

An E-learning Tools Acceptance System for Higher Education Institutions in Developing Countries

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Abstract

Integrating Information and Communications Technology (ICT) in teaching and learning has posed new problems for administrative and academic procedures in higher educational organizations. This research proposed an E-Learning Tools Acceptance System for Higher Education that aims to assess the degree of acceptability and critical factors influencing the adoption of online educational resources among undergraduates in developing nations. The approach employed a self-administered survey of 1160 pupils from Higher Education Organizations in developing countries (Bangladesh and Russia). A factor analysis with confirmation was conducted to establish the relationship between the observable variables and latent variables or factors described in the proposed system. The results demonstrate a significant correlation between the Perceived Usefulness component and the factors of Instructional Preparedness and Autonomy in Learning. There is a substantial relationship between the Ease-of-Use component and the Reported Self-Efficacy Perceptions factor. The key elements influencing the acceptance of e-learning technologies among students in the examined group are the teacher's planning, learning independence, and feelings of self-efficacy.

Keywords. E-learning, Learning Opportunity, Developing Countries, Higher Education, Education Institutions.

1 Introduction to E-learning in Developing Countries

Educational organizations have recognized the necessity to modify their organizational structure and operational methods in response to the advancement of Information and Communication Technologies (ICTs) and their influence on the emergence of new opportunities to improve the way students learn (Chatti, 2021; Sulochana Neranjani, 2020). The widespread use of ICTs in higher education has compelled schools to educate students to fulfil societal demands adequately. Still, teachers must adapt Teaching and Learning (TL) methods to adjust to this new context in developing countries (Abdulrahman et al., 2020). Acknowledging that ICTs alone only facilitate the education process if they are effectively included and utilized to their maximum capacity is crucial.

ICTs offer several advantages. They enhance the decentralization and effectiveness of TL processes. They encourage students to become self-directed learners and boost their drive to learn. ICTs foster interaction among TL while bringing about various overall enhancements to the process of learning. Pupils are crucial in effectively implementing ICTs in Higher Education (HE) (Rawas, 2024; Sudipa et al., 2022). Understanding the key aspects influencing student adoption of these technologies, including their experience, drive, and attitudes, is essential in developing countries. The studies have identified four groups that classify these variables: educators, learners, utilized technology, and assistance for technological resources that align with modern teaching and learning methods.

While many studies examine technology acceptance models in pupils, most primarily concentrate on industrialized nations (Jang et al., 2021). The distinctive attributes of developing countries, such as heightened socio-economic disparity, lower rates of internet access, and limited access to higher education, indicate the necessity for doing fresh research that explicitly addresses these circumstances. This research analyzes the degree of acceptability of e-learning resources among college students from poor countries by utilizing an acceptance methodology of e-learning tools in developing countries (Tangirov et al., 2021). This study examines the main variables that influence the utilization of e-learning resources among pupils from three universities in developing countries (Prashanth et al., 2024).

2 Background and Related Works

The proliferation of the Internet and other technological advancements has profoundly influenced colleges and HE institutions worldwide, leading to new initiatives to enhance TL procedures (Tseng et al., 2020; Surendar et al., 2024). The emergence of electronic learning in HE has transformed teaching models and academic practices, shifting the emphasis from the instructor to the student's role, facilitated by utilizing digital technologies to satisfy the influencing factors in consumer adaptation (Raman & Ramachandaran, 2023).

2.1. E-learning in Developing Countries

The research on the impact of e-learning in poor nations is still in its early stages, with most authors focusing on the phenomena in developing countries (Mohamed et al., 2024). The absence of studies in developing nations has led to the argument for the immediate transfer of information from industrialized countries to delightful customer experiences (Raman et al., 2023). The transfer method has faced scrutiny due to cultural, economic, and social disparities that can result in significant variations between advanced and developing countries regarding adopting modern technology by higher level digitalization in the logistics industry (Tseng et al., 2020). This discrepancy creates imbalances when evaluating factors such as efficacy, independence, and the proficiency and enthusiasm to utilize ICT in learning

contexts with data-driven culture and business analytics models (Azoury et al., 2024). The rationale for employing e-learning methodologies varies based on the staff engagement in health services institutions (Subrahmanyam & Arif, 2023). The primary goal is to enhance ongoing HE, but in developing countries, the primary purpose is to transition their educational system toward a knowledge-based economy.

