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Assessing the E-learning Readiness of Universities in Developing Countries and Expected Obstacles

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Abstract

To benefit from electronic learning (E-learning), organizations should execute considerable upfront analysis to ascertain their E-learning readiness. Studies have demonstrated a range of models that have been adapted, but they are used in developed countries for whom E-learning readiness is elevated. Thus, these models are not valid in growing countries, such as Sudan. Based on a modified model, this research was performed descriptively by applying a questionnaire-based survey method to assess the level of Sudan universities' readiness in the employment of the E-learning system. This modified model includes social support, technology readiness, attitude toward E-learning, acceptance of E-learning, and individual learners. Furthermore, the adoption and implementation of E-learning involve numerous challenges and constraints. Therefore, in this study, the challenges that could be faced in applying E-learning in Sudan from students' perspectives are investigated. The results show that the most prepared factor is individual learners at Sudanese universities. However, this factor still needs a few improvements for E-learning with an overall mean (3.59). Given that the learners are willing to collaborate and share information and knowledge, they can manage time for their learning, and they are also motivated and enthusiastic about using computers. Moreover, attitude toward E-learning is the least prepared factor among all factors (mean = 3.16), which means that this factor is not ready and needs some work. The study recognizes serious barriers that constrain the effective incorporation of E-learning in higher education institutes (HEIs) in developing countries.

Abstrak

Menilai Kesiapan E-learning Perguruan Tinggi di Negara Berkembang dan Hambatan yang Diharapkan. Organisasi harus melakukan analisis awal yang cukup untuk memastikan kesiapan pembelajaran elektronik (*E-learning*) mereka agar mendapatkan manfaat dari *E-learning*. Penelitian telah menunjukkan berbagai model yang telah diadaptasi, tetapi mereka digunakan di negara maju yang kesiapan *E-learning* mereka meningkat. Dengan demikian, model-model ini tidak berlaku di negara berkembang, seperti Sudan. Berdasarkan model yang dimodifikasi, penelitian ini dilakukan secara deskriptif dengan menerapkan metode survei berbasis kuesioner untuk menilai tingkat kesiapan universitas-universitas di Sudan dalam penggunaan sistem *E-learning*. Model yang dimodifikasi ini meliputi dukungan sosial, kesiapan teknologi, sikap terhadap *E-learning*, penerimaan *E-learning*, dan peserta didik. Selain itu, adopsi dan implementasi *E-learning* melibatkan banyak tantangan dan kendala. Oleh karena itu, tantangan yang dapat dihadapi dalam menerapkan *E-learning* di Sudan dari perspektif siswa diselidiki dalam penelitian ini. Hasil penelitian menunjukkan bahwa faktor yang paling siap adalah peserta didik di universitas-universitas Sudan. Namun, faktor ini masih memerlukan beberapa perbaikan untuk *E-learning* dengan rata-rata keseluruhan (3,59). Mengingat bahwa peserta didik bersedia untuk berkolaborasi dan berbagi informasi dan pengetahuan, mereka dapat mengatur waktu belajar mereka, dan mereka juga termotivasi dan antusias untuk menggunakan komputer. Selain itu, sikap terhadap *E-learning* adalah faktor yang paling tidak siap di antara semua faktor (rata-rata = 3,16), yang berarti bahwa faktor ini belum siap dan perlu diperbaiki. Penelitian ini mengakui hambatan serius yang membatasi penggabungan efektif *E-learning* di perguruan tinggi di negara berkembang.

Keywords: challenges, E-learning readiness, higher education institute

1. Introduction

Electronic learning (E-learning) readiness considers the essential factors for achieving the successful execution

of the E-learning platform in higher education. Recognizing the role of these factors can assist educational institutions in integrating proper and effective E-learning initiatives.

E-learning readiness is critical for ascertaining whether or not E-learning programs can be successful [1]. Therefore, before adopting E-learning, universities need to clearly define the objectives of the new strategy and consider its benefits and drawbacks and the variety of potential E-learning solutions that may be implemented in that particular educational environment depending on their E-learning readiness.

E-learning has various benefits. For instance, E-learning helps physicians gain experience and new knowledge for professional growth without commuting to different venues or waiting for class schedules [2]. Moreover, an organization willing to implement E-learning has different cultures and conditions, including other nationalities, which naturally have various resources, capabilities, and perspectives to meet their E-learning demands [1]. This situation requires universities to recognize their state and to respond to questions about extending and performing E-learning. To address this issue, they need to evaluate themselves. Before E-learning is introduced, an organization needs to determine whether or not E-learning is feasible, how to implement it, what are its consequences, and how to evaluate it [3].

