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DIGITAL DIVIDE: ANALYSING PERCEPTION OF ONLINE LEARNING ACROSS DIFFERENT GROUPS

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Abstract. This study aims to explore the key factors influencing students' perceptions and preferences regarding online learning during the COVID-19 pandemic. A primary data collection method was employed, yielding 109 responses from students in the Delhi NCR region through snowball sampling. After data screening, 89 valid responses were subjected to further statistical analysis. The results identify four major perceptual factors affecting students' preference for online classes. Among these, psychological factors exert the strongest influence, while understandability-related aspects have a relatively minimal impact. The study also reveals that a limited number of students exhibit a preference for online learning. The identified factors provide meaningful insights into how students engage with online education, offering a foundation for policymakers and educational institutions to design more effective, student-centered online learning frameworks that enhance motivation and acceptance. This study offers a novel contribution by examining a multidimensional set of factors across varied student groups, including school, undergraduate, and postgraduate levels, to better understand the determinants of online learning preference.

Keywords: Online learning, Perceptual Factors, Student Preference, Psychological Influence, Empirical Analysis.

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1. Introduction

The COVID-19 pandemic, which began in early 2020, caused a global upheaval with profound impacts on mental, social, economic, and educational systems. Looking back, it is evident how dramatically the world transformed within a short span. During the initial lockdowns, when roads emptied, offices shut down, and schools fell silent, it felt as though the world had come to a halt. However, human resilience and adaptability quickly came to the forefront. Individuals and institutions began embracing digital technologies to continue working, socializing, and learning amid the crisis.

One of the most significant and lasting changes brought about by the pandemic has been in the field of education. Traditional classroom teaching rapidly transitioned to online learning, a shift that was once considered supplementary but became the primary mode of instruction almost overnight. Platforms such as Zoom, Google Meet, Microsoft Teams, and WhatsApp video conferencing became the new classrooms, helping schools and colleges avoid academic disruptions.

Now, more than five years later, the influence of this sudden digital shift continues to shape educational practices. While the emergency phase of online learning has passed, hybrid and fully digital modes of education remain integral components of many institutions. This raises important and enduring questions: How effective is online learning from the students' perspective? How motivated are students to participate in digital classrooms? And what factors shape their perception and engagement?

This study aims to explore **students' self-motivation and perception toward online classes** across different academic levels, namely secondary school, undergraduate, and postgraduate students. Although online learning existed before the pandemic, its widespread adoption—whether voluntary or enforced—has brought new challenges and opportunities that merit deeper investigation(Rahman et al., 2023).

To provide context and a comprehensive understanding, this research draws upon a range of academic literature and previously conducted studies. By analyzing the experiences and attitudes of students, this paper seeks to contribute to the ongoing conversation about the role and future of online education in a post-pandemic world.

So, for studying and analysing this topic, firstly we have done the literature study in section 2 whose aim is to organise similar research to better understand the characteristics as well as the connections between the applied concepts. The third section looks at the objectives of the research and the research hypothesis. The fourth section looks into the research

design being applied whereas the fifth section describes the data being used to find the results. The results of statistical analyses are contained in sections 6 and 7 conclude the study. The last section poses the limitation as well as raises some questions for future research.

2. **Literature Review**

The transition to online education has significantly reshaped students' perceptions of learning, with various factors influencing their experiences and preferences. Various factors have been identified influencing students' perception to online learning, including self-directed learning abilities, technological self-efficacy, and communication skills. Research using self-determination theory highlights that intrinsic factors such as autonomy, competence, and relatedness are fundamental in driving students' motivation to engage in online environments (Ojo et al., 2024). This framework suggests that students' confidence in using technology and their ability to communicate effectively in online settings are crucial to their engagement with online learning. As the self-efficacy of students' increases, their perception related to online learning also modifies which motivates them to learn via online methods (Ojo et al., 2024).