2.2. Technology Acceptance Systems

Technology acceptance refers to a person's psychological disposition towards willingly or expectedly utilizing a specific technology (Alfadda & Mahdi, 2021). The Technology Adoption System is an intended framework to elucidate and forecast consumers' adoption of computer technology.

This widely utilized model posits that the perception of utility and the noticed ease of usage are affected by individual attitudes toward the utilization of technology. These attitudes are believed to impact the intention to engage in the behavior of using technological advances. Outside influences such as preparedness of self-efficacy, student preparedness, instructor preparedness, personalized inventiveness, and self-learning have been recognized as factors that might clarify the adoption of technological advances in developing nations (Dutta et al., 2021).

3 Proposed e-learning Model for Higher Education in Developing Countries

This research utilizes numerical and subjective techniques to investigate the degree of willingness among undergraduates from four HE institutions in Bangladesh and Russia to use virtual acquiring tools. Figure 1 illustrates the conceptual framework developed to study the acceptability of technological advances in developing countries based on current ideas (Jang et al., 2021).

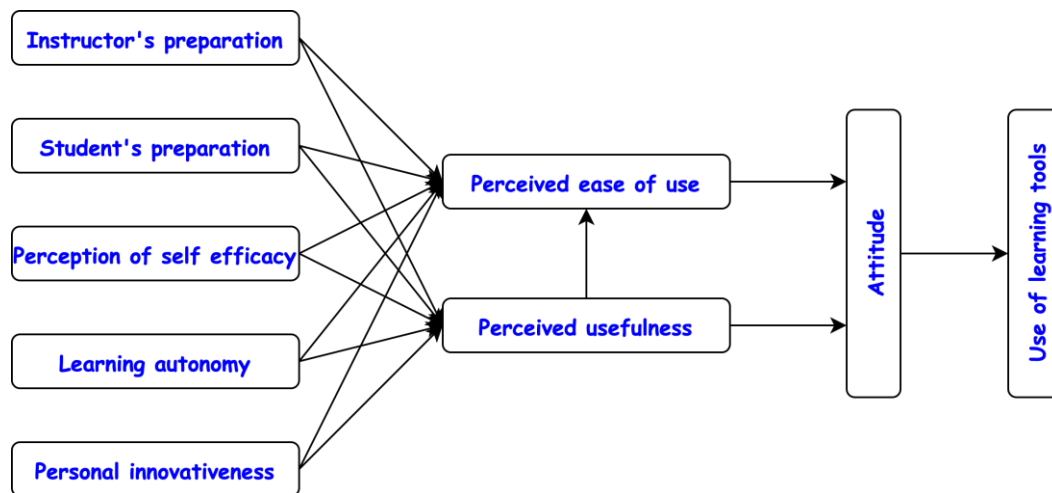


Figure 1: Proposed e-learning Model for Higher Education in Developing Countries

The study utilized 1110 students from occupational and degree-level courses at four participating colleges in developing countries. The selection of participants was done using a random sampling stratified approach. The data collecting tool had dichotomous inquiries and a Likert scale of one to five. The survey was distributed to pupils in the classroom so they could complete it independently.

To assess the dependability of the tool for every one of the components of the proposed model, Cronbach's alpha was employed to calculate the dependability for every sub-questionnaire associated with every component (Wu et al., 2023). A confirmation component analysis was conducted to assess the reliability of the measuring levels, every one of the components, and the device as a whole.

3.1. Survey

A survey was created to gather respondents' views on e-learning, ICTs, and HE technology. The research was disseminated to scholars, pupils, and administrators in five governmental HE institutions in developing countries during July and August 2023. The survey utilized in this study was constructed based on three primary resources. The initial source comprised a comprehensive examination of the research on e-learning and mobile devices.

The second source consisted of the researcher's first-hand expertise in managing the utilization of learning administration systems in creating and implementing e-learning programs. The third source consisted of informal interactions with professionals in the field of e-learning at HE colleges and universities.

The questionnaire had four sections. The initial section of the survey encompassed the respondent's demographic information. The second portion of the survey consisted of fifteen items designed to assess the participants' opinions regarding the notion of e-learning—the final section of twelve items intended to examine respondents' views towards ICTs and HE technology. In the fourth section, the participants were required to assess their views on eight barriers that impede the adoption of e-learning in developing countries. The poll utilized a five-point Likert scale to gather responses, with each point representing a certain level of agreement: (1) firmly oppose, (2) oppose, (3) neutral, (4) agree, and (5) firmly agree.

