An Analytical Study on the Challenges of E-Learning in Higher Education

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ABSTRACT

The emergence of e-learning, which offers unmatched access to knowledge and flexible study opportunities, has revolutionized higher education. But this big change comes with certain difficulties. The critical analysis examines the various difficulties with e-learning in higher education and their effects on students. From the vast literature, lists of difficulties faced by the students were prepared. The final list that consisted of 11 issues faced by the students, were finalized for the data collection purposes. The sample study included 472 respondents which includes the students of Uttarakhand. The study data was gathered through a survey method. Five-point Likert scale was used to measure the data. Further the "principal component analysis (PCA)" applied to extract the principal components or most important issue from a multidimensional data. The challenges identified in the study were "Academic challenge", "Technological challenge" and "Infrastructure challenge". The result states that the academic challenge was the major issue in e-learning quality and to a larger extend the universities are working in these areas.

Keywords: Challenges, e-learning, Student perspective, Higher Education

1. Introduction

E-learning is not the norm. Very first time in Indian education system, e-learning has been introduced at mass level. Earlier, the e-learning was a procedure of teaching adopted by professional training institutes and primarily focused on the working professionals. But, first time during covid, e-learning has been adopted at university level at such pace. There were many issues and challenges identified by the universities during the process of adoption and after this. As e-learning is a modern approach and viewpoints that have opened up for educational practice as a outcome of quick changes in technical advancement, the trend toward globalization in higher education, and the removal of barriers among students. Information and communication technology, or ICT, is being employed in the classroom to help learners learn more effectively. There are varieties of different issues with e-learning systems, each with a unique significance to the whole system. The challenges here include academic, technological; and administrative. Such challenges are categorized as the questionnaire domains.(Ahmad et al., 2023; Mohammed Nasser Hassan Ja'ashan, 2020).

2. E-learning and Higher Education

The Higher education institutions are going through a technology revolution that is disrupting conventional teaching and strategies of learning. Since learning no longer requires a teacher's actual presence in the classroom, teaching and the learning are no longer limited to that setting.(Zhang & Nunamaker, 2003). Studies suggest that students learning online are considerably more proactive and goal-oriented, meaning they see the value which comes along with using this type of learning environment.(Levy, 2004).e-learning has been growing due to the adaptability, accessibility, and the quick development of digital tools. One of the important factors which have a major impact over the student experience in the higher education which is the perceived service quality of e-learning. It takes into account a number of factors that influence how well-suited, satisfying, and valuable students believe online learning to be. Perceived service quality in e-learning is determined by various factors such as usability of the platform, accessibility, content relevancy, peer and instructor engagement, technical assistance, and responsiveness of the learning environment. Traditional universities and colleges are offering various online courses at all educational levels due to the exponential growth in the online enrollment. Online platforms are heavily utilized more frequently to supplement or replace traditional classroom-based educational offerings. Predictions indicate that the many online courses offered will surpass the various onsite courses, particularly in emerging and high-population countries.(Bolliger & Martindale, 2004).

3. Objective of Study

Aim of this study is to identify the various challenges and issues faced by the students while learning online.

4. Research Methodology

The Research Design: In the research work the quantitative method is being used to collect data using questionnaire from a broad spectrum of respondents. The Close ended type questions were considered for the questionnaire. Experts were consulted to confirm the validity of the questionnaire, establishing its validity.

Population: The population included the students studying in the private universities of Uttarakhand.

Data Collection Process: In the quantitative study, 472 students of private universities of Uttarakhand answered questionnaires.

Instruments design: The instruments utilized in this investigation are questionnaires. From the vast literature, the numbers of issues identified by the students were prepared. The final list that consisted of 11 issues faced by the students was finalized for the data collection. The responses of students were measured on a five-point Likert scale (strongly disagree=1 to strongly agree=5). Further "principal component analysis (PCA)" was applied to extract the principal components or most important issue from a multidimensional data-set. Results of the PCA are discussed below one by one.

5. Results and Discussions

Table.1 enlists- descriptive statistics of issues faced by the students. As per the inferences, mean scores ranged between 2.86 (SD = 1.10) for 'lack of interaction between students and teaching staff" to highest score of 3.55 (SD = 1.00) for lack of technology/software required for home access. The overall scores ranged between from low to moderate level.

Table.1: Univariate solution: The Descriptive Statistics of the issues faced by the students		
	Mean	**Std. Deviation**
Lack of interaction between students and teaching staff	2.86	1.10
Inaccessibility of course notes/materials	2.97	1.08
Lack of time required to have online exam/assignments	2.97	1.12
Lack of technical support/advice	3.47	1.10
Inaccessibility of audio/video material, PDF, Power point	3.52	0.96
Lack of training courses provided by the institution	3.20	1.07
The software of e-learning is too complicated to use it	3.49	0.94
Lack of technology/software required for home access	3.55	1.00
Problem with internet access	3.50	1.03
Negative comments about e-learning	3.32	1.08
Inadequate ICT and e-learning infrastructure	3.48	1.00

Table.2 exhibits the results of the "Kaiser-Meyer-Olkin (KMO)" test of the sampling adequacy and the "Bartlett's test of Sphericity". The KMO test validates sample size whereas Bartlett's test validates that if there were significant correlation exists among the variable to form these factors. Value of the KMO test ranges from 0 to 1. In this way desired test value of the KMO test is > 0.50. Higher value means better sample size. KMO = 0.674 is a quite acceptable value to "principal component analysis". (Andy Field., 2009).

The Bartlett's test of the Sphericity is a statistical test to check the presence of the significant level of the correlation among variables. A statistical significant Bartlett's test (p<.01) indicates that there is a sufficient correlation exist among the different variables in order to proceed with the factor analysis (Hair, et al., 2010). Table.2 shows that the Bartlett's test was highly significant as value of the Chi-square = 729.435 (p<.1) was very high that is a desired result.

