Indian Journal of Extension Education
Vol. 56, No. 4 (October-December), 2020, (37-42)

ISSN 0537-1996 (Print)
ISSN 2454-552X (Online)

Determinants of Successful Integration of E-learning into Higher Education

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ABSTRACT

The recent lockdown followed by spread of global pandemic COVID-19 compelled schools and colleges to continue education by online mode. Such scenario calls Universities to blend e-learning with class room learning in future, too. The use of e-learning is influenced by various factors. Therefore, the current study was undertaken to identify various factors which affect students' perception towards e-learning. Data was collected through questionnaire from 200 students from four well-established universities of Punjab. The results show that out of ten factors of Technology Acceptance Model considered in the study, subjective norm and computer skills were most prominent in determining integration of e learning into higher education. There is need to enhance the computer skills of students for successful implementation of e-learning in universities. Further, as subjective norm was leading factor so administrations and teachers should encourage students to use web-based learning.

Keywords: Blended learning, e-learning, e-learning, Factors affecting, Perception, Technology acceptance model

INTRODUCTION

Electronic-learning (e-learning) is changing the means of teaching as well as learning in university campus. Creation of e-learning environment is not only technical matter rather it demands the concern of numerous human and social factors (McPherson and Nunes, 2004). The recent lockdown due to spread of global pandemic, compelled teachers to adopt on line learning methodologies like zoom app, Google meet, Google classroom etc. besides sharing video lecture via WhatsApp and Facebook. These tools are extremely favourable for higher education students and modernising the students' interaction, sharing information and learning (Pandey *et al.,* 2020). But how much of teachers and students could actually benefit out of it. In fact determinants of e learning are crucial to the success of e learning. Before implementation of e-learning system in higher educational institutions to be successful, various factors need to be considered. There can be many hindrances in online learning like lack of understanding between student and teacher, lack of handling technology, lack of knowledge, monitoring and evaluation and so on (Bhati *et al.,* 2020). Sumak *et al.* (2011) reported that the actual use of the e-learning system is influenced by students' behavioural intention.

Hence, studies worldwide put forward that the use of e-learning technology directly or indirectly is influenced by attitude, behavioural intention, perceived ease of use and perceived usefulness of the system. Substantial theoretical and empirical progress has been made in illuminating and predicting users' acceptance of IT. In that, The Technology Acceptance Model (TAM) has become well-established as a model for predicting IT acceptance, usage intensions and

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behavioural attitude (Davis, 1986). He suggested that perceived usefulness (PU) and perceived ease of use (PEOU) are the two mediating variables to predict the acceptance of information technology. Further, the extended TAM introduced additional variables that influence perception towards e-learning such as university climate, access to computer, behavioural intention etc (Davis *et al.,* 1989; Venkatesh and Davis, 2000). The studies which used TAM model in different parts of the world recommended considering social and cultural factors while implementing e-learning. Hence, the present study was done to study the determinants which influence the perception of university students towards e-learning by using Technology Acceptance Model and its extended models in India.

METHODOLOGY

The study was conducted in Punjab state of India. Four old and well established universities of Punjab i.e. Punjab Agricultural University, Ludhiana; Guru Nanak Dev University, Amritsar; Panjab University, Chandigarh and Punjabi University, Patiala were purposively selected for the study. Independent of discipline/stream of degree, a total of 50 students comprising of 30 undergraduate and 20 postgraduate students were selected from each university using random sampling technique. Thus, the sample comprised of 200 respondents. Self-structured questionnaire was prepared to collect the data from the respondents. These factors were adopted from Technology Acceptance Model developed by Davis in 1989 and its extended models. In total, there were 90 statements which were measured on five-point Likert scale i.e. strongly disagree, disagree, undecided, agree and strongly agree with the assigned scores of 1, 2, 3, 4 and 5. For negative statements scores were assigned vice versa. The prepared questionnaire was pretested and necessary modifications were done. The reliability of the scale was tested by split-half method for which correlation coefficient was found to be significant (r=0.68). Kruskal Wallis and t test were used to analyse the data.

