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IMPACT OF COVID-19 ON BEHAVIORAL INTENTION TO USE INFORMATION AND COMMUNICATION TECHNOLOGY.

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ABSTRACT

The digital world is developing today at a faster rate and it is evident from the way it has invaded all aspects of our life. In the current education system, the progressive development of ICT throughout the COVID -19 pandemic empowers the students and teaching community to access the world beyond the classroom knowledge sharing. However, students are not familiar with the content of the ICT materials, and this brings a burden for students on learning the technology. The purpose of the present study is to apply the Technology Acceptance Model to determine the intentions of the students to use ICT during the COVID – 19 pandemic. The study was conducted among 325 higher secondary students of Ernakulam district. The study revealed that COVID - 19 created a positive intention to use ICT in this pandemic situation.

Keywords: Digital world, ICT, COVID-19, Technology acceptance model

INTRODUCTION

COVID – 19 is an infectious disease caused by a newly discovered coronavirus(WHO) in 2019. The COVID – 19 has spread all over the world and compelled human beings to uphold social distancing. Most of the countries around the world, as well as India, had announced lockdown in an attempt to reduce the spread of the coronavirus which resulted in a complete shutdown of educational institutions. Owing to COVID- 19, educational institutions were closed by the 2nd week of March 2020 in Kerala, the southern state of India. Initially, educational institutions were confused and did not even understand how to cope up with the crisis of closure of educational institutions. Though the lockdown disrupted the education sector, the coronavirus pandemic has created a ray of hope for students and teachers to continue their academic activities online. Earlier studies have proved that COVID – 19 created many opportunities for educational institutions to strengthen their technological facilities and infrastructure (Jena, 2020).

ICT is an umbrella term that comprehends all communication technologies such as software tools, satellite communication, digital television, internet, wireless network which make available to access information. Backinsale and Ram (2006) defined ICT as any technology used to support information gathering, processing, distribution, and use. ICT provides a platform for sharing knowledge (Rodriguez and Casal, 2007) and the progressive development of ICT applications empowers the students community to access the world beyond classroom learning. (Flex, 2008). There are numerous ICT applications made available by the information technology sector for our daily life. But few specific ICT tools are used abundantly by the education sector. Bhattacharya & Sharma (2007) highlighted the ICT tools available for an educational purpose such as email, teleconferencing, television, audio conferencing, interactive voice response system, etc. Howard, Cornuel, Thomas & Thomas (2012) point out the following tools such as Microsoft office tool, email, webchat, online forum, video, and electronic conferencing which would enhance the learning capacity of the students. Hence, ICT is considered as a blend of technologies for collecting, storing, communicating and delivering information. In normal conditions, the aim of ICT integration is to support classroom learning (Howard, Cornuel, Thomas & Thomas, 2012) to be more flexible and effective. During the COVID – 19, the role of ICT integration has touted as a powerful tool for educational change and reform.

Intention is an individual's readiness to do a specific behavior(Ajzen,1991). It explains his/her intention either to perform or not to perform a behavior. In this study, intention refers to the extent to which students intend to use ICT

for knowledge sharing in the future. Technology Acceptance Model (TAM) is one of the most influential research models that explain technology acceptance and the intentions to use the system. The technology acceptance model developed by Davis (1989) states that the success of a system can be determined by user acceptance of the system. In TAM behavior intention is determined by 3 determinants such as perceived usefulness(PU), perceived ease of use(PEOU) and attitudes towards usage(ATU) of the system(Davis, 1989). Attitude explains an individuals' belief in outcomes either positive or negative which has been resulted due to the experience towards the specific behavior. Perceived usefulness denotes the extent to which an individual thinks that the use of a system will improve his or her job performance. Perceived Ease of Use indicates the degree to which the same person feels that the system usage is effortless for him. According to the model, users' perceptions about the system's usefulness and ease of use result in an intention to use the system (Davis, Bagozzi &Warshaw, 1989). The relevance of this study is to know how far ICT applications helped learning so that it can be accepted as an emerging educational technology.

THEORETICAL FRAMEWORK AND HYPOTHESIS

The various researchers have conducted many empirical studies on determinants that influence ICT adoption by the students. The literature review was carried out with primary emphasis on the determinants such as perceived usefulness, perceived ease of use, and attitude towards usage which would strengthen the intention to use the ICT.