Students' engagement is influenced by both extrinsic and intrinsic factors with online education. Intrinsic motivation, tied to students' needs for autonomy and competence, is crucial for determining how actively students engage with online learning. Inclusion of various activities lie learning based quizzes and group work help to gain students' engagement and reduce stress in virtual environments (Rahman et al., 2023). These strategies help alleviate the anxiety many students experience in virtual classrooms. However, extrinsic motivation—such as career prospects and external rewards—has been found to be a stronger driver for students in fields like optometry, where academic success is directly tied to future career opportunities (Naipal et al., 2024).

There also exists inconsistency in the response of students belonging to different groups to online learning. Research comparing urban and rural students found that urban students were generally more receptive to online learning, likely due to greater access to technology and resources (Bast, 2021). Similarly, studies focusing on women engineering students revealed that their academic plans and learning styles were influenced by the online format, emphasizing the need for greater peer interaction (Sung and Huang, 2024). These findings underscore the role of demographic factors in shaping online learning preferences and motivation levels.

Peer learning has been identified as another factor that can improve online learning experiences. In studies on flipped classrooms, the integration of peer learning strategies significantly increased students' motivation, participation, and feedback, even in the face of challenges like technological anxiety (Li and Huang, 2023). This suggests that peer interactions are essential for creating a sense of community in online education, which can reduce feelings of isolation and foster greater engagement.

The effectiveness of online learning platforms has been a subject of significant exploration, particularly during the COVID-19 pandemic. Despite facing technological challenges, students generally maintained a positive attitude toward online learning, appreciating its flexibility. A study in Bangladesh on higher secondary students highlighted that factors such as platform usability, effectiveness, and motivation were critical in shaping students' perceptions of online education (Rahman et al., 2023). Furthermore, in an online physiology lab, students who were assigned group work reported higher feelings of belonging, competence-related beliefs, and lower psychological costs compared to students who worked alone. This demonstrates that group work can foster an inclusive learning environment and enhance student motivation (Wilson et al., 2024).

The role of instructors and their interactions with students is another critical factor influencing online learning outcomes. Research conducted during the pandemic revealed that increased interaction between students and instructors led to higher motivation and satisfaction with online courses. Interestingly, female students, in particular, reported greater satisfaction from these interactions than their male counterparts, emphasizing the importance of fostering inclusive and interactive learning environments (Thanasi-Boçe, 2021).

Regarding students' preferences for online versus offline learning post-pandemic, many students expressed a preference for continuing online education, citing greater alertness, satisfaction, and academic success in the online setting. Emotional factors, such as fear of infection, also shaped students' preference for online learning, contributing to a growing inclination towards e-learning platforms (Rahman et al., 2023). These studies highlight that motivation, technological efficacy, learning environment satisfaction, and emotional resilience are significant factors influencing students' preference for online classes.

Research suggests that blended learning, which combines online and in-person instruction, has also been explored as a potential model for online education. Both students and instructors recognized the importance of designing effective blended learning experiences, but studies indicated that educators needed professional development to create more interactive and motivating online courses. A study on English language courses

highlighted that while both students and teachers were open to blended learning, improvements in course design are mandatory to improve motivation among students. (Tongpoon-Patanasorn and White, 2020).

In addition to traditional self-report data, newer methods like tracking online learning behavior are being used to gain a more comprehensive understanding of motivation and learning strategies. A study on self-regulated learning combining self-reports and online trace data found that while self-reports capture students' perceptions of motivation, online traces provide deeper insights into academic performance, offering a more holistic understanding of student engagement (van Halem et al., 2020).

Also, studies on various aspects of online learning highlight its potential for enhancing student motivation and engagement across disciplines. For instance, research on the use of storytelling in online education showed that narrative techniques could significantly increase student motivation, particularly in complex subjects like computer security (Arnedo-Moreno and Garcia-Font, 2021). Moreover, the use of video cameras in synchronous online learning has been found to increase social presence, cooperation, and self-discipline, thus fostering better student-teacher relationships and greater motivation (Sederevičiūtė-Pačiauskienė et al., 2022).

