STUDENT'S PERCEPTIONS ON TECHNOLOGY ACCEPTANCE OF ONLINE LEARNING IN HIGHER EDUCATION: AN EMPIRICAL STUDY

Dr Bharat Kumar Lakra

Assistant Professor (Stage-II), Department of Industrial Relations & Personnel Management
Berhampur University, Odisha.

Abstract
Technology in the present day has changed the landscape of learning as to how the teacher teaches and the learners learn. More recently, the practices in deploying organizational learning have transformed through mobile, online and technologies that optimise learning processes and hence a paradigm shift in the teaching learning process becomes a necessity. Integration of technology into the curriculum will enhance the student's understanding and creativity. Although we are still in the early stages of adoption, the use of new learning technologies. This study aims at fostering students' autonomy and their central role in the achievement of their learning through technology. The study examines the effects of technological tools that promote quality and student's acceptance in teaching learning process.

It is concluded that student learning is enhanced by integrating technology into curriculum which enhance and promote learning process with an active and autonomous role of students supported by educational technologies. The more students are satisfied with technology enable learning service; the more organizational learning will be enhanced.

Keywords: Students Perception, Online Learning, Technology, Higher Education.

1. Introduction

Innovation in education systems has become an imperative need in higher education, as it seeks change and greater dissemination of successful experiences, as the university needs to change at all levels to survive and thrive in the new e-learning solutions for educational market (Lawrence et al.,2017). For professors, this means a significant use of resources and time, which makes it necessary to analyse its effectiveness in the academic result and the quality of teaching through the application of these new techniques.

The integration and intensive use of digital technologies, especially web-based technologies, are transforming universities around the world (Duart&Mengual, 2015; Boelens et al.,2018; Dziuban, et al., 2018). Higher education institutions have incorporated media-rich technology platforms for the evaluation, as well as "personalized or adaptive courses and web conferencing tools, capable of connecting students for synchronous distance activities, which are becoming common solutions for blended learning (b-learning, BL) designs" (Alexanderet al., 2019, p. 12), as technology has the potential to increase access to education, improve learning experiences and reduce the cost of providing high-quality postsecondary education(Protopsaltis & Baum, 2019).

2. Literature reviews

The student's perceptions of technology acceptance learning in the higher education may be influenced by several factors. According to Keller and Cernerud (2002) have found the variables such as age, gender, previous experience of computers, technology acceptance and individual learning styles as major predictive factors when discussing acceptance of technology by students. According to the learning system perspective identified by Marquardt (1996), learning organization is composed of five systems: the organization, people, knowledge, technology, and learning. Technology used to be the groundwork for organizational learning, especially information technology, learning-based technology, and electronic performance support systems. They

contribute to organizational learning as an infrastructure, and when they are used to support learning activities via the Internet, we call them e-learning technology. E-learning has become the major factor in the delivery and diffusion of workplace learning that affect the effectiveness of training (Lim, Lee, and Nam, 2007).

Technology acceptance theories are used to explain how users come to accept a specific technology. Among theory models, two of the most widely accepted are the Technology Acceptance Model (TAM) proposed by Davis et al. (Davis, Bagozzi, and Warshaw, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) proposed by Venkatesh, Morris, Davis, and Davis (2003).

TAM explains the acceptance of information technology in performing tasks and identifies perceived usefulness and perceived ease of use as two key determinants that enhance the use of technology. Although the model is supported by empirical studies (Lee and Lee, 2008; Parka, Romanb, Leec, and Chungd, 2009; Roca et al., 2006), critics doubt it could only be applied in the education context (Ma, Andersson, and Streith, 2005), and point out that it ignores the social influence on technology acceptance (Chen, Gillensonb, and Sherrell, 2002).

Empirical studies show that e-learning technology has positive effects on learning effectiveness and job performance as well (Beamish, Armistead, Watkinson, and Armfield, 2002; Egan, Hessan, Taylor, and Zenger, 2003; Huang, Chu, and Guan, 2007). Further, e-learning technology plays an important role in facilitating learning content and interacting with learners in organizational learning (Juan, Real, Leal, and Roldan, 2006; Robey, Boudreau, and Rose, 2000). Researchers indicate that e-learning technology is an important factor in organizational learning and that the effectiveness of organizational learning can be enhanced through e-learning (Real, Leal, and Rolda´n, 2006). They do not, however, verify directly that e-learning has a positive effect on organizational learning effectiveness (Chang, 2007). In addition, e-learning system service quality might be an important factor in e-learning outcomes.