Perceived usefulness

Davis et al., (1989) defined perceived usefulness as "prospective user's subjective probability of using a specific application will increase his job performance". In this study perceived usefulness is the level to which students consider ICT usage to enhance the learning experience. Irrespective of an individual's attitude towards the system, his experience of relative advantage in the system would improve the intention to use the system(Venkatesh,2000; Venkatesh & Davis, 2000). Perceived usefulness has a significant direct effect on behavioual intention which was empirically proved in the various context of studies.(Al-Gahtani,2006; Faqih & Jaradat 2015; Al harbi & Drew, 2014).Therefore, the hypothesis(H_1) -"perceived usefulness significantly influences behavioural intention to use the ICT" is formed.

Perceived ease of use

Davis, Bagozzi & Warshaw (1989) described Perceived ease of use as "the degree to which the prospective user expects that the target system to be free of effort". In this study, perceived ease of use refers to the level to which a student is convinced that ICT use is easy and beneficial. As the degree of ease of use towards the system increases, the intention to use the system would improve positively among the users (Davis, Bagozzi &Warshaw, 1989).The fact that Perceived ease of use has a significant direct effect on behavioural intention, was empirically proved by many researchers in the various context of studies (Al Gahtani, 2016; Faqih & Jaradat, 2015). Therefore, the hypothesis(H_2)- "perceived ease of use significantly influences behavioural intention to use the ICT" is formed.

Attitude towards use

Fishbeing and Ajzen(1975) defined attitude towards behavior as "an individual's feelings about performing the target behavior". In this study, attitude towards ICT refers to the level to which a student is convinced that ICT use enriches his learning, which in turn heightens the intention to use ICT. The strong effect of attitude on intention was supported by many information system researchers (Taylor and Todd, 1995; Tan, Potamites & Wens-chi, 2012; Al-Adwan, Al-Adwan & Smedley, 2013).

The perceived usefulness is considered as one of the factors that determine behavioural belief of attitude (Davis, 1986) in the context of the information system. The direct effect of perceived usefulness has been evidenced to influence attitude towards usage (Bagozzi, 1982; Ashraf, Thongpapani, Auh,2014; Brinberg,1979).Therefore, the hypothesis(H_3) - "attitude towards usage mediates the relationship between perceived usefulness and behavioural intention to use the ICT" is constructed.

According to the studies of Davis et al., (1989) and Venkatesh et al., (2003) when technology is viewed as being easy to use, it is likely that an individual will develop a positive attitude towards it. The strong effect of perceived ease of use on attitude was supported by many information system researchers (Al harbi & Drew, 2014; Ashraf, Thongpapani, Auh, 2014). Therefore, the hypothesis(H_4) – "attitude towards usage mediates the relationship between perceived ease of use and behavioural intention" is constructed.

RESEARCH GAP

The prior research on ICT integration by the students had investigated the following research issues such as factors affecting students' adoption of ICT tools (Rosaline and Wesley,2017) and the determinants that influence the ICT

adoption (Shehzadi et al.,2020; Bui, 2020; Tiwari, 2020; Makewa et al., 2014; Yeop, 2019;). Though there exist studies measuring the intention of students to use ICT in the higher education sector, no prior research endeavour has investigated the intention to use ICT by the students in higher secondary education. Hence the present study explores the factors that influence the intention to use ICT by the students in higher secondary education in the context of COVID -19 pandemic.

OBJECTIVES

Following are the specific objectives of the present study;

1. To examine the factors that determine the behaviour intention to use ICT by the students during the COVID – 19 outbreaks.
2. To ascertain the mediating role of attitude in the relationship between students' intention to use ICT with perceived ease of use and with perceived usefulness.

HYPOTHESIS

In view of the above objectives, the following hypotheses are developed,

H_1 Perceived usefulness significantly influences behavioural intention to use the ICT

H_2 Perceived ease of use significantly influences behavioural intention to use the ICT

H_3 attitude towards usage mediates the relationship between perceived usefulness and behavioural intention to use the ICT

H_4 attitude towards usage mediates the relationship between perceived ease of use and behavioural intention to use the ICT

METHODOLOGY

The present study is descriptive in nature. The population of the study comprises higher secondary students from the aided schools in the state of Kerala. For the present study, few aided higher secondary schools located in Ernakulam district were selected. Judgemental sampling was used to draw the samples. The primary data were collected using a structured questionnaire which was sent to the sample respondents through online in Google platform. The data were collected from 325 respondents during the month of October

2020.In the phase of data collection, 325 responses were received from the respondents. The scale for measuring intention, attitude, perceived ease of use, and perceived usefulness was adapted from the work of Davis (1989). The reliability of the questionnaire was calculated using Cronbach alpha and found ranging from .736 to .778(Annexure I).This range exceeds the reliability estimates(Alpha =.70) recommended by Nunnally and the data were analysed using SPSS software version 22. The test of normality was confirmed through the symmetric distribution, analysis of skewness, and kurtosis. In symmetric distribution, the values of mean and median of all the variables were approximately equal (annexure II), then data were considered to be symmetrically (normally) distributed. In the measure of skewness and kurtosis, data under study (annexure II) fall within the range of -1.96 to +1.96(Cramer, 1998) and are normally distributed. Hence structural equation modeling was used for confirming the hypothetical relationship between the factors that influence the behavioural intention to use ICT in the context of COVID – 19 Pandemic.