The transition to online learning has reshaped how students perceive and engage with education. The literature reveals that factors such as self-efficacy, peer interactions, instructor engagement, and emotional factors significantly impact student motivation and learning outcomes. As online learning continues to evolve, understanding these factors is crucial for optimizing educational experiences and ensuring that students remain motivated and engaged in virtual learning environments.

Objectives of the Study:

(1) To identify the different factors affecting the perception of students related to online classes.

(2) To assess level of consistency among different classes attending online classes.

(3) To find the motivation level among different class groups while attending online classes. Hypothesis:

H_{01}**:** There exists no relationship between perceptual factors and preference for online classes.

H_{02}**:** There exists a relationship between perceptual factors and preference for e-classes.

Research Design: The agenda of this study is to know the perception of different groups for online classes. To carry out research primary data collection is being done. The primary data was collected from 109 respondents. For data collection, a structured questionnaire was designed. Google forms were sent to more than 115 individuals through WhatsApp, studying in DELHI NCR. Convenient Sampling and Snowball Sampling are being used for the collection of data. Out of 109 responses, only 88 responses were accepted after stage 1 of filling out the questionnaire and the rest were rejected because of non-exposure to online classes. First different demographic characteristics have been classified. Factor Analysis is used to recognise several factors affecting the perception of different groups for online classes. For this, SPSS software was used. At last regression analysis was used for analysing the relationship between different factors and perception for online classes.

3. Results, Data Analysis and Discussion

Profile of Respondents:

Primary Data is collected from 109 respondents, out of 109 respondents 67.9% are female. Out of the total respondents, 33% are between 21 to 23 years old whereas only 3.7% individuals are below 15. The different groups selected to carry on research are almost nearly 30% except for other groups including working individuals, professional course-pursuing individuals, etc. More than 80% have first experienced e-learning during a pandemic, which is a huge percentage of individuals.

PREFERENCES- 1 platform used by the institute

Maximum number of institutes use Google Meet (79.5%) for e-learning, then Microsoft Teams (18.2%) and so on.

The mean scores of these factors lie between 4.01 to 1.71. To understand, how these factors affect the perception of different groups, factor analysis was used.

Factor Analysis: To access the factors affecting the perception of different groups, factor analysis is being used. Firstly, for checking internal consistency, Cronbach's Alpha is used for all the factors. At first, Cronbach's Alpha is calculated stage-wise. The value of Cronbach's Alpha for each stage was more than 0.6. And if the value of Cronbach's Alpha is coming out to be greater than 0.6 then it is regarded as reliable. Since the Alpha value

Demographics		**Frequency**	**Percentage (%)**
GENDER	Male	33	30.3
	Female	74	67.9
	Prefer Not to Say	2	1.8
AGE	Below 15	4	3.7
	15 to 18	34	31.2
	19 to 21	25	22.9
	21 to 23	36	33
	Above 23	10	9.2
DIFFERENT GROUPS	Secondary Education	33	30.3
	Graduation	38	34.9
	Post-Graduation	30	27.5
	Others	8	7.33
TIME OF FIRST EXPOSURE (stage 2 88 respondents)	Before Pandemic	11	12.5
	During Pandemic	77	87.5

Table 1. **Demographic Profile of the Respondents (Source: Primary Data)**

is more than the threshold limit specified, this scale is suitable to recognize the factors. For ascertaining the sample adequacy, Bartlett's test of sphericity and Kaiser-Mayer-Ohlin measure were calculated.

Bartlett's sphericity test is significant as p=.000 and the Kaiser-Meyer-Olkin measure has a value of .627 which is greater than .6. The method used to identify factors is Rotation Method.