The purpose of this study was to contribute to technology acceptance knowledge gap in online learning. This study provides added insight into the need for faculty's presence to guide students and anticipate their needs from the technological acceptance standpoint on online teaching.

3. Research Objectives
1. To investigate perceptions of university students on technology acceptance of online learning in higher education.
2. To determine the key factors that influence of university students about using technology acceptance of online learning in higher education.
3. To establish the relationship between the factors reflecting students views towards technology acceptance online teaching and overall satisfaction levels of the students.

4. Hypothesis
H1: Accessibility to study through technology enable learning has a positive effect on university student's perception about higher education learning.

H2: Interaction through technology acceptance learning has a positive effect on university student's perception about higher education learning.

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H3: Responses through technology enable learning has a positive effect on university students' perceptions about higher education learning.

H4: Results of using technology acceptance learning has a positive effect on university students' perceptions about higher education learning.

5. Research Methodology
Participants

The participant in this study were post-graduate students enrolled in the Berhampur University at South Odisha State University in 2019-2020 academic year comprised the study population. There were 1056 students in the population frame. The researcher drew a random sample of 233 students out of this student's population.

Data collection

The online survey was administered through the questionnaire, and the survey link was sent with an e-mail and Whatsapp. Students selected for the study were given two weeks to respond to the survey request from 6rd to 25th November 2020.

Scale of Measurement

The measurement scale designed for this study was structured questionnaire having 26 Likert Scale statements along with basic and demographic information was collected through e-mail and Whatsapp groups for primary data collection. The responses were coded and recoded in SPSS software for data analysis. The scale used to record students' attitudes toward online teaching classes contained five items related to online learning with a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). Students' responses to five items were aggregated to get the overall attitude score. A panel of educators reviewed the survey instrument to establish instrument validity. Internal consistency was tested to establish the reliability of the measurement scale.

Tools used for data analysis

The data has been analysed by using IBM SPSS software. The validity of instrument was checked by exploratory factor analysis (EFA) and multiple regressions using software. CFA has been used for checking the model fit by multiple regression analysis.

Data Analysis and Interpretation

All the questionnaires were coded, and data was verified for data analysis. The data were cleaned, and the tables were prepared, and descriptive studies were derived. Frequencies and percentage were calculated. For the reliability of the instrument, Cronbach's Alpha was calculated for the scale items. Cronbach's alpha was 0.930, which suggests fair and acceptable reliability. Factor analysis was applied to find out the factors reflecting the student's perception regarding technology acceptance online teaching.

In order to find out the most causal factor affecting overall satisfaction of technology acceptance online teaching, multiple regression analysis was done between the overall satisfaction and extracted factors scores as independent variables.

The demographic profile of the respondents is as follows:

Table-1: Demographic Details (n = 233)

Sr. No	Demographic	Frequency	Percentage
1	Age Group		
	18-24 years	211	90.6
	25-29 years	18	7.7
	30 and above	4	1.7
2	Gender		
	Male	103	44.2
	Female	130	55.8
3	Place of Living		
	Urban	47	20.2
	Semi-Urban	67	28.8
	Rural	119	51.1
4	Enrolment status		
	Full-Time	233	100
5	Type of online course		
	Arts & Humanities	97	41.6
	Commerce & Management	36	15.5
	Science	100	42.9
6	Technology uses for Learning		
	Android Mobile	166	71.2
	Laptop	49	21
	Desktop	18	7.7

From the above table-1, it is shown that 233 respondents were responded to the survey. Out of the 233 respondents, most were between the age group 18- 24 years (90.6%), female (55.8%), with the highest level of online education was science (42.9%) with full - time enrolment status was 100%. Most of the respondents were living in the rural area (51.1%) and with the highest number of online classes were enter through Android Mobiles (71.2%).