RESULTS AND DISCUSSION

Structural equation modeling technique following a 2 stage analysis in which the first stage evaluates the measurement model and in the second stage structural equation model is tested (Anderson & Gerbing, 1988).

In stage one, a measurement model was constructed in order to measure the validity of the scales used in this study. Accordingly, the study estimated standardized factor loading, Average variance extracted (AVE) of the hypothesized constructs. In this study AVE scores obtained for each construct was >.50 and significant (p<.001) on the respective construct. These results (Annexure III) supported the evidence of the convergent validity of the constructs used in this study. To confirm the discriminate validity, all AVE values were compared with squared correlation values between the respective constructs. It is found that all AVE values were greater than the squared correlation values (Fornell & Larcker, 1981) and the results reported in Table 1 established the discriminant validity.

Table 1

Descriptive statistics, AVE and Correlation for the Hypothesised constructs

Constructs	Mean	Standard Deviation	1	2	3	4
1. Perceived usefulness	3.6708	1.50276	**0.75**			
	3.9042	0.81921	.49*	**0.61**		

2.Perceived ease of use						
3.Attitude for use	3.5651	1.58877	.54*	.42*	**0.60**	
4. Behaviour intention	4.0714	1.7866	.68*	.44*	.29*	**0.50**
Notes, N=325,p<.01 level; AVE:Average Varience Extracted; Diagonal elements in bold show AVE						

In stage 2, the structural equation model(SEM) was constructed to test the relationship between the latent constructs such as perceived usefulness, perceived ease of use, attitude towards usage, and behavioural intention. An SEM technique following AMOS 23 version with maximum likelihood estimator was used to test the relationship between the latent constructs. In this stage, the study tested the direct effect model first, followed by the partial mediation model. The direct effect considers that perceived ease of use and perceived usefulness act as an antecedent to attitude towards usage and these dimensions determine users' intention to use ICT.

H_1 Perceived usefulness significantly influences behavioural intention to use the ICT

The results of the analysis found supporting direct relationship between perceived usefulness and behavioural intention to use ICT. Values of the hypothesis testing results are exhibited in Table No.2.

Table 2			
Hypotheses testing results			
Path(direct effect)	Estimates(S.E)	P value	Standardised regression estimates
Behaviour intention <--Perceived usefulness	.161(.12)	.000	.70

Perceived usefulness (beta = 0.161, Standard Error = 0.126, $p < 0.000$) support the direct relationship between perceived usefulness and behavior intention. These results support the hypothesis (H_1) that in a higher secondary school context, perceived usefulness significantly influences students' intention to use ICT. Hence H_1 is proved.

H_2 Perceived ease of use significantly influences behavioural intention to use the ICT

The results of the analysis given below found supporting direct relationship between perceived ease of use and behavioural intention to use ICT. Values of the hypothesis testing results are exhibited in Table No.3 given below.

Table 3			
Hypotheses testing results			
Path(direct effect)	Estimates(S.E)	P value	Standardised regression estimates
Behaviour intention <--Perceived ease of use	.889(.061)	.000	.91

Perceived ease of use (beta = 0.889, Standard Error = 0.061, p < 0.000) support the direct relationship between perceived ease of use and behavior intention. These results support the hypothesis (H_2) that in a higher secondary school context, perceived ease of use significantly influences students' intention to use ICT. Hence H_2 is proved.