Table 2. **Descriptive Analysis of the Variables**

S. No.	Statement	Mean	Standard Deviation
ST1.1	I am curious to attend online classes	2.59	1.095
ST1.2	I prefer to keep my camera on during the classes	4.01	1.156
ST1.3	I can easily understand the topics taught by the teacher	2.55	0.985
ST1.4	I reply to the teacher's questions during the class	2.39	1.185
ST1.5	I feel too shy to ask my doubts in class	3.34	1.292
ST1.6	The teacher immediately responds to my doubts	1.71	0.951
ST2.1	There are minimum attendance criteria, in the courses I have enrolled till now	2.77	1.515
ST2.2	I always take classes in a quiet atmosphere	2.13	1.043
ST2.3	I feel left out during class discussions	3.36	1.161
ST2.4	I prefer to get recorded classes rather than live one	3.24	1.54
ST2.5	I make handwritten notes during the class	2.23	1.264
ST2.6	I open books on specific subjects while attending online classes	2.36	1.32
ST2.7	I tend to do other activities after joining the class	3.15	1.281
ST2.8	I avoid morning lectures	3.6	1.351
ST2.9	I prefer to join classes a few minutes before the scheduled time	2.55	1.516
ST2.10	I, sometimes omit taking classes	3.36	1.164
ST3.1	Online classes provide more time to pursue other hobby	2.52	1.098
ST3.2	Interaction with mates is less possible	1.82	0.829
ST3.3	Online classes cause mental and physical stress	2.13	1.149
ST3.4	Online classes result in feelings of isolation	2.2	0.975
ST3.5	Generally, online classes result in a lower level of concentration	2.05	1.044
ST3.6	There is a risk of leakage of personal information during the e-learning process	2.62	1.144
ST3.7	Online/e-learning is way much better than traditional classroom-based learning	3.62	1.26

Source: Questionnaire form

Four factors have been finalised from this table. Factor one can be named a 'Time Related factor', factor two a 'Psychological factor', factor three a 'Sincerity and motivation

Table 3. **KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.627
Bartlett's Test of Sphericity	Approx. Chi-Square	668.428
	Df	253
	Sig.	0

Source: SPSS Output

Table 4. **The Total Variance Explained Table**

	Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Component	Total	Percentage of Variance	Cumulative (%)	Total
1	4.463	19.403	19.403	3.337
2	3.465	15.066	34.469	2.209
3	2.096	9.112	43.581	2.826
4	1.486	6.461	50.042	2.558
5	1.294	5.626	55.668	1.997
6	1.201	5.223	60.891	2.949
7	1.054	4.583	65.474	1.281

Source: SPSS Output

factor', and factor four an 'Understandability factor'by taking the highest correlation in Factor loadings.

Regression Analysis:

a. Predictors: (Constant), Understandaibility factor, Sincerity and motivation factor, Time-related factor, Psychological factor.

Source: SPSS Output

Table 6 shows all the details of the regression model, through the entry, we can see that the independent variables taken as a set account for 8.2% of the total variance in the dependent variable. Preference is very moderately dependent on perceptual factors is a value of R=51.6%.

Table 7 shows the coefficient table which tests each predictor at $\alpha = 0.05$
TIME-RELATED FACTOR SIG. [$p = 0.002$]
PSYCHOLOGICAL FACTOR SIG. [$p > 0.001$]
SINCERITY AND MOTIVATIONAL FACTOR SIG. [$p = 0.021$]
UNDERSTANDABILITY NOT SIG. [$p = 0.748$]

Table 5. **COMPONENT MATRIX**

	COMPONENTS			
	1	2	3	4
ST3.1	0.607			.
ST3.2				0.439
ST3.3		0.606		
ST3.4		0.504		
ST3.5		0.667	.	
ST3.6		0.476		
ST3.7				0.624
ST1.1	.		0.54	
ST1.2		.	0.55	
ST1.3				0.55
ST1.4			0.591	
ST1.5		0.573		
ST1.6				0.64
ST2.1				0.545
ST2.2	.		0.6	
ST2.3		0.59		
ST2.4	0.575	.		
ST2.5			0.533	
ST2.6			0.556	
ST2.7			0.56	
ST2.8	0.456			
ST2.9	0.552			
ST2.10	0.507			

Source: SPSS Output

Table 6. **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.516[a]	0.266	0.228	0.357

These all are the amounts of unique variance a predictor accounts for statistically significant. Since for first three factors value of $p > 0.05$, therefore they are statistically significant but the last factor named 'understandability' is not statistically significant.

