



## **The Rise of EduTech: Embracement of Online Learning Apps among Consumers During COVID-19 Pandemic**

*Aparajita Hembrom<sup>1</sup>, Sakshi Shaw<sup>2</sup>*

<sup>1</sup>Assistant Professor, Dept. of Commerce (Evening), St. Xavier's College (Autonomous), Kolkata

<sup>2</sup>CA Inter and B. Com Graduate, St. Xavier's College (Autonomous), Kolkata

### **ABSTRACT**

After the emergence of COVID-19 pandemic, students have largely been active through the online mode of education, further demonstrating the need for such a whirlwind way of learning. There are several online learning apps, most notably, Byjus, Unacademy, Vedantu, Toppr, all of which have witnessed a dramatic surge in adoption and usage, especially during the COVID-19 pandemic. In this light, it has been observed that a large number of students all across India have been resorting to online learning apps to fulfil their academic agenda. In this context, it becomes quite pivotal to throw light upon the perception of students towards online learning apps. The current research study is attempted at probing into the attitudes and behaviour of undergraduate students towards online learning apps by the application of "Technology Acceptance Model" (TAM). The findings reveal positive perception among the surveyed undergraduate students towards online learning apps.

**Keywords:** *Online Learning Apps; Technology Acceptance Model; Attitudes and Behaviour; Kolkata; Undergraduates*

### **Introduction**

The rapid pace at which globalization is occurring along with fine tuning in the milieu of technology has fuelled the emergence of head turning electronic devices, especially, smartphones and tablets, further propelling a spectacular proliferation of mobile internet. The present research study is primarily based in selected regions of Kolkata, during the time of a menacing global pandemic. One such revelation has been the usage of online learning apps. Online learning apps is a tech-based tool of study which enables information sharing between students and teachers. It is extremely useful for students who are "working professionals" and is in the continuous quest for improvisation. Learning apps make learning a bit more personalized for its students. Students are benefitted widely by staying away from the real physical classroom while still being engaged in an impeccable learning environment, albeit, being virtual. There exist no malaise of travelling and many other conundrums which might arise in case of physical classes, thereby proving to be a win-win scenario for both the students as well as the teachers. Currently, there are several online learning apps which have gained popularity in India like Byjus, Unacademy, Vedantu, Toppr, Vidyakul, Testbook, Khan Academy, GradeUp. A whopping proportion of students across India have been observed to use online learning apps for its expedient services. In fact, the essence of the current research endeavour exists in this rudimentary idea.

### **Review of Literature**

In the present research study, an attempt has been made to study the attitudes and behaviour of Undergraduates towards online learning apps and hence it is almost imperative to discuss about TAM. "TAM is an extension of TRA (Theory of Reasoned Action)", which was brought into existence by Ajzen & Fishbein (1975). The TAM is "an amelioration over TRA" as it is rooted on dimensions like "Perceived Usefulness" (PU), "Perceived Ease of Use" (PEU) and "Attitude towards Usage" (ATU).

Fred David first coined the term "Perceived Usefulness" which refers to the "extent of a belief held by an individual that the usage of a particular system results in the enhancement of his/her job performance". Davis (1989), also defined the term "Perceived Ease of Use" as the "extent of a belief held by a person regarding the usage of a system which would be effortless". In further addition to the existing theory, David (1993), opined that the usage of the actual information system was a determination of a concept called "Behavioural Intention" which was a result of the combined force of "attitude towards usage" and "perceived usefulness". He defined it as "the subjective probability that an individual will perform a specified behaviour." Attitude towards Usage (ATU) is a crux dependent variable in the TAM and in the words of Ajzen & Fishbein (2000), ATU is the "evaluative effect of positive and negative emotions among individuals towards the usage of a particular system".