RESULTS

The profile data revealed that overall more than half of the students i.e. 51 per cent were in the age group of 21-24 years followed by 38.50 per cent who were below 20 years of age and remaining 10.50 per cent of the students aged above 25 years. Further, the data indicates that on the whole almost all i.e. 97.00 per cent of the respondents were unmarried. Overall, majority of the respondents were in the category of the general caste i.e. 68.50 per cent. Nearly one fifth of the respondents (18.50%) were in the other backward caste (OBC) group and rest 13.00 per cent belonged to SC/ST category. Overall, as far as the personal profile of students in concerned, half of them were in the age group of 21-24 years, most of them were unmarried and belonged to general castes. Further family profile of the students selected for the study was also collected and revealed that majority of the respondents were from the urban background i.e. 62.50 per cent. University wise also majority of the respondents (72.00% in Guru Nanak Dev University, 62.00% in Panjab University and 68.00% in Punjab Agricultural University) were from the urban background except Punjabi University, Patiala where nearly half of the respondents (52.00%) were from the rural background. As regards the family type of the students, majority (81.00%) were from the nuclear families. It was further found that majority of the respondents (57.50%) had small family size followed by 34.50 per cent who had medium sized families. Further, the table showcases parents' education of the students. Parent's education was studied in 10 categories ranging from illiterate to Ph.D. Then it was divided into three levels i.e. low (4-5.4), medium (5.5-6.9) and high (7-8.25). Overall, majority (59.50%) of the students' parent's education was medium followed by 31.50 per cent who had high level of parents' education. There were 9.00 per cent students whose parent's education level was low. As far as family income is concerned most (84.50%) of the students' annual family income was less than nine lakhs. Only 11.50 per cent of the students' family annual income was in the range of 10-19 lakhs. Merely four per cent of them had high income worth 20 lakhs or more per annum.

The data in the Table 1 show that students agree that all the factors considered in the study are important for successful integration of e-learning into higher education. The foremost determinants were subjective norm and computer skills ($\bar{x}$ = 3.9 each) followed by self-

Table 1: Factors affecting e learning integration into higher education (n=200)

Factors	University					Gender			Total
	GNDU (n_1=50)	PUC (n_2=50)	PUP (n_3=50)	PAU (n_4=50)	Kw Value	Male n_m=80	Female n_f=120	t-value	
Subjective norm	3.9±0.9	4.0±0.8	3.9±0.9	3.8±0.9	6.57***	3.9±0.5	3.8±0.6	2.47*	3.9±0.6
Computer skills	3.8±0.9	4.0±0.8	4.0±0.9	3.8±0.9	46.41**	3.9±0.7	3.9±0.7	NA	3.9±0.7
Self-efficacy	3.7±0.8	3.9±0.8	4.0±0.9	3.7±0.8	20.10**	3.9±0.6	3.8±0.6	1.16	3.8±0.6
Innovativeness	3.7±0.9	3.8±0.9	3.8±0.9	3.6±0.9	7.66*	3.8±0.7	3.7±0.6	1.08	3.8±0.7
Perceived ease of use	3.8±0.8	3.8±0.8	3.7±0.9	3.7±0.9	7.0.3***	3.8±0.4	3.7±0.4	1.17	3.8±0.4
Behavioural intention	3.6±0.8	3.9±0.8	3.8±1.0	3.5±0.9	9.95*	3.7±0.7	3.7±0.6	NA	3.7±0.6
Attitude	3.6±0.8	3.7±0.9	3.7±0.9	3.5±0.8	12.55*	3.6±0.5	3.6±0.5	NA	3.6±0.5
Perceived hedonism	3.6±0.8	3.6±0.9	3.6±1.0	3.5±0.8	10.94*	3.6±0.4	3.6±0.5	NA	3.6±0.5
Perceived usefulness	3.5±0.9	3.5±0.9	3.5±1.0	3.5±0.9	NA	3.5±0.3	3.5±0.3	NA	3.5±0.3
University climate	3.3±1.1	3.6±1.2	3.4±1.1	3.5±1.1	5.41	3.6±0.7	3.4±0.8	1.82	3.5±0.8
Overall	3.7±0.6	3.8±0.9	3.7±1.0	3.6±0.9	21.63**	3.7±0.6	3.7±0.6	NA	3.7±0.6
Kw Value	49.21**	56.29**	41.16**	38.07**					

*****p≤0.05, ****** p≤0.01, *** p≤0.1; Mean range: 1 to 5

GNDU: Guru Nanak Dev University**,** Amritsar**; PUC**: Punjab University, Chandigarh; **PUP**: Punjabi University, Patiala; **PAU**: Punjab Agricultural University, Ludhiana

efficacy, innovativeness and perceived ease of use ($\bar{x}$ =3.8 each), behavioural intention ($\bar{x}$ =3.7), attitude, perceived hedonism ($\bar{x}$ =3.6 each), perceived usefulness and university climate ($\bar{x}$ =3.5 each). All the factors had mean value above three (≥3.00) which represent that students agree that all factors considered in the current study affect perception towards e-learning.