It also describes the regression equation as
$X = 1.594 + 0.130TRF - 0.242PF + 0.141SMF - 0.018UF$

a. Predictors: (Constant), Understandaibility Factor, Sincerity and Motivation Factor, Time-Related Factor, Psychological Factor

Table 7. **Co-efficients**[a]

Model		Unstandardized Coefficients		Standardized Coefficients
		beta	Std. Error	Beta
1	(Constant)	1.594	0.246	
	Time-Related Factor	0.13	0.04	0.332
	Psychological Factor	-0.242	0.064	-0.399
	Sincerity and Motivation Factor	0.141	0.06	0.245
	Understandability Factor	-0.018	0.056	-0.033

a. Dependent Variable: PREFERENCE
Source: SPSS Output

Table 8. **Co-efficients**[a]

Model		t	Sig.	Collinearity Statistics	
				Tolerance	VIF
1	(Constant)	6.471	0		
	Time-Related Factor	3.271	0.002	0.912	1.096
	Psychological Factor	-3.757	0	0.834	1.2
	Sincerity and Motivation Factor	2.351	0.021	0.869	1.15
	Understandability Factor	-0.323	0.748	0.877	1.141

a. Dependent Variable: PREFERENCE
Source: SPSS Output

Table 9. **ANOVA**[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.593	4	0.898	7.06	.000[a]
	Residual	9.925	78	0.127		
	Total	13.518	82			

b. Dependent Variable: PREFERENCE
Source: SPSS Output

Table 9 shows the details of ANOVA pertaining to Delhi NCR students. Since at F[4,78] =7.060 Sig. F is less than 0.001 at a 5% level of significance, therefore R^2 is statistically significant. So, the null hypothesis is rejected and we can say that preference for online classes significantly depends on the perceptual factors of students.

4. CONCLUSION

In today's era, online classes play a very crucial role inthe education and skills enhancement of students. To see the influence of online classes on students and to see whether perceptual factors influence the preference for online classes, this study has been undertaken. Around 87.5% of the individuals in primary data have had their first exposure to online classes during the pandemic only and a maximum number of students are familiar with Google Meet as an online platform for taking classes. Factor analysis is used and four factors are drawn namely 'time-related factor', 'Psychological factor', 'Sincerity and Motivation factor', and 'Understandability factor'.

Among them, the psychological factor plays a very important role during online classes and the understandability factor doesn't have such a significant role to play. The motivational factor plays a very significant role in the preference for opting for online classes, showing that a very low number of students attend online classes. The perceptual factors have a very moderate correlation with a preference for online classes. Different demographic factors perceive online classes differently. Based on the 5% level of significance, the null hypothesis is rejected and can conclude that perceptual factors influence the preference to take online classes (Arnedo-Moreno & Garcia-Font, 2021). Therefore based on primary data, when given the choice between online and offline classes, it has been noticed that only 20.5% of students prefer online classes over offline classes which shows that the effectiveness of online classes is less on students due to one major factor that is, perceptual factor.

The findings have practical implications for educational institutions and policymakers. Firstly, efforts to enhance online teaching should not solely focus on technological infrastructure but must also prioritize pedagogical innovation, including adaptive content delivery, regular feedback mechanisms, and student-centered learning strategies. Secondly, fostering self-regulated learning should be integrated into the curriculum through orientation programs, mentorship, and digital literacy initiatives. Lastly, the emotional and social dimensions of learning need attention, and institutions must develop mechanisms to ensure students remain connected, supported, and engaged in virtual environments.

In conclusion, this study provides empirical evidence that students' motivation and perception in online learning are multifaceted, shaped by personal, technological, and pedagogical factors. While online education offers flexibility and accessibility, its effectiveness depends heavily on students' intrinsic motivation and the quality of instructional design. As education systems continue to evolve in the post-pandemic era, a balanced, inclusive,

and student-centric approach to online learning is essential for sustaining engagement and academic success.