Table-2 below indicates the descriptive analysis of the scores obtained of 233 respondents on 26 items under study:

Table-2: Descriptive Statistics (n=233)

Sr.No	Items	Mean	Std. Deviation	Coefficient of Variation(%)
1	I have to be self-disciplined in Online learning environment.	3.820	0.945	24.738
2	I have freedom to take help from my classmates through email.	3.620	1.035	28.591
3	I have freedom to ask my teacher when I have any doubt on Online study material.	3.680	0.939	25.516

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4	I feel sense of achievement and satisfaction on the Online learning.	3.590	1.060	29.526
5	Online learning environment improve my academic performance	3.470	1.253	36.110
6	Online class helps me to assess and enhance my learning.	3.730	1.153	30.912
7	I like to communicate with my classmates Online learning is user-friendly	3.860	1.074	27.824
8	It is easier to study and work cooperatively with other group members.	3.460	1.310	37.861
9	Learning outcomes of assignments are stated clearly and concisely.	3.680	1.036	28.152
10	The flexibility helps me to accomplish my learning objectives.	3.610	1.140	31.579
11	Online learning environment retains my interest throughout the course of learning.	3.630	0.988	27.218
12	The flexibility helps me to explore my own areas of interest.	3.560	1.033	29.017
13	I enjoy doing assignments in the online learning environment.	3.370	1.201	35.638
14	I can search study materials by online at any locations suitable for me.	3.720	1.007	27.070
15	Time is saved by online mode of learning.	4.000	0.898	22.450
16	Learning activities can be accessed as per convenient for me.	3.820	0.978	25.602
17	Online classes offer more flexibility in managing my study time	3.820	1.102	28.848
18	Online classes offer more flexibility in organizing my study materials	3.580	1.111	31.034
19	Online classes offer more flexibility in terms of deadlines	3.570	1.151	32.241
20	Online classes are planned systematically.	3.640	1.193	32.775
21	I think I could be participative more in class discussion in an online class	3.500	1.260	36.000
22	Online learning helps me to interact with classmates and the teachers asynchronously.	3.800	1.016	26.737
23	Learning objectives are clearly stated in each online assignment.	3.700	1.077	29.108
24	The online class assignment is easy to follow.	3.810	0.970	25.459
25	The structure of assignments provides a focus for learning to me.	3.890	0.908	23.342
26	My classmates respond quickly to queries about studies.	3.710	1.192	32.129

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The highest means score correspondents to items no.25, which shows that the structure of assignments provides a focus for learning to me. The least mean score is item no. 13, which shows that I enjoy doing assignments in the online learning environment. The Coefficient of Variation of item no.15 is the least one which indicates that the responses for variable no.3 are most consistent. The Coefficient of Variation of item 5 is the highest one which indicates that the responses for variable no.5 are most inconsistent.

Factor analysis was applied to identify the factors that reflect the student's perceptions on technology acceptance of online learning. In order to test the data appropriateness for factor analysis "KMO and Bartlett's test" was carried out in the Table-3 as below:

Table-3: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.940
Bartlett's Test of Sphericity	Approx. Chi-Square	2586.98
	df	325
	Sig.	0

The value of KMO is 0.940; hence the data is suitable for Factor analysis. In order to test the null hypothesis, Bartlett's Test of Sphericity was applied and revealed that the significant value was 0.000 which is less than the 0.05 this testified that the sample was appropriate for factor analysis.

Table-4: Factor 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	9.954	38.286	38.286	9.954	38.286	38.29	3.367	12.951	12.95
2	1.396	5.368	43.654	1.396	5.368	43.65	3.302	12.699	25.65
3	1.163	4.475	48.129	1.163	4.475	48.13	3.291	12.656	38.31
4	1.113	4.28	52.409	1.113	4.28	52.41	3.018	11.608	49.91
5	1.031	3.965	56.374	1.031	3.965	56.37	1.68	6.46	56.37
6	0.908	3.494	59.868						
7	0.87	3.345	63.213						
8	0.798	3.07	66.283						
9	0.769	2.959	69.242						
10	0.749	2.882	72.124						
11	0.71	2.732	74.856						
12	0.699	2.689	77.544						
13	0.629	2.42	79.965						
14	0.585	2.249	82.214						
15	0.546	2.099	84.312						
16	0.519	1.995	86.307						

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17	0.474	1.822	88.13						
18	0.434	1.67	89.799						
19	0.421	1.617	91.417						
20	0.386	1.485	92.902						
21	0.372	1.432	94.334						
22	0.356	1.371	95.704						
23	0.337	1.298	97.002						
24	0.307	1.18	98.182						
25	0.243	0.936	99.118						
26	0.229	0.882	100						

Table-4 above shows that Principal component method was applied to determine the minimum number of factors that accounted for maximum variance in the data regarding the student's perception about technology acceptance of online teaching. As the table shows, all the factors together explained 56.38 % of the total Variance the responses towards the variables that describe the technology acceptance of online teaching characteristics.