Table.2: KMO and the Bartlett's Test		
Kaiser-Meyer-Olkin, Measure of Sampling Adequacy		.674
The Bartlett's Test of Sphericity	Approx. Chi-Square	729.435

df	55
Sig.	.000

Table.1 enlist the communality of each of the variable. Communality defines the proportion of the variance of each variable that can be jointly explained by all other variables in analysis. The value of communality range between 0 and 1. Initial value of the communality refers to total variance/information initially present in variable which is = 1. Extraction means the variance or information retained in variables after PCA. Higher values explain that more of information in variable that is retained by factor analysis (PCA). The minimum desired value of the communality is 0.35 (Field, 2009). As it can be seen that the communality ranges between 0.396 and 0.643, which are within acceptable range.

Table.3: Communalities		
	Initial	Extraction
Lack of technical support/advice	1.000	.441
Inaccessibility of course notes/materials	1.000	.569
Lack of time required to have online exam/assignments	1.000	.576
Problem with internet access	1.000	.596
Inaccessibility of audio/video material, PDF, PowerPoint	1.000	.453
Lack of interaction between students and teaching staff	1.000	.623
Lack of training courses provided by the institution	1.000	.511
The software of e-learning is too complicated to use it	1.000	.396
Lack of technology/software required for home access	1.000	.547
Negative comments about e-learning	1.000	.482
Inadequate ICT and e-learning infrastructure	1.000	.643
"Extraction Method: Principal Component Analysis"		

As shown in table.3, the PCA technique extracted 3 principal components. The three components model was found theoretical support from the literature as well. The variance retained using three component model was 76% which is above the minimum required value of 60%. The three components retained 76% of variance or information present in data. Loss of information was very low. The three components retained maximum of pattern and trends existent in the information. First principal component explained that 28% of variance in data, second principal component described approximately 27% variance, and third component explained 21% variance available in data. First principal component explained the highly important aspect of issues faced by the students.

Table.4:The Total Variance Explained									
	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.54	32.14	32.14	3.54	32.14	32.14	3.07	27.88	27.88
2	2.60	23.65	55.79	2.60	23.65	55.79	2.94	26.76	54.65
3	2.22	20.20	75.99	2.22	20.20	75.99	2.35	21.35	75.99
4	0.60	5.47	81.46						
5	0.52	4.73	86.19						
6	0.44	3.99	90.18						
7	0.41	3.69	93.87						
8	0.28	2.57	96.44						

9	0.17	1.59	98.03					
10	0.12	1.13	99.17					
11	0.09	0.83	100.00					
"Extraction Method: Principal Component Analysis"								

Table.4 shows the rotated components matrix. Three components that were extracted indicated that the components appear to focus on broader infrastructure and access issues related to e-learning. The "Varimax rotation technique" was applied to simplify the interpretation of the components by maximizing the variance of the squared loadings. Kaiser Normalization is a method to enhance the interpretability of the rotated components. The first component represents challenges related to the practical implementation of the e-learning and therefore it was named as "Academic challenge". Second component highlights issues related to technological infrastructure and access and therefore has been named as "Technology challenge". Third component highlighted infrastructure challenges. The academic challenge is the biggest challenge, followed by technology challenge, and infrastructure challenge. The three components received enough support from the literature (Mohammed Nasser Hassan Ja'ashan, 2020).

Table.5: "Rotated Component Matrix[a]"			
	Principal Components		
	Academic Challenge	Technology challenges	Infrastructure challenges
Lack of interaction between students and teaching staff	.774		
Lack of time required to have online exam/assignments	.756		
Inaccessibility of course notes/materials	.745		
Lack of technology/software required for home access		.740	
Lack of technical support/advice		.658	
Inaccessibility of audio/video material, PDF, PowerPoint		.578	
Lack of training courses provided by the institution		.555	
The software of e-learning is too complicated to use it		.532	
Inadequate ICT and e-learning infrastructure			.791
Problem with internet access			.772
Negative comments about e-learning			.598
"Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization"			
a. Rotation converged in 4 iterations.			

Table.5 exhibits descriptive statistics and the internal consistency statistics of three principal components of e-learning challenges. Since the average score of academic challenge was 2.93 (SD = 0.85), which is below the mid value of 3, this suggests that this was not a major issue. The universities were able to cope up with it to the larger extent. The Cronbach's alpha (CA) = 0.772 was acceptable and exhibited the acceptable level of reliability. The technological challenge was biggest of all (3.45, SD = 0.61). Although the score was not high but it revealed that the students faced the technological challenge to some extent. The CA = 0.765 suggested an acceptable level of reliability. Equally important was the infrastructure challenge (3.44, SD = 0.76), suggests that the students also faced challenge pertaining to support e-learning to certain extent. The CA = 0.769 was also acceptable.

Table.6: descriptive statistics and internal consistency of components.

Challenges	Mean	Std. Deviation	Cronbach's Alpha
Academic Challenge	2.93	0.85	0.772
Technological Challenge	3.45	0.61	0.765
Infrastructure Challenge	3.44	0.76	0.769

6. Conclusion

From the discussion, a conclusion can be drawn that the academic challenge was the major issue in ELQ. This is most logical explanation as well. As majority of universities actually used e-learning concept first time. The university teachers had to learn how to teach online and students had to learn how to learn online. Technology was new to faculty and students as well from learning perspective. Software and its uses were never explored before. The infrastructure required to implement e-learning was also new and never tried before.

From the discussion mentioned above it can be said that the academic challenge was the main issue and to a certain extent the universities of Uttrakhand are working on it. Although the universities struggled to cope up with the challenge of technology and infrastructure.

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