Comparison of different universities for Subjective norms indicated that Panjab University had highest mean ($\bar{x}$ =4.0) for subjective norms followed by Guru Nanak Dev University and Punjabi University ($\bar{x}$ = 3.9 each) and Punjab Agricultural University ($\bar{x}$ = 3.8). It was statistically significant at the 10.00 per cent level of significance (H=6.57). Gender comparison shows that the male students had higher mean ($\bar{x}$ = 3.9) as compared to female ($\bar{x}$ = 3.8) for subjective norm and it was statistically significant at the 5.00 per cent level of significance (t=2.47). Park (2009); Revythi and Tselios (2017) also concluded that the subjective norm is one of the prominent factors for usage of e-learning system. Comparison of different universities for computer skills another leading factor shows that students of Panjab University and Punjabi University had higher mean ($\bar{x}$ = 4.0 each) than Guru Nanak Dev University and Punjab Agricultural University ($\bar{x}$ = 3.8 each) the difference amongst them was statistically significant (H=46.41, p≤0.01). There was no gender difference regarding about computer skills ($\bar{x}$ = 3.9) as a factor affecting e-learning usage. The results are in conformity with Adewole-Odeshi (2014 who also concluded that computer skills is a critical in determining e-learning usage. Recent lock down due to COVID-19 pandemic also witnessed that students and teachers proficient in computer skills were able to continue teaching and learning without any hindrances.

Subjective norm and computer skills were followed by self-efficacy, innovativeness and perceived ease of ease ($\bar{x}$ = 3.8 each), as important factors. Punjabi University, Patiala had highest mean for self-efficacy ($\bar{x}$ = 4.0) followed by Panjab University ($\bar{x}$ = 3.9), Guru Nanak Dev University and Punjab Agricultural University ($\bar{x}$ = 3.7 each) which was statistically different at 1.00 per cent level of significance (H=20.10). Park (2009); Revythi and Tselias (2017) reported the role of self-efficacy in usage of e learning. During recent lockdown, the students who didn't possess smart phones or laptop or face the network problem were the sufferers. Hence there is need to make students and teachers self–efficient, prior to going virtual for teaching and learning. University wise mean score for innovativeness was highest in Panjab University, Chandigarh and Punjabi University, Patiala ($\bar{x}$ = 3.8 each) followed by Guru Nanak Dev University ($\bar{x}$ = 3.7) and Punjab Agricultural University ($\bar{x}$ = 3.6) which was statistically significant (H=7.66) at 5.00 per cent level of significance. There was no statistical gender difference among male and female (t=1.08). Park (2009) in South Korea also stated that the innovativeness is a important factor which influence the perception of student towards e-learning. During International Online Conference on Teaching-Learning in the Time of Pandemic: Role of Online Learning held by Krishna Kanta Handiqui State Open University, Guwahati, Assam, India in Collaboration with Commonwealth Educational Media Centre for Asia (CEMCA), New Delhi, India from 21–22 April, 2020, presenters worldwide shared that those who are more innovative, tend to learn online methods of teaching faster.

The mean score for perceived ease of use for e-learning was higher in Guru Nanak Dev University and Punjab University ($\bar{x}$ = 3.8 each) than Punjabi University and Punjab Agricultural University ($\bar{x}$ = 3.7 each). It was statistically significant at the 10.00 per cent level of significance (H=7.03). The results are in conformity with Chinyamurindi and Shava (2015) and Punnoose (2012). Behavioural intention ($\bar{x}$ = 3.7) was also reported as a significant determinant for integrating e-learning into higher education. Among universities, Panjab University had highest mean ($\bar{x}$ = 3.9) followed by Punjabi University ($\bar{x}$ = 3.8), Guru Nanak Dev University ($\bar{x}$ = 3.6) and Punjab Agricultural University ($\bar{x}$ = 3.5) and it was statistically significant at 5.00 per cent level of significance (H=9.95). Chinyamurindi and Shava (2015); Park (2009); Adewole-Odeshi (2014); Revythi and Tselios (2017) also reported that behavioural intention affects perception.

Attitude ($\bar{x}$ = 3.6) also emerged as an important determinant of e-learning usage. University wise, Panjab University and Punjabi University ($\bar{x}$ = 3.7 each) had highest mean followed by Guru Nanak Dev University ($\bar{x}$ = 3.6) and Punjab Agricultural University ($\bar{x}$ = 3.5)