Extraction Method: Principal Component Analysis
Varimax rotation was applied, and it was determined those factors which are uncorrelated with each other. The rotated component matrix is given in the table-5 below:

Table-5: Rotated Component Analysis

Rotated Component Matrix						
Sr.No.	**Items**	**Component**				
		1	**2**	**3**	**4**	**5**
1	Learning activities can be accessed as per convenient for me.	0.729	0.103	0.27	0.138	0.171
2	I can search study materials by online at any locations suitable for me.	0.632	0.116	0.455	0.12	0.133
3	Time is saved by online mode of learning.	0.627	0.19	0.018	0.215	0.178
4	The flexibility helps me to accomplish my learning objectives.	0.531	0.189	0.127	0.364	0.145
5	The flexibility helps me to explore my own areas of interest.	0.494	0.343	0.321	0.288	0.15
6	I like to communicate with my classmates through Online learning	0.14	0.757	0.029	0.221	0.142
7	I have to be self-disciplined in Online learning environment.	0.346	0.611	0.38	0.183	0.108
8	I have freedom to ask my teacher when I have any doubt on Online study material.	0.33	0.594	0.253	0.172	0.12
9	I have freedom to take help from my classmates through email.	0.373	0.534	0.421	0.243	0.12
10	My classmates respond quickly to queries about studies.	0.421	0.459	0.202	0.325	0.155

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11	Online learning helps me to interact with classmates and the teachers.	0.073	0.187	0.637	0.205	0.235
12	I feel sense of achievement and satisfaction on the Online learning.	0.244	0.427	0.607	0.291	0.222
13	I enjoy doing assignments in the online learning environment.	0.496	0.0105	0.586	0.224	0.219
14	It is easier to study and work cooperatively with other group members.	0.037	0.171	0.571	0.301	0.246
15	Online learning environment retains my interest throughout the course of learning.	0.027	0.346	0.547	0.17	0.163
16	Online learning environment improve my academic performance	0.2	0.424	0.505	0.335	0.147
17	Learning objectives are clearly stated in each online assignment.	0.197	0.146	0.21	0.691	0.122
18	The online class assignment is easy to follow.	0.254	0.18	0.172	0.615	0.151
19	The structure of assignments provides a focus for learning to me.	0.212	0.303	0.365	0.61	0.143
20	Learning outcomes of assignments are stated clearly and concisely.	0.131	0.511	0.16	0.536	0.139
21	Online classes are planned systematically.	0.189	0.072	0.365	0.524	0.122
22	Online class helps me to assess and enhance my learning.	0.282	0.178	0.193	0.481	0.104
23	I think I could be participative more in class discussion in an online class	0.026	0.117	0.231	0.199	0.725
24	Online classes offer more flexibility in terms of deadlines	0.298	0.25	0.14	0.197	0.571
25	Online classes offer more flexibility in organizing my study materials	0.288	0.319	0.266	0.81	0.489
26	Online classes offer more flexibility in managing my study time	0.029	0.395	0.184	0.174	0.448

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalisation. Rotated converged in 8 iterations.

The factor analysis resulted in a total of four (5) factors that describes the student's perceptions of technology acceptance of online teaching. The factors named accordingly the variables that converged within them, which is shown in able-6 below:

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Table-6: Factor Matrix

Factor Name	Items	Items Loading	Total factor Loading	Eigen Value	% of Variance
(1) **Accessibility**	Learning activities can be accessed as per convenient for me.	0.729	3.013	3.367	12.951
	I can search study materials by online at any locations suitable for me.	0.632			
	Time is saved by online mode of learning.	0.627			
	The flexibility helps me to accomplish my learning objectives.	0.531			
	The flexibility helps me to explore my own areas of interest.	0.494			
			2.955	3.302	12.699
(2) **Interactive**	I like to communicate with my classmates Online learning is user-friendly	0.757			
	I have to be self-disciplined in Online learning environment.	0.611			
	I have freedom to ask my teacher when I have any doubt on Online study material.	0.594			
	I have freedom to take help from my classmates through email.	0.534			
	My classmates respond quickly to queries about studies.	0.459			
			3.453	3.291	12.656
(3) **Responsive**	Online learning helps me to interact with classmates and the teachers.	0.637			
	I feel sense of achievement and satisfaction on the Online learning.	0.607			
	I enjoy doing assignments in the online learning environment.	0.586			
	It is easier to study and work cooperatively with other group members.	0.571			
	Online learning environment retains my interest throughout the course of learning.	0.547			
	Online learning environment improve my academic performance	0.505			
			3.457	3.018	11.608
(4) Result Oriented	Learning objectives are clearly stated in each online assignment.	0.691			
	The online class assignment is easy to follow.	0.615			
	The structure of assignments provides a focus for learning to me.	0.61			