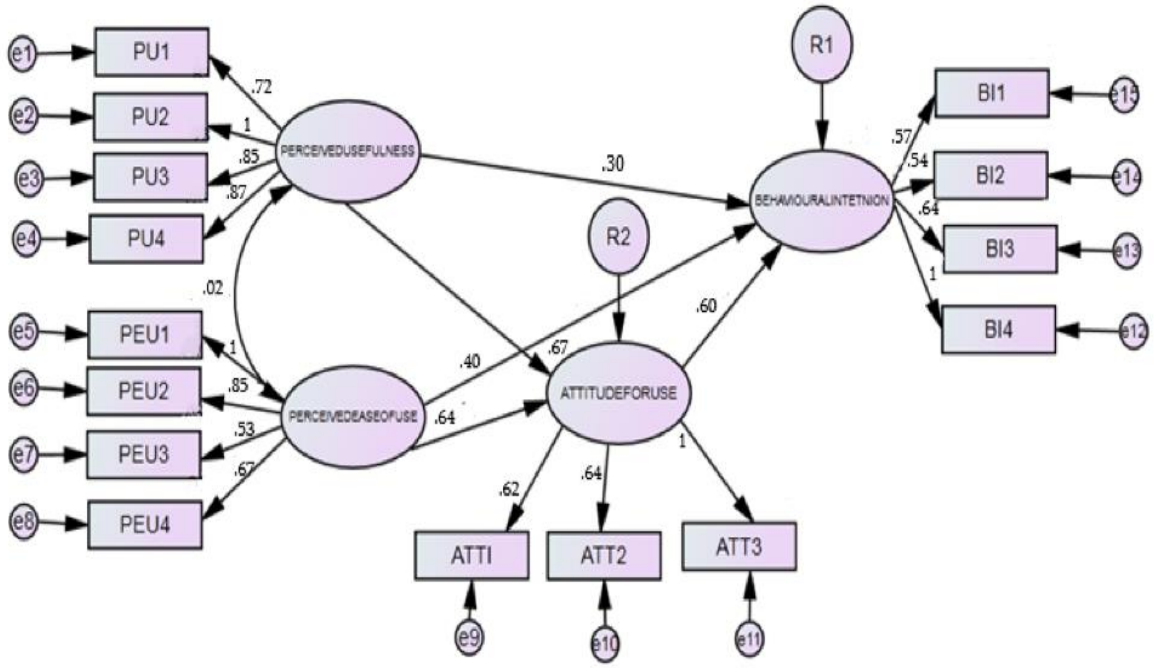
As a part of hypothesized testing, the study evaluated the direct effect model based on the model fit indices. The chi square test of the measurement model is found to be significant ($\pi 2$= 200.084, p<0.01), since the value of the ratio of Chi square to degree of freedom (CMIN/DF =3.923) are in the acceptable level the model can be considered having enough model fit. Apart from other indices like Goodness of fit, comparative fit indices, and parsimonious fit indices were examined. It was found that all indices (NFI = 0.770, RFI = 0.702, IFI = 0.818, TLI = 0.760, CFI = 0.815, RMSEA = 0.075) are within the generally acceptable limits which shows that direct effect model achieved a satisfactory fit to the data. Therefore, the study decided to go on the mediation model for further hypothesis testing.

The mediation model (Indirect effect model) was estimated to test the impact of perceived usefulness and perceived ease of use,was mediated by the attitude towards usage of ICT.

The structural model is shown in figure No.1.

Figure No.1

Structural model showing the mediating effect of attitude on behavioural intention



Examination of the indirect effect model based on model fit indices(CMIN/DF=4.346,NFI = 0.828, RFI = 0.756, IFI = 0.830, TLI = 0.760, CFI = 0.730, RMSEA = 0.045) revealed that all indices are within generally acceptable limits which provide a sufficient evidence for model fit. After validating the structural model through various indices, this study further proceeds with the kind of mediating relationship for further hypothesized testing.

H_3 attitude towards usage mediates the relationship between perceived usefulness and behavioural intention to use the ICT.

The following analysis shows that indirect effect of perceived usefulness and behavioural intention through attitude towards usage of ICT supports the H_3. Values of the hypothesis testing results are exhibited in Table No.4 given below.

Table 4			
Hypotheses testing results			
Path(direct effect Mediation)	Estimates(S.E)	P value	Standardised

			regression estimates
Behaviour intention <--Perceived usefulness	.453(.142)	.00	.30
Behaviour intention <--Attitude towards use	.350(.118)	.00	.591
Attitude towards usage<-- Perceived usefulness	.739(.085)	.00	.673
Path(Indirect effect Mediation)			
Behaviour intention <--Attitude towards use <--Perceived usefulness		.00	.39

From the inspection of the estimates of the indirect effect table, it is found that there is a significant indirect effect (β = .39 (.591*.673), p < .001) of perceived usefulness on behavioural intention through attitude towards use. Thus H_3 is accepted. With the presence of a mediating variable, the direct effect of perceived usefulness on behavioural intention has come down from β1 =.70(Table 2) to β2 =.30(Table 4) This represents the mediating effect of attitude. Had the P been >.05, the interpretation would have been attitude fully mediates between perceived ease of use and behavioural intention. Here P is .00, which indicates that there exist only partial mediation between perceived ease of use and behavioural intention.