3.2. Verification and Reliability

The instrument's opacity poses a challenge for the person responding in responding. To ensure accuracy, six experts in technique, technology for learning, psychology of learning, and education assessment were provided copies of the survey for validation. The feedback and recommendations they provided were valuable. The survey items were modified based on their input and views. The researcher assessed the tool's dependability by administering it to a pilot group of thirty pupils not part of the main study population. The Cronbach's alpha coefficient was computed using the Statistical Package for the Social Sciences (SPSS) software, yielding a value of 0.86 for the survey.

3.3. Semi-structured Discussion

The interview followed a semi-structured framework. The individuals interviewed were professionals specializing in e-learning and creators of e-learning platforms. This semi-structured discussion aimed to ascertain the perspectives and viewpoints of e-learning professionals regarding the current e-learning platforms in developing countries.

3.4. Specimen

The present study employed a cross-sectional selection strategy, which was selected according to the available period for the investigation. The study population comprised pupils, scholars, and administrators from five public colleges and the Ministry of HE in developing countries, which houses most of the nation's HE institutions. Using easy sampling, an investigator chose a sample of 900 pupils, 200 professors, and 300 administrators from various institutions and the Ministry of Higher Education. Out of the 1110 surveys issued, 290 were received back and considered legitimate.

4 Simulation Analysis and Findings

4.1. Data Processing Analysis

Additional analysis and distribution statistics are based on 1110 responses from 1400 surveys. Eight hundred surveys were delivered in Bangladesh, of which 290 were returned. Six hundred surveys were sent to Russia, and 120 were returned. This indicates that more than 90% of the surveys were returned in Bangladesh, whereas 94% were answered in Russia. After excluding 80 outliers in the instance of Bangladesh and 65 misfits in the example of Russia, a total of 650 instances were evaluated for Bangladesh, and 510 cases were taken into account for Russia in the modeling phase of this research. The provided data includes details about those surveyed and their understanding of the technique.

4.2. Demographics

The data indicates that the percentage of male donors was around 58.462% in Bangladesh and 39.216% in Russia. In Russia, those between the ages of 20 and 30 accounted for 38.462% of the population, while in Bangladesh, those between the ages of 31 and 40 accounted for 23.077%. Learners in both countries have a preference for part-time and modular modes of learning. In Bangladesh, 33.846% of learners possess degree diplomas, whereas in Russia, this figure is 50.98%. This research observed that 43.077% of the 650 cases in Bangladesh and 39.216% of the 510 cases in Russia had a master certification.

The PhD diploma showed a 23.077% rate in Bangladesh and a 9.804% incidence in Russia. This investigation observed a consistent and reliable power supply in Russia, in contrast to the scenario in Bangladesh. The pupils involved in this survey affirmed their knowledge regarding online education. It appears that those with doctorate and master's degrees had a lower completion percentage, with many citing lack of time owing to their work as the main reason. This study provides evidence that Bangladesh's power supplies are lower than Russia's, as seen in Table 1 of the research.

Table 1: Demographic Analysis of the Survey

Particulars	Class	Frequency			
		Bangladesh (N=650)		Russia (N=510)	
Gender	Men	380	58.462	200	39.216
	Women	270	41.538	310	60.784
Age	20 to 30	250	38.462	180	35.294
	31 to 40	150	23.077	220	43.137
	41 to 50	200	30.769	60	11.765
	Above 50	150	23.077	50	9.804
Education	Degree	220	33.846	260	50.98
	Master	280	43.077	200	39.216
	Doctorate	150	23.077	50	9.804
Hae regular power supply	Yes	150	23.077	140	27.451
	No	400	61.538	370	72.549
Aware of e-learning	Yes	500	76.923	410	80.392
	No	150	23.077	100	19.608

4.3. Exploratory Factor Evaluation

The Exploratory Factor Evaluation (EFE) examines and gives insights into the number of variables needed to describe the data accurately. All measured parameters are associated with the underlying hidden variables within the EFE framework. The validity of the instruments is supported by the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test findings for Bangladesh and Russia. Each EFE was conducted individually.

The KMO analysis of adequate sample size yielded a value of 0.732 for Bangladesh and 0.817 for Russia. Normality tests are necessary to confirm that the dataset follows the normal distribution. The statistical significance of the data set in this study is assessed using the Kurtosis and Skewness metrics. The z-values for kurtosis and skewness ought to be about ± 1.82 , and the p-value for the Shapiro-Wilk test must be more than 0.15. Despite being unanticipated, the data acquired a skewness z-value of 75% over ± 1.82 , which is considered appropriate for further examination in both nations of this research. The research removed the identified anomalies, including 26 in Bangladesh and 20 in Russia.