and it was statistically significant (H=12.55, $p \leq 0.05$). But there was no gender difference for attitude scores as the mean was same i.e. 3.6. The results are in line with Park (2009). Further perceived hedonism score shows that enjoyment in using e-learning also determines the success of e-learning. Guru Nanak Dev University, Panjab University and Punjabi University had equal mean score for perceived hedonism ($\bar{x}$ = 3.6) followed by Punjab Agricultural University, Ludhiana ($\bar{x}$ = 3.5) and it was statistically significant at 5.00 per cent level of significance (H=10.94). There was no gender difference as the mean was same ($\bar{x}$ =3.6). Mean score for perceived usefulness and university climate was lowest ($\bar{x}$ = 3.5 each) as compared to other factors but these were also reported as major factors. Interestingly, the mean score of perceived usefulness was same gender wise ($\bar{x}$ = 3.5) as well as in all four universities ($\bar{x}$ = 3.5). Chinyamurindi and Shava (2015) and Punnoose (2012) also reported that perceived usefulness (PU) as a determinant of e-learning usage. Punjab University, Chandigarh students reported university climate as determinant ($\bar{x}$ = 3.6) followed by Punjab Agricultural University ($\bar{x}$ = 3.5), Punjabi University ($\bar{x}$ = 3.4) and Guru Nanak Dev University ($\bar{x}$ = 3.3). Male students perceived university climate as more determining factor ($\bar{x}$ = 3.6) as compared to female ($\bar{x}$ = 3.4) but it was statistically non-significant.

The overall mean score for all selected factors was 3.7 which indicates that all the factors under study such as subjective norm, computer skills, self-efficacy, innovativeness, behavioral intention, attitude, perceived hedonism and university climate affect the success of integration of e-learning into higher education. Punjab University had highest mean ($\bar{x}$ = 3.8) followed by Guru Nanak Dev University and Punjabi University ($\bar{x}$ = 3.7 each) and Punjab Agricultural University ($\bar{x}$ = 3.6) and it was statistically significant at 1.00 per cent level of significance (H=21.63).

A comparison was also made amongst different factors within each university. GNDU students reported subjective norm ($\bar{x}$ = 3.9) as most prominent factor followed by computer skills and perceived ease of use ($\bar{x}$ = 3.8), self-efficacy, innovativeness ($\bar{x}$ = 3.7 each), behavioural intention attitude, perceived hedonism ($\bar{x}$ = 3.6 each), perceived usefulness ($\bar{x}$ = 3.5) and university climate ($\bar{x}$ = 3.3) in that order. It was found to be statistically significant when Kruskal Wallis test was applied (H=49.21) at 1.00 per cent level of significance.

Students of Panjab University, Chandigarh strongly agreed that subjective norm and computer skills ($\bar{x}$ = 4.0 each) were foremost factors which influence their perception followed by self-efficacy, behavioral intention ($\bar{x}$ = 3.9), innovativeness and perceived ease of use ($\bar{x}$ = 3.8 each), attitude ($\bar{x}$ = 3.7), perceived hedonism and university climate ($\bar{x}$ = 3.6) and perceived usefulness ($\bar{x}$ = 3.5) in that order. It was statistically significant at 1.00 per cent level of significance (H=56.29). In case of Punjabi University, Patiala students reported computer skills and self-efficacy ($\bar{x}$ = 4.0 each) were equally leading factors followed by subjective norm ($\bar{x}$ = 3.9), innovativeness, behavioural intention ($\bar{x}$ = 3.8), attitude and perceived ease of use ($\bar{x}$ = 3.7 each), perceived hedonism ($\bar{x}$ = 3.6), perceived usefulness ($\bar{x}$ = 3.5) and university climate (X = 3.4) in that order. It was found to be significant when Kruskal Wallis test was applied (H=41.16, $p \leq 0.01$). Punjab Agricultural University, Ludhiana students stated subjective norm and computer skills ($\bar{x}$ = 3.8 each) as most prominent factors followed by self-efficacy and perceived ease of use ($\bar{x}$ = 3.7 each), innovativeness ($\bar{x}$ = 3.6), behavioral intention, attitude, perceived hedonism, perceived usefulness and university climate ($\bar{x}$ = 3.5) in that order. It was also statistically significant at 1.00 per cent of significance (H=38.07).

CONCLUSION

This study assessed the determinants/ factors which we need to take care of before implementation of e learning in our education system. The results show that students agree that all the factors considered in the study affect integration of e-learning into higher education. Contributing to the existing literature our results consistently shows that subjective norm and computer skills were the most prominent factors which should be considered prior to integration of e learning into higher education. There is need to enhance computer skill of students. At the same time as students are influenced by other people's opinion (teachers, friends and parents) hence teacher can motivate them for blended learning.

Self-efficacy and Innovativeness also emerged to be the leading factors influencing perception of students towards e-learning. In the crucial situations like lock down, our education solely depends upon online learning. In such situation students and teachers with computer skills and innovativeness had been able to connect via different apps like google meet, google classroom, zoom app etc. only if they possessed smart phones, laptops along with good network connection. Hence, there is need to make teachers and students self efficient by providing them laptops, smart phones besides strengthening network connectivity, especially in rural areas. Thus, such prerequisites for implementing e-learning in higher education system must be fulfilled so that institutes can introduce blended learning to achieve the goals of teaching and learning.

Paper received on : October 10, 2020
Accepted on : October 21, 2020

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