Further studies need to be done to determine the effectiveness of online classes from time to time as this study is cross-sectional in nature. The influence of other different factors on preference for online classes can be found to better understand the effectiveness of online classes.

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Appendix

Self Motivation and Perception for Online Classes among Different Class Groups

Dear Respondent,

Greetings of the day!

We are pursuing M.Com from Delhi University and this survey is part of data collection for our research work. The study focuses on self-motivation and perception of students towards online classes. You are kindly requested to fill out the questionnaire. Your responses will be kept confidential and used solely for academic purposes.

Thank you for your valuable time!

Section 1: Respondent Information

1. Name: _____

2. Age:

☐ Below 15 ☐ 15–18 ☐ 19–21 ☐ 21–23 ☐ Above 23

3. Gender:

☐ Male ☐ Female ☐ Prefer not to say ☐ Other: _____

4. Email ID: _____

5. City: _____

6. Class Group:

☐ Secondary education (Class 9–12) ☐ Graduation ☐ Post-graduation ☐ Other: ____

7. School/College/Institute Name: _____

8. Do you have exposure to online classes?

☐ Yes ☐ No

Section 2: Experience and Perception of Online Learning

9. Since when have you been learning through online platforms?

☐ Before pandemic ☐ During pandemic

10. Which platform is used by your institute for teaching?

☐ Google Meet ☐ Microsoft Teams ☐ Zoom ☐ Cisco Webex Meetings ☐ Skype ☐ Other: _____

11. Which platform is used by your institute for sharing resources?

☐ WhatsApp ☐ Google Classroom ☐ Google Email Group ☐ Microsoft Teams ☐ Telegram ☐ Other: _____

Stage 1: Frequency-Based Questions

Statement	Always	Often	Sometimes	Rarely	Never
I am curious to attend online classes	☐	☐	☐	☐	☐
I prefer to keep my camera on during the class	☐	☐	☐	☐	☐
I can easily understand the topics taught by the teacher	☐	☐	☐	☐	☐
I reply to the teacher's questions during the class	☐	☐	☐	☐	☐
I feel shy to ask my doubts in the class	☐	☐	☐	☐	☐
Teacher immediately responds to my doubts	☐	☐	☐	☐	☐

Stage 2: Frequency-Based Questions

Statement	Always	Often	Sometimes	Rarely	Never
There is a minimum attendance criteria in my courses	☐	☐	☐	☐	☐
I always take classes in a quiet atmosphere	☐	☐	☐	☐	☐
I feel left out during class discussions	☐	☐	☐	☐	☐
I prefer recorded classes over	☐	☐	☐	☐	☐

live ones					
I make handwritten notes during the class	☐	☐	☐	☐	☐
I open subject books while attending online classes	☐	☐	☐	☐	☐
I tend to do other activities after joining the class	☐	☐	☐	☐	☐
I avoid morning lectures	☐	☐	☐	☐	☐
I prefer to join classes a few minutes before schedule	☐	☐	☐	☐	☐
I sometimes omit to take classes	☐	☐	☐	☐	☐

Stage 3: Agreement-Based Questions

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Online classes provide more time to pursue hobbies	☐	☐	☐	☐	☐
Interaction with classmates is less possible	☐	☐	☐	☐	☐
Online classes cause mental & physical stress	☐	☐	☐	☐	☐
Online classes result in a feeling of isolation	☐	☐	☐	☐	☐

Online classes reduce concentration levels	☐	☐	☐	☐	☐
There is a risk of personal info leakage during e-learning	☐	☐	☐	☐	☐
Online learning is better than traditional classroom learning	☐	☐	☐	☐	☐

If given an option, which would you choose?

☐ Online ☐ Offline

Why did you choose the above option?

_____

What do you think could be done to improve the e-learning process?

_____