H_4 attitude towards usage mediates the relationship between perceived ease of use and behavioural intention to use the ICT

The results of the analysis found supporting the indirect effect of perceived ease of use and behavioural intention through attitude towards usage of ICT. Values of the hypothesis testing results are exhibited in Table No.5 given below.

Table 5			
Hypotheses testing results			
Path(direct effect Mediation)	Estimates(S.E)	P value	Standardised regression estimates
Behaviour intention <--Perceived ease of use	.490(.061)	.00	.39
Behaviour intention <--Attitude towards use	.350(.118)	.00	.60
Attitude towards usage<-- Perceived ease of use	.50(.03)	.00	.640
Path(Indirect effect Mediation)			
Behaviour intention <--Attitude towards use <--Perceived ease of use		.00	.384

From the inspection of the estimates of the indirect effect table, it was found that there is a significant indirect effect (β = .384(.640*.60), p < .001) of perceived ease of use on behavioural intention through attitude towards use. Thus H_4 is accepted. With the presence of a mediating variable, the direct effect of perceived ease of use on behavioural intention has come down from β1 =.91(Table 3) to β2 =.39(Table 5) and become significant also. Had the P been >.05, the interpretation would have been attitude fully mediates between perceived usefulness and behavioural intention. Here P is .00, this indicates that there exist only partial mediation between perceived usefulness and behavioural intention.

FINDINGS OF THE STUDY

Major findings arrived at after testing of hypotheses shows that the relationship of students' intention to use ICT with a selected number of factors(perceived usefulness, perceived ease of use and attitude toward usage).This study observed that perceived usefulness and perceived ease of use create a positive intention to accept ICT technology. It is also found that there exists a partial mediating effect of attitude in the relationship between perceived usefulness, perceived ease of use and behavioural intention. Perceived usefulness and perceived ease of use has significantly influenced students behaviour intention.

DISCUSSION AND IMPLICATION OF THE STUDY

The present study was carried out to assess students' intention to use ICT during the COVID – 19 outbreak. The main finding was that all four constructs of the TAM model significantly influence students' intention to use ICT technology. The results are consistent with the findinds of the previous studies (Taylor and Todd, 1995; Tan et al.,2012; Teo et al.,2009; Al-adwan et al.,2013). This implies that students undergoing secondary education in Kerala believe that ICT learning is useful and will enable them to accomplish their learning activities easier with requisite technical support. Therefore, educational institutions are advised to pay attention to the quality of ICT resources deployed in learning devices as well as developing tools that will facilitate student's learning.

CONCLUSION

India's school education is progressing but is far from world-class. Effective ICT in the learning process can help in bridging the gaps. Students spend a lot

of time interacting online due to the school closure, but in fact, it limits productive contact with academics. Students have access to technology and their attitude towards its usage reflects their academic outcomes. The research model predicts that when students use technology for academic purposes, they are more concerned about the usefulness and ease of technology. The empirical findings of the study observed that perceived usefulness and ease of use of technology create a positive intention to accept ICT technology.

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ANNEXURE I

Table 1 Cronbach alpha reliability coefficient

Factor	Item	Alpha
Perceived usefulness(PU)	4	.778
Perceived ease of use(PEU)	4	.757
Attitude towards usage(ATT)	3	.768
Behavioural intention (BI)	4	.736

ANNEXURE II

Test of Normality					
Constructs	Mean	Median	Standard Deviation	Skewness	Kurtosis
Perceived usefulness(PU)	3.7	3.8	1.5	1.040	.912
Perceived ease of use(PEU)	3.9	4.1	0.8	-.340	.559
Attitude towards use(ATT)	3.6	3.7	1.6	1.014	1.134
Behavioural intention (BI)	4.1	4.2	1.8	.240	.248

ANNEXURE III

Convergent validity AVE calculation

	Factor loading	square of loading	sum of square of lading	no of indicator	AVE	SQUARE TOOT AVE
PU1	0.723	0.522729				
PU2	1	1				
PU3	0.846	0.715716				
PU4	0.865	0.748225	2.98667	4	0.7466675	0.864099
PEU 1	1	1				
PEU 2	0.847	0.717409				

PEU 3	0.53	0.2809				
PEU 4	0.668	0.446224	2.444533	4	0.61113325	0.78175
ATTI	0.62	0.3844				
ATT 2	0.64	0.4096				
ATT 3	1	1	1.794	3	0.598	0.773305
BI1	0.568	0.322624	1.219024			
BI2	0.538	0.289444				
BI3	0.638	0.407044				
BI4	1	1	2.019112	4	0.504778	0.710477