TAM also offers a real flexibility to include independent constructs most notably "Subjective Norm", as first introduced by Taylor & Todd (1995), who defined it as "the influence gained from social circle on whether or not to use a particular system." Roy (2017), conducted a very interesting study embedding the construct of "Subjective Norm" in a conventional TAM in the context of "Taxi Hailing Apps". The study explored that "Subjective Norm"

was significantly knitted with behaviour of consumers towards “Taxi Hailing Apps”. TAM 2 by Venkatesh & Davis (2000) and “Unified Theory of Acceptance and Use of Technology” by Venkatesh et al. (2003), are two major upgrades. One of the major find is a TAM 3, which includes concepts of “Trust Effects” and “Perceived Risk” (Venkatesh & Bala, 2003).

However, there has been quite a few researches discussing about the perception of students towards online mode of learning by applying TAM. Tracing back to almost a decade in 2012, a very interesting study done by Farahat delved into student perceptions towards online learning in the context of Egyptian universities. The study revealed that “perceived ease of use”, “perceived usefulness”, “attitude towards usage” and “social influences” as important determinants of online learning. Similarly, one of the latest researches by Han & Sa (2021), after surveying 313 university students of Korea found that all TAM constructs were related to each other, with “perceived ease of use” and “perceived usefulness” had a positive impact on educational satisfaction. Aguilera-Hermida (2020), found that “attitude”, “motivation”, “self-efficacy” and “use of technology” played key roles in cognitive engagement and academic performance of students.

## Research Gap

The domain of mobile applications and consumer behaviour is not new, but measuring the perception of students towards online learning app has limited empirical researches, especially in the context of “new normal”. Talking in the context of geographical location, a major gap lies in unfurling the perceptions of consumers in the region of Kolkata with the help of “Technology Acceptance Model” (TAM).

## Research Objectives

1. To develop a novel research framework of TAM emphasizing on online learning apps during COVID-19.
2. To examine the attitudes and behaviour of undergraduates towards online learning apps amidst COVID-19 pandemic.

## Theoretical Framework

The content of literature in the domain of consumer behaviour and TAM is a huge one. In this respect, a major contribution to the existing literatures would be to blend the keywords of “Subjective Norm” and “Exigency (COVID-19)”.

The present research study is attempted in developing a conceptual framework which emphasizes on the students’ adoption and usage of online learning, pillared on marginally modified Technology Acceptance Model (TAM). The proposed research model is composed of the traditional TAM constructs along with the domains of “Subjective Norm” and “Exigencies (Covid-19)” for catering to the influence of peer groups and urgent unforeseen needs respectively. Therefore, the research model would actually consist of six ingredients, which has been developed and presented below. Also, the following hypotheses have been developed.

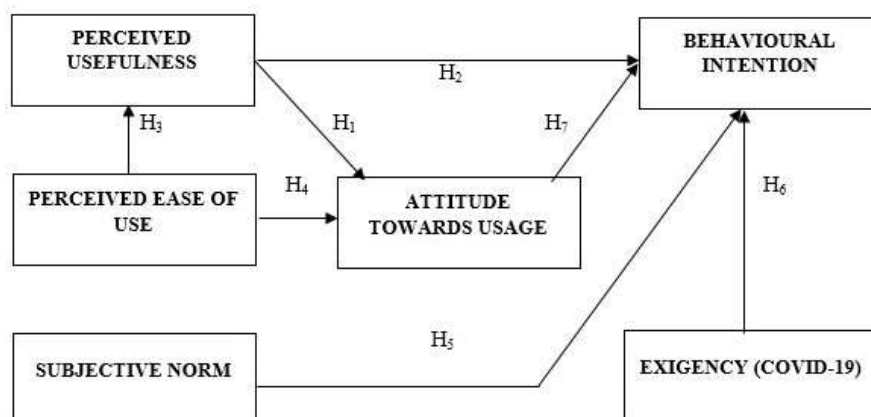


Figure 3: Research Model (Author’s own conceptualization)

*H<sub>1</sub>: “Perceived Usefulness has a positive influence on Attitude towards Usage”*

*H<sub>2</sub>: “Perceived Usefulness has a positive influence on Behavioural Intention”*

*H<sub>3</sub>: “Perceived Ease of Use has a positive influence on Perceived Usefulness”*

*H<sub>4</sub>: “Perceived Ease of Use has a positive influence on Attitude towards Usage”*

