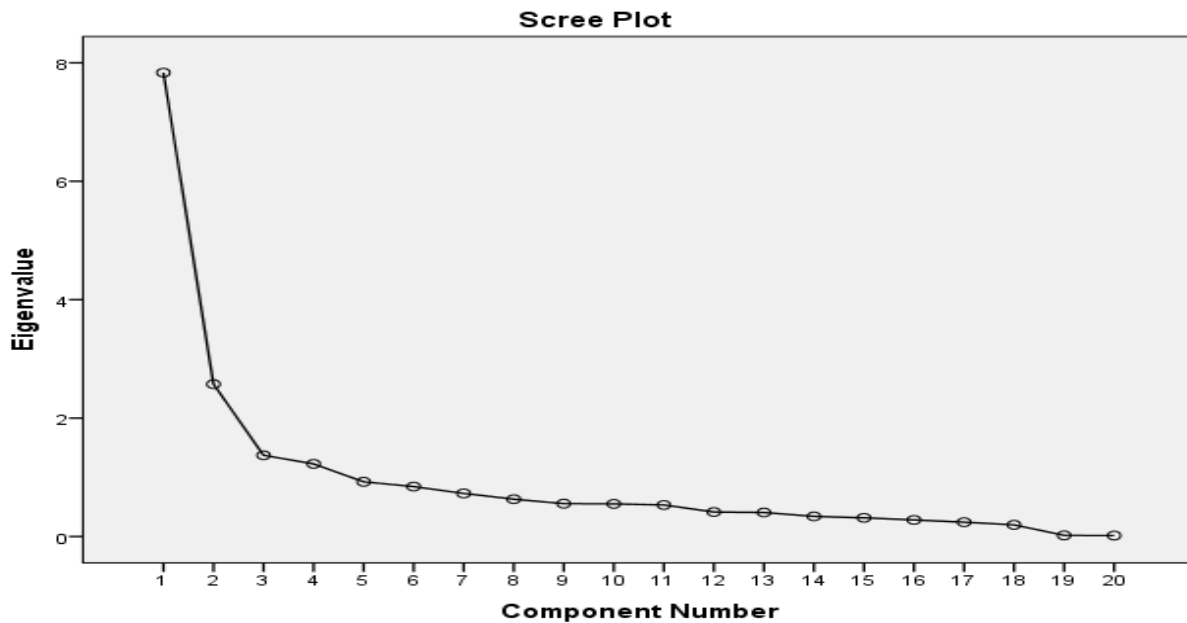
The total variance is explained by a total of 4 factors and the cumulative frequency comes to be 65.030% the rest of variance is 34.97% is due to some unknown factors.

FACTOR 1: The variance explained by Factor 1 is 39.170%

FACTOR 2: The variance explained by Factor 2 is 12.866%

FACTOR 3: The variance explained by Factor 3 is 6.860%

FACTOR 4: The variance explained by Factor 4 is 6.133%



The graph of Scree plot helps to extract the factors describing most of the components. It is a plot of total variance explained by each component. The numbers of components are equal to the number of variable. From the above figure it is clear that we have to retain four factors above the inflection point

**Rotated Component Matrix<sup>a</sup>**

	Component			
	1	2	3	4
@ 1 Online teaching leads to adequate communication between students and teachers.	<b>.576</b>	.433		
@ 2 In online teaching discussion is possible.	<b>.887</b>			
@ 3 Online teaching makes learning course material better.	<b>.888</b>			
@ 4 In online teaching there is difficulty in non-verbal communication.			<b>.765</b>	
@ 5 In online classes you need competent technology.				<b>.604</b>
@ 6 In online classes' access to email make it easier to communicate with teachers.	<b>.669</b>			
@ 7 It is comfortable responding to questions by email.	<b>.583</b>	.443		
@ 8 Online teaching helps improving technical skills.	<b>.562</b>	.482		
@ 9 Online teaching has an interesting screen design.	.500	<b>.541</b>		
@ 10 It is fun to use the online learning apps.		.441	<b>-.574</b>	
@ 11 Online learning apps take short time to learn.	<b>.553</b>	.417		
@ 12 I am comfortable communicating electronically.		<b>.907</b>		
@ 13 I am comfortable with written communication.		<b>.915</b>		
@ 14 Online learning presents data in a meaningful way.	.422	<b>.576</b>		
@ 15 Online learning provides wide range of learning options.	<b>.425</b>		-.422	
@ 16 In online teaching queries are held in timely manner.	<b>.738</b>			