Adopting E-learning without proper planning will expand the cost and cause failure. Accordingly, the utilization of E-learning can commence by assessing E-learning readiness [4], which can be determined using different measures. These factors must be considered to avoid failures in implementing E-learning [5]. Evaluating E-learning readiness allows universities to realize what might be needed to promote this technology optimally in a particular situation [5–7].

Numerous E-learning readiness assessment models have been proposed in the literature [3, 6]. These models have been applied in an established context rather than in the least developed countries, such as Sudan. The significance of using a suitable method to measure E-learning readiness has been particularly highlighted in [5]. Rogers [8] stated that each system has its stander, which can diffuse innovation in its system. To ensure that the actual benefit of E-learning is valid in appropriate situations, the readiness of an organization or individual should be measured appropriately. Furthermore, E-learning models may not be appropriate to be used across countries due to the varying needs of role players.

For various developing countries, E-learning is considered a response to the growing demand for higher education. In Pakistan, online learning is encouraged as “education for all.” It intends to reach out students who live quite far from towns and cannot cover traditional education expenses [9]. Issues and challenges have also been deliberated concerning the development of online

education in developing countries. A study on students and staff in three universities in Nigeria demonstrated that the lower approbation of E-learning was due to the insufficient knowledge of E-learning, low computer literacy level, inconsistency platform, inadequate Internet services, and high implementation cost [10].

Universities in Sudan are not excluded from distinguishing this technical fact. Nevertheless, while incorporating E-learning is essential, there is also a need to understand that integrating E-learning in an institutional environment and integrating it into the educational framework are challenging procedures [11]. Such a technology demands either a reliable infrastructure to facilities for the implementation and the complete acceptance and understanding of its potential users, e.g., students and staff [12].

E-learning’s open learning multimedia education delivery methods are being proven to improve educational experiences and enhance the quality of education. E-learning readiness evaluation will identify the integration of information and communication technology (ICT) with education facilities and define areas that require consideration before implementation. Accordingly, in this study, the readiness of Sudanese university students to switch from conventional learning to the E-learning technology culture was evaluated. The primary aim of this study is to assess the readiness to introduce E-learning in respect of readiness categories, including social support [13], technology readiness [3], attitude toward E-learning [14], acceptance of E-learning [15], and individual learners [16], as well as obstacles to E-learning in different colleges and universities in Sudan from the students’ point of view.

2. Literature Review

E-learning. E-learning utilizes electronic media, technological education, and ICT in education. E-learning includes a broad variety of media that offer images, text, animation, audio, and video streaming through technology applications, such as videotape or audio, satellite television, CD-ROM, computer-based learning, and local extranet/intranet and web-based learning [17]. Whether free-standing or using local networks or the Internet, ICT systems are networked [17].

E-learning has been defined in numerous dissimilar ways in the literature. E-learning is primarily used to designate “instructional content or knowledge transmitted or empowered by electronic technologies [18].” Some E-learning descriptions are more comprehensive than this one, for example, restricting E-learning to the shared content through the Internet [19]. Scholars approve that the most well-known concept is that E-learning collects asynchronous and synchronous

guidance to educators on technology [20]. E-learning comprises similar concepts, such as virtual learning, online learning, distance learning, and web-based learning [21]. Khan [22] stated that the E-learning software can help various components and features in education. Components are vital parts of the E-learning system. The attributes are the characteristics of the E-learning software provided by these components. Components, individually and as a team, can correspond through one or even more features.

E-learning is measured as an effective response to the call for a just-in-time approach to deliver learning content at a low cost [5]. The flexibility of the Internet to enable education availability regardless of the location or period of the day has made web-based instruction very desirable recruitment and retention method for universities and colleges worldwide [23].

Assessing the readiness of consumers is crucial to the success of any E-learning program. E-learning development in education institutions has substantial advantages: First, E-learning offers a reliable feature that helps students overcome obstacles associated with the different teaching styles of instructors. Second, through self-learning in E-learning, learners can skip content they already know and switch to the next subject [24]. Third, class materials are submitted to the server, allowing teachers and the help desk team to quickly enhance and maintain the materials [24]. Fourth, students are given the opportunity to learn anytime and anywhere. Fifth, E-learning allows to development of students' computer literacy an important skill required in the workplace [25].

E-learning readiness. An E-learning readiness assessment is essential for universities who want to adopt E-learning and those with an E-learning system already in place. In general, the evaluation of E-learning readiness offers valuable information to produce solutions that can meet individuals' needs in each learning community. Web content availability, institutional management support, skilled human resources, and ICT infrastructure are important factors in deciding E-learning readiness. Accordingly, several scholars have proposed diverse assessment models.

Approximately 20% of the college students indicated that online connectivity troubles interfered with their class participation often, approximately 30% indicated occasional disruption and approximately 50% experienced disruption not often or never.