*H<sub>5</sub>: “Subjective Norm has a positive influence on Behavioural Intention”*

*H<sub>6</sub>: “Exigency (Covid-19) has a positive influence on Behavioural Intention”*

*H<sub>7</sub>: "Attitude towards Usage has a positive influence on Behavioural Intention"*

## Research Methodology

The data methodology consist of the use of both primary and secondary data. Secondary data has been used to lay the base of a strong conceptual framework. This has been possible through accessing various research paper from authentic and reliable databases like INFLIBNET, EBSCO and Google Scholar. The process of primary data collection has been done through a structured questionnaire, wherein a survey has been conducted among 350 undergraduate students who are all residents living in different regions of Kolkata. Most of the respondents were surveyed through mailed questionnaires, while the others have been surveyed by random administration of questionnaires. The regions of survey from Kolkata include urban municipal areas of Entally, Park Circus, Khidderpore, Beckbagan and Taltala. The questions in the questionnaire were mostly self-developed albeit few questions have been adopted from previous researches. The questionnaire contained 23 questions under 6 segments, namely, "Perceived Usefulness" (PU), "Perceived Ease of Use" (PEU), "Subjective Norm" (SN), "Exigencies" (Covid-19), "Attitude towards Usage" (ATU) and "Behavioural Intention" (BI). A "Five-point Likert scale", where "(5= Strongly Agree; 4=Somewhat Agree; 3=Neutral; 2=Somewhat Disagree and 1=Strongly Disagree)" has been used to measure the concepts. Few responses were rejected due to minor errors and incomplete responses. After the rejection of such responses, the final valid responses stood at 334. The analysis has been conducted in SPSS-AMOS v23.

## Analysis and Presentation of Data

- *Demographic Profiling*

Table 1: Representation of Descriptive Statistics (Source: Author's Own Calculations)

Demographic Construct	Classification	Population Statistics	Percentage
Gender	Male	178	0.53
	Female	156	0.47
	<b>TOTAL</b>	<b>334</b>	<b>1.00</b>
Monthly Income	Less than 10000	21	0.06
	10001-25000	110	0.33
	25001-50000	123	0.37
	50001-100000	53	0.16
	Above 100000	27	0.08
	<b>TOTAL</b>	<b>334</b>	<b>1.00</b>

As observed in the above the number of male respondents (n=178) exceeds the female respondents (n=156). We also see that most of the respondents having a moderately strong level of income perched in the range of 25.1K-50K and 10.1K-25K.

- *Reliability Analysis*

For the purpose of testing the internal consistency of the variables, "Cronbach's Alpha Test" has been conducted. This will serve the purpose of measuring the scale reliability of the various constructs which has been taken into consideration in the current research endeavour. The table below displays robust reliable results as the "Cronbach's Alpha" values for all items exceed the standard value of 0.7.

Table 2: Reliability Statistics (Source: Author's Own Calculations)

Construct	Cronbach's Alpha	Items	Total Correlation Value of Corrected Item	Cronbach's Alpha When Item Removed
Total	0.994	23	—	—
Perceived Ease of Use	0.988	PEU1	0.987	0.982
		PEU2	0.985	0.980
		PEU3	0.985	0.978
Perceived Usefulness	0.989	PU1	0.975	0.986
		PU2	0.974	0.985
		PU3	0.978	0.985
		PU4	0.979	0.985
		PU5	0.977	0.985
		PU6	0.917	0.983
Attitude Towards Usage	0.990	ATU1	0.980	0.985
		ATU2	0.978	0.986
		ATU3	0.971	0.988
		ATU4	0.969	0.988
Subjective Norm	0.962	SN1	0.872	0.957
		SN2	0.935	0.943
		SN3	0.950	0.940
		SN4	0.938	0.945
Behavioural Intention	0.981	BI1	0.977	0.961
		BI2	0.941	0.984
		BI3	0.974	0.962
Exigency (Covid-19)	0.975	EXC1	0.972	0.989
		EXC2	0.930	0.912
		EXC3	0.974	0.962

- *Convergent and Divergent Validity Test*

As observed by Table 3, the subcategories of construct validity are the “convergent and divergent validity”. The “convergent validity” has been estimated by their respective “factor loadings” (CFA), “average variance extracted” (AVE) and “composite reliability” (CR). It is observed from the table depicted below that the CFA for all items are above the ideal level of 0.7, while AVE and CR fall above their respective threshold criterion of 0.5 and 0.7.