@ 17 Learning through online apps are more complex.			.727	
@ 18 Online teaching lacks adequate time to revise online classes.				.596
@ 19 Developing online learning can be complicated.			.665	
@ 20 In online teaching absence of face to face interaction is disadvantage for students.				.670

Rotated component matrix is the major part that shows how the retained, rotated components load on each variable. The complex structure of rotated component matrix needs to be structured in simple form. Simple structure means that each variable has only one component that strongly loads on it and after it the final matrix starts making sense. By taking into account the rotated component matrix following are the major variables derived.

FACTOR	VARIABLES	LOADING
<b>Effectiveness of teacher and students' interaction</b>	Online teaching to adequate communication between teachers and students.	0.576
	In online teaching discussion is possible.	0.877
	Online teaching makes learning course material better.	0.888
	In online classes access to email makes it easier to communicate with teachers.	0.669
	It is comfortable responding to questions by email.	0.583
	Online teaching helps improving technical skills.	0.562
	Online learning apps take short time to learn.	0.553
Online learning provides wide range of learning options.	0.425	
In Online Teaching queries are held in timely manner.	0.738	
<b>User friendly and effective interface</b>	Online teaching has an Interesting screen design.	0.541
	It is fun to use the online Learning app.	0.441
	I am comfortable Communicating electronically.	0.907



	I am comfortable with written Communication.	0.915
	Online learning presents data In a meaningful way.	0.576
<b>Complexity of learning process</b>	In online teaching there is difficulty in non-verbal communication.	0.765
	Learning through online apps are more complex.	0.727
	Developing Online learning can be complicated.	0.665
<b>Technical proficiency</b>	In online classes you need competent Technology.	0.604
	Online teaching lacks adequate time to revise online classes.	0.596
	In online teaching absence of face to face interaction is disadvantage for students.	0.67

#### FACTOR EXPLAINED

##### ➤ **FACTOR 1: Effectiveness Of Teacher And Students' Interaction:**

As per the study this is considered to be the most important factor as it explains 23.77% of the total variance. The factor suggests that a favourable perception of students for online learning depends upon interaction and feedback procedures of learners and the teacher. That means online learning can become more effective only if students and teachers interact together and the queries of the learners are answered otherwise it will all go vague.

➤ **FACTOR 2: User Friendly and Effective Interface:** Another factor that impact students' perception is the user friendly interface of the online learning platforms and this accounts for 18.34% variance. The students' perspective it has revealed that more students find it effective to learn on online platforms because of interesting screen design, pictorial representation along with audio and effects. That is why in our study also 44.5% students are using Google classroom and 26% are using zoom app and this is just because of effectiveness and easy to use interface of these platforms.

➤ **FACTOR 3: Complexity of the Learning Process:** This factor contributes to 14.26% of total variance. This implies that students' perception for online learning depends upon the complexities and challenges faced during the learning process; this includes complex and difficult interface or any other matter. More complex learning process and usage of sophisticated interfaces hinders the smooth flow of online learning in the country like India.

➤ **FACTOR 4: Technical Proficiency:** The fourth factor affecting the online learning among students is the technical proficiency explaining 8.65% of the total variance. Those users who are tech savvy are having positive perception about the online learning process than those who are not very efficient in using these technical online media. Moreover this also indicates the adequate infrastructure needed to run these online learning platforms. In India, heavy reliability on online platforms of learning can't be made because only half of the young population is having enough reach to this cloud learning sources.

## Section V CONCLUSION

Thus, the study concludes that after the outbreak of corona virus the online learning has been significantly affected. This situation of pandemic has motivated India to focus on these virtual platforms not for the sake of activities but as a part of curriculum. This has brought dynamic change in the numbers of students using online learning platforms. There are about four major factors affecting the perception of the students towards e learning platforms, these are: effectiveness of teacher and students interaction, user friendly and effective interface, complexity of the learning process and technical proficiency needed to operate these platforms. There can be more aspects to refer the student's perception and more indepth analysis can be possible if the sample size increases. Hence, if we want to enhance the effectiveness of online learning it is important to focus on feedback, infrastructure requirements and catering the complexities and difficulties arising during the process.

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