Chapnick [3] built a model that can assess the readiness of institutions for E-learning. This model examines human resources; psychological, environmental, sociological, and financial readiness (aptitude); equipment; technological skill; and content readiness. It

also classifies various variables into eight groups. Several organizations in many countries as Sudan have utilized this model to evaluate their E-learning readiness.

Engholm and McLean [16] claimed that the model comprises substantial readiness indicators found in this study and attempted to provide administrators and individuals with a beneficial tool in determining different organizations' readiness for E-learning development and training.

Brotis and Poulymenakou [5] introduced 11 subjects (blend instruction, provide "E-learning technology infrastructure, continuously evaluate and provide feedback to development, leadership, design and develop the content carefully, motivate E-learners, align with business objectives, design usable and know your "customers," manage the project and manage change, and keep in mind that E-learning is a training delivery method) as significant success aspects for E-learning sustainability and adoption.

Aydain and Tasci [26] established a model with four categories: people, innovation, self-development, and technology. They claim that, because most businesses buy E-learning solutions from outside suppliers, the presence of many E-learning providers and/or mentors can be seen as another indicator of whether or not E-learning can be implemented rapidly.

Psycharis [6] recommended three categories, namely, education, resources, and environment, each of which comprises specific requirements. The environment category contains the readiness of culture, entrepreneurial readiness, and leadership readiness. The resources category includes economic readiness, human resources readiness, and technological. The education category includes material readiness and educational readiness.

Machado [27] proposed a prime model to reveal the electronic readiness of a particular higher education environment. The key groups are the ability of higher education institute (HEI) stakeholders, facility by learning stakeholders and key stakeholders, and capacity of learning stakeholders. E-readiness is defined as "the capability of HEIs and organizational stakeholders' ability to produce E-learning chances by enabling computer-based technologies."

Divjak and Begičević [28] proposed an E-learning readiness evaluation model in an E-readiness report on the E-learning employment in Kosovo. They developed a model with five key categories: economy, society, learning, access, and strategy and policy. These categories are measured with 23 indicators.

3. Methods

To assess the E-learning readiness of Sudanese universities, a questionnaire survey was implemented. As asserted by King and He [29], academics have been substantially applied survey questionnaires to evaluate constructs and associations. The research was performed descriptively using a questionnaire-based survey method to evaluate Sudan universities' readiness in the E-learning system's employment. The questionnaire was structured following various studies on the E-learning readiness best-practice model. The suggested model includes social support [13], technology readiness [3], attitude toward E-learning [14], acceptance of E-learning [15], and individual learners [16]. Forms have a five-point Likert scale: 1 = strongly disagree (SD), 2 = disagree (DA), 3 = neutral (NU), 4 = agree (AG), and 5 = strongly agree (SA). The analysis was conducted on the students from different. Based on the evaluation model [26], a mean score of 3.41 is considered the mean expected level of readiness (MeI_r) for each element to start an adequate E-learning readiness index, (Figure 1) shows E-learning assessment model.

Population and sample. The sample group was composed of 248 students from various universities, among which 159 are enrolled in public universities and 89 are enrolled in different private universities. The universities located in Khartoum State were grouped into four main clusters based on their locations. Surveys were used to gather data from students and were conducted online (through email. After the distribution

and retrieval of survey responses, the data were obtained and found suitable for investigating the data.

Research Instrument and Data Collection Method

Instrument. A three-section survey, "E-learning Readiness Survey (E-LRS) was made to evaluate the E-learning readiness of universities in Sudan. The first part identifies the background data of the demographic feature. It contains four matters covering the gender age, and university of students, whether public or private and whether their school is considered a scientific or literary school. The second part examines students' insight toward E-learning readiness at the university. This part of the survey has 25 items that correspond to the proposed model, namely, technology readiness (5 items), attitude toward E-learning (5 items), social support (5 items), acceptance of E-learning (5 items), and individual learners (5 items). Lastly, the third part deals with the E-learning obstacles experienced by the students in the different colleges and universities in Sudan.

DeVellis [30] demonstrated that the first phase in evaluating a tool is defining what the investigators intend to measure. This research performed a comprehensive examination of the E-learning readiness instruments.

First, technology is one of the variables that can be efficiently utilized to adopt a technology innovation institute [8]. Without sufficient equipment and easy accessibility, any E-learning implementation becomes challenging, if not impossible [31].

Figure 1. E-learning Readiness Assessment Model [26]

The consumers of E-learning should also have the technological skills to use the framework. In this research project, technical readiness has the following subdimensions: resources, skills, and attitude. The subdimensions examine the availability of computers, the accessibility of the Internet to the students, the learners' expertise to utilize the Internet or computer, and their attitude toward E-learning.