Table 3: Convergent Validity Results (Source: Author’s Own Calculations)

Construct	Items	Factor Loading	AVE	C.R.
<b>Perceived Ease of Use</b>	PEU1	0.972	0.977	0.968
	PEU2	0.972		
	PEU3	0.977		
<b>Perceived Usefulness</b>	PU1	0.978	0.947	0.992
	PU2	0.977		
	PU3	0.980		
	PU4	0.981		
	PU5	0.980		
	PU6	0.942		
<b>Attitude Towards Usage</b>	ATU1	0.978	0.961	0.991
	ATU2	0.977		
	ATU3	0.979		
	ATU4	0.977		
<b>Subjective Norm</b>	SN1	0.925	0.885	0.990
	SN2	0.846		
	SN3	0.889		
	SN4	0.857		
<b>Behavioural Intention</b>	BI1	0.979	0.960	0.986
	BI2	0.977		
	BI3	0.976		
<b>Exigency (Covid-19)</b>	EXC1	0.980	0.947	0.992
	EXC2	0.942		
	EXC3	0.978		

The usage of “square root of ACE” and the “correlation coefficient matrix” is imperative for testing the “divergent validity” of constructs. As per Fornell & Larcker (1981), “discriminant validity was obtained by comparing the shared variance between factors with the AVE from the individual factors.” The above matrix clearly reflects that the variables and their in-between MSV and ASV fall short when juxtaposed to AVE and also the “square root of AVE” is higher compared to the “correlations of inter-constructs”, hence, satisfying the “discriminant validity” test.

Table 4: Divergent Validity Results (Source: Author’s Own Calculations)

Construct	Inter-construct Correlations					
	PEU	PU	ATU	SN	BI	EXC
PEU	0.989					
PU	0.985	0.973				
ATU	0.982	0.954	0.980			
SN	0.805	0.827	0.817	0.941		
BI	0.963	0.969	0.974	0.934	0.942	
EXC	0.975	0.982	0.989	0.958	0.966	0.980

- *Test for Structural Equation Modelling*

SEM has been performed to delve into the relationships existing between 6 variables, namely, PEU, PU, ATU, SN, BI and EXC. The rationality exist in testing the fit between the model and the obtained data. The first stage of making inference about the results of SEM encompasses a review of “fit indices.” All the fit indices when juxtaposed with their corresponded values which has been suggested will give a good model fit “Ratio of Chi-square to its Degrees of Freedom” ( $\chi^2/df$ ) = 1.977, “Goodness of fit index” (GFI) = 0.958, “Adjusted Goodness of fit index” (AGFI) = 0.936, “Relative Fit Index” (RFI) = 0.967, “Comparative Fit Index” (CFI) = 0.983 and “Root Mean Squared Error of Approximation” (RMSEA) = 0.042.

Table 5: Indices for measure of “Goodness-of-Fit” (Source: Author’s Own Calculations)

Goodness of Fit	Recommended	Actual Value of	Result of Model Fit
Measure	Value	Measures	
CMIN/DF	$\leq 3.00$	1.977	Good
GFI	$\geq 0.90$	0.958	Good
AGFI	$\geq 0.90$	0.936	Good
RFI	$\geq 0.90$	0.967	Good
CFI	$\geq 0.90$	0.983	Good
RMSEA	$\leq 0.05$	0.042	Good