4.4. Discriminant Verification

The discriminant features of the SPSS make the inference. The importance of the measures was justified by conducting tests to compare the means of different groups and by using pooled within-group composites in developing countries. The discriminatory reliability analysis indicated that 26 cases among Bangladesh participants and 17 cases among Russian participants should be removed.

4.5. Components factor analysis

Factor Evaluation (FE) is highly significant in studies about modeling structural equations. The factor loads of the items were analyzed in this study. The variables were determined using the principal elements and rotation technique, with a threshold of 0.5 for each factor loading. A total of 6 items that did not match the appropriate level of 0.50 or were added in a different row were removed from the total of 26 items in Bangladesh and four items in the example of Russia. $FE < 0.5$ is determined by perceived simplicity of use, e-learning, and technological assets.

Table 2: Composite Reliability Analysis

Constructs	Bangladesh			Russia		
	Cronbach's Alpha	Average	Composites	Cronbach's Alpha	Average	Composites
Perceived usefulness	0.784	0.685	0.823	0.753	0.796	0.823
Technical assets	0.738	0.683	0.785	0.764	0.785	0.853
Perceived ease of usage	0.852	0.652	0.753	0.795	0.735	0.812
Power supply	0.752	0.695	0.863	0.723	0.765	0.785
E-learning	0.784	0.673	0.742	0.742	0.786	0.752

Table 2 depicts the reliability and validity of the constructs. The suitability of the mean-variance retrieved, the combined reliability, and Cronbach's alpha for every developing country of this study are supported. The present investigation successfully attained a criterion of 0.6 for the mean variance taken out, composite accuracy above 0.6, and Cronbach's alpha over 0.6. The required constructs were analyzed after meeting the quality requirements of the evaluation model, and they were assessed using SPSS.

5 Conclusion and Findings

In developing countries, implementing and utilizing technological resources is more intricate than in developed countries due to the introduction of online learning tools, which provide novel academic and social obstacles. This study validates the E-Learning system as a suitable method for examining and determining the elements, variables, and relationships that hinder or promote the implementation of technology in the educational sector of developing countries. Combined perceived utility and reported ease of use are the primary characteristics taken into account by the model. The research successfully forecasted the adoption and use of e-learning tools among undergraduates, as demonstrated by assessing the model's reliability in developing countries. This assessment was conducted at two stages: the validity of observable elements and the validity of the concepts.

The model uncovered the presence of relationships with a moderate to high level of correlation between categories. The proposed e-learning system enables analyzing how external factors influence the decision to implement virtual tools for establishing world HE universities. Among these factors, college preparation is the only construct with a weak association with the perceived simplicity of use.

The study's findings indicate that the primary elements influencing the acceptance of e-learning tools among undergraduates in the sample are teacher preparation, learning independence, and feelings of self-efficacy. HE universities are confronted with a cohort of individuals known as digital natives, which compels them to implement structural modifications that promote the provision of relevant training in developing countries. Parents and instructors unfamiliar with digital technology must establish and adjust to virtual reality by acquiring skills and qualities associated with a more practical teaching approach, effectively translating information into actionable behaviors.

One of the disadvantages of the suggested model is that it depends on a cross-cutting structure. Performing longitudinal research would examine the efficacy of the suggested tactics across various periods, allowing for the development of an appropriate approach to promote the utilization of virtual learning resources for learners from developing countries.

Future research validating the proposed e-learning model should include a qualitative methodology to investigate the potential of educators, academic executives, and other education experts in online classrooms. This will help provide an appropriate setting for the identified variables and findings that influence the acceptance of virtual learning instruments in developing countries.

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Dr. Priya Sukirthanandan, has over 25 years broad experience in driving wide spectrum corporate legal advisory, commercial and corporate litigation towards safeguarding the interest of organizations as well as individual clientele. Well versed in the areas of corporate due diligence, disputes resolution along with agreements drafting and vetting coupled with outstanding negotiations acumen. Furthermore, having over 15 years' extensive experience across academic administration as well as lecturing and teaching. Well versed in the areas of academic management, leadership initiatives in strategic planning, policy and curriculum development, teaching method evaluation and improvement, student retention along with industry collaboration.