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	Learning outcomes of assignments are stated clearly and concisely.	0.536			
	Online classes are planned systematically.	0.524			
	Online class helps me to assess and enhance my learning.	0.481			
			2.233	1.680	6.460
(5) Flexibility	I think I could be participative more in class discussion in an online class	0.725			
	Online classes offer more flexibility in terms of deadlines	0.571			
	Online classes offer more flexibility in organizing my study materials	0.489			
	Online classes offer more flexibility in managing my study time	0.448			
	Total		**15.111**	**14.66**	**56.734**

Factors affecting Students Perception's regarding Online Teaching Characteristics

The table-6 above shows the five factors that affect the students' views about technology acceptance of online teaching characteristics along with the percentage of variance by each factor that indicates their relative importance in terms of perceptions about online teaching characteristics instruction seen that student perceptions about technology acceptance of online teaching are positively affected by "Accessibility" of online teaching. The second most important factor is **Interactive**, followed by **Responsive**, **Result Oriented** and **flexibility** of online teaching establishing the relationship between students' perceptions regarding the technology acceptance of online learning characteristics and overall satisfaction levels of online learning.

Further, Multiple Regression Analysis has been analysed to inspect the relationship between the various online teaching features and the overall satisfaction from online teaching, which is given in table-7 below:

Table-7: Multiple Regression Analysis

Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	1.133	0.283		3.998	0.000
Accessibility	0.126	0.096	0.078	1.314	0.190
Interactive	1.128	0.094	0.760	12.002	0.000
Responsive	0.196	0.092	0.139	2.122	0.035
Result Oriented	1.183	0.097	0.111	12.195	0.000
Flexibility	1.045	0.078	0.029	13.398	0.000
Note: R^2= .656; Adjusted R^2=.648; F-Value=86.427; Sig.=.000, Dependent Variable: Overall satisfaction of Technology Acceptance in Online Learning					

Predictors: Accessibility, Interactive, Responsive, Result Oriented, Flexibility

Dependent Variable: Overall Satisfaction of Technology Acceptance of Online Learning

The above table shows that the estimated regression model can be presented as:

Overall Satisfaction = 1.133 + 0.126* Accessibility + 1.128 * Interactive + 0.196*Responsive + 1.183* Result Oriented + 1.045 * Flexibility.

From the above table reveals that the factor Interactive i.e., 0.760 is contributing highest towards the student's acceptance of technology of online learning satisfaction followed by responsive, result oriented, accessibility and flexibility with 0.139, 0.111, 0.078 and 0.029 respectively.

Discussion

The study findings support the previous studies that document particular teaching practices rated highly by the students in online teaching. These can be summarized as concern for students, flexibility, responsiveness with regards to students' feedback (Dennen et al.,2007; Fabry,2012; Jackson et al., 2010), all practices that would be included within the element of teaching presence in the community of inquiry model of online learning (Garrison et al., 2000). The findings from this study begin to expand the understanding of different aspects of online pedagogy, particularly among the higher studies students.

Implications of the Study

This study is useful for the faculty and educators of technology application in online teaching. They can understand the student's perceptions regarding the online characteristics that student value most, the factors they consider for their online learning decision. Educational institutions and faculty can formulate their pedagogical strategies according to the student's perceptions to attract more and more online teaching and learning process. Teachers may construct proper pedagogical techniques which can be suitable for accessing, understanding and application of technology in online teaching-learning.

Conclusion

Based on the findings of this study can be concluded that the overall perceptions of the students regarding technology acceptance of online teaching had a positive perception among the students. The result states that perceived usefulness, student supportiveness, faculty responsiveness and perceived flexibility have an effect on student perceptions and the overall satisfaction about the online teaching. Perceived usefulness is the most important factor that attracts student towards learning through online mode, and the same factor is also major contributing factors to the overall satisfaction level of online teaching. The findings of this research generally related to previous studies investigating the perceptions of students with regard to the online course (Seok,2010; Capra,2011; Fabry,2012). In future, similar studies can also be undertaken in different regions, states and nations or comparative studies may be undertaken.

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