To this end, the results of hypothesis testing have been obtained. The below table clearly represents the validation of all the hypotheses through the path analysis. It can be concluded that “perceived usefulness” and “perceived ease of use” favourably impact attitudes towards usage with each reporting figures of ( $\beta= 0.192, P<0.05$ ) and ( $\beta= 0.402, P<0.05$ ) respectively, thereby supporting H<sub>1</sub> and H<sub>4</sub>. The same could be safely asserted for the relationship between “perceived usefulness”, “subjective norm”, “attitude towards usage” and “Exigency (COVID-19)”, which are all significantly associated with “behaviour intention” of students towards online learning apps, with each reporting figures of ( $\beta= 0.198, P<0.05$ ), ( $\beta= 0.405, P<0.05$ ), ( $\beta= 0.443, P<0.05$ ) and ( $\beta= 0.402, P<0.05$ ) respectively substantiating H<sub>2</sub>, H<sub>5</sub>, H<sub>6</sub> and H<sub>7</sub>. The relationship between “perceived ease of use” and “perceived usefulness” is also linked with figure reporting ( $\beta= 0.609, P<0.05$ ), thus, substantiating H<sub>3</sub>.

Table 6: Results of Path Validation (Source: Author’s Own Calculations)

Hypotheses	Path	Coefficient	Direction	Results
H1	PU→ATU	0.192	Positive	Supported
H2	PU→BI	0.198	Positive	Supported
H3	PEU→PU	0.609	Positive	Supported
H4	PEU→ATU	0.408	Positive	Supported
H5	SN→BI	0.405	Positive	Supported
H6	ATU→BI	0.443	Positive	Supported
H7	EXC→BI	0.402	Positive	Supported

## Discussion of Research Findings

The present research study delved into the attitude and behaviour of undergraduate students towards online learning apps by applying “Technology Acceptance Model” (TAM). The inter-relationships between traditional TAM components and the other two contemporaneous components like “Subjective Norm” and “Exigency (Covid-19)” has been explored. According to the first hypothesis, “Perceived Usefulness” (PU) had a positive relationship with “Attitude towards Usage” (ATU) as the extent to which the importance of usefulness will be psychologically casted would have a bearing on the attitude of the students. As per the second hypothesis, it was also observed that “Perceived Usefulness” (PU) was related to “Behavioural Intention” (BI). An explanation for this would be that the students are always in the quest for using a beneficial application which would make their lives more convenient. We evidence, in the third hypothesis testing that “Perceived Usefulness” (PU) was strongly influenced by “Perceived Ease of Use” (PEU). This hints that providing appropriate user training is essential for bolstering the students’ perception of the usefulness of a technology. Besides, “Perceived Ease of Use” (PEU) was also positively related to “Attitude towards Usage” (ATU), validating our fourth hypothesis. The fifth hypothesis

was attempted at examining the relationship between “Subjective Norm” (SN) and “Behavioural Intentions” (BI). The impact cast by social circle had a significant impact on the “Behavioural Intentions” of students towards online learning apps. This is a crucial finding as local clubs, colleagues or opinion leaders shape the perceptions and attitudes of individuals towards a technology. As observed by the sixth hypothesis, it is fathomed that the attitude of students towards online learning apps has been instrumental in shaping the “behavioural intention” of such students, as both mental as well as physical faculties are a nifty driving force in developing the perceived likelihood of consumers. Finally, the seventh hypothesis analyzed the relationship between “Exigency (Covid-19)” (EXC) and “Behavioural Intentions” (BI). Any unforeseen exigencies would trigger an abnormal behaviour among people and the current pandemic of COVID-19 is no exception. In addition to this, the using an online learning apps is also easy and convenient and reduces a lot of hassles. Such prolonged attitudes observed among the students during this “new normal” has brought a bewildering change in their behaviour as well.

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## Conclusion

The current research study is highly relevant in the context of recent proliferation in the milieu of technological advancements, resulting in the enormous growth of smartphones and various mobile applications. The smartphones and tablets of today exhibit qualities like never before making the modus operandi of people rather luxurious. The current research study highlighted certain crux elements under TAM constructs which shall be highly relevant in guiding future researches. Undergraduate students of Kolkata, are highly valuing online learning apps during this pandemic. There has been certain criticism pointed at TAM, but it still proves to be amongst the most popular theoretical model used in academia. The current research study is strong enough to provide valuable conclusions concerning behaviour of students towards online learning apps.

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