Second, attitude, whether negative or positive, can be attributed to politicians, society, teachers, and students themselves and can be made visible in the policy priority or in how individuals distinguish E-learning. Attitude can become a significant issue in E-learning if not discussed explicitly [32]. Thus, recognizing the perspectives on E-learning is considered the most problematic implementing factor because it deals with some struggles. It can also be an obstacle for facilitators as they have to be pro-E-learning or, in any case, pro-external modes of education because if not, then their institutions of learning would not be desirable. Moreover, if E-learning were making students learn by themselves (self-studying), then they would be out of the corporate as well.

Third, for social support, social nature is different in various nations. In [12], some key fundamentals that support the approval of the perception of E-learning in Sudan were recognized, which will help enhance the quality of education services provided to learners. Among these factors, the nature of residents with a high level of social cohesion and the presence of strong family relationships imposes a great deal of communication on individuals and make them more familiar with the utilization of communication innovations, leading to a higher acceptance of various technologies in the field of education. Considering the nature of consumption of community members in Sudan, most people have great ability to pay cellphone bills [12]. The bill rates in Sudan are more significant compared to those in bordering countries, allowing communications companies to develop their networks to cover the burden. With the civil wars and crises faced by Sudan in previous times, the literacy rate in Sudan is much higher compared to that of the overall population. This fact indicates that the awareness degree and level of learning are very rational, which make the proportion of receivers and students who can work with mobile systems continue to grow.

Moreover, regarding acceptance, several studies have extensively used learners' satisfaction levels with E-learning to assess the efficiency of E-learning [33, 34]. More recently, researchers have focused on a broader range of factors that influence students' E-learning acceptance. Pedagogical layout and scholar/implementer collaboration are revealed to impact students' E-learning acceptance [35]. A

significant number of studies have focused on students' recognition of E-learning. Moreover, educators' recognition of E-learning is always of substantial concern for academic institutions.

Finally, for learner readiness, all respondents understood the importance of being familiar with utilizing computers and obtaining skills needed to be productive with an E-learning concept for learning and development. Numerous variables of readiness referring to individual learners were viewed as essential for the success of E-learning, such as students being comfortable with and utilizing computers and having necessary computer skills. Abilities should be described and demonstrated before E-learning is introduced [36]. Nevertheless, Urdan and Weggen [37] claimed that some people would never be comfortable or eager to use computers for education, which might be a more significant obstacle to address.

4. Findings

Characteristics of respondents based on demographics. The majority of the participants were female (males = 86, females = 162). Age-wise, the respondents who were aged 17-23 participated with the most elevated rate of 74.6%, followed by the respondents aged 24-30 with 23.4 % and those aged 31-37 with 2%. Almost all the student respondents are enrolled in public universities (64.1%), and 35.9% are enrolled in private universities. Moreover, 77.5% belong to scientific schools, and 22.6% belong to literary schools (see Table 1).

Table 1. Characteristics of the Students Based on the Demographics

Variable	Measurement	Frequency	Percent
Gender	Male	86	34.7
	Female	162	65.3
University	Public	159	64.1
	Private	89	35.9
Age	17-23	185	74.6
	24-30	58	23.4
	31-37	5	2.0
School	Scientific	192	77.5
	Literary	56	22.6

Data analysis. Cronbach's alpha is used to check the reliability of instruments. The findings of this study demonstrate that all parameters have a Cronbach's alpha of 6 and above, which indicates that all the table constructs have sophisticated reliability within the context of measurement. Table 2 displays the Cronbach's alpha coefficient for every sub-dimension in the student instrument.

This study is focused on how Sudanese university students perceive their institutional readiness for E-learning. To determine whether the universities in Sudan are prepared for E-learning or not, Table 3 explains the overall mean score of the students' responses and the mean scores of items associated with each factor. The table shows that the overall mean score is lower than the expected level of readiness (overall mean (M) = 3.38 < Melr = 3.41). This finding implies that universities in Sudan are overall "not ready for E-learning and need some work."

The results also show (Table 3) that the average value of the factor "attitude toward E-learning (att)" is smaller compared to that of "universities' readiness for E-learning" (mean att (Matt) = 3.16 < Melr = 3.41). The finding concerning attitude implies that the universities are "not ready for E-learning and need to take some work." The average value for "acceptance of E-learning" (ae) is (mean ae (Mae) = 3.31 < Melr = 3.41), which means that the Sudanese universities are not ready for E-learning from the students' perspective and need to do some work. The average value of social support (ss) is (mean ss (Mss) = 3.37 < Melr = 3.41), which shows that universities are "not ready for E-learning and need to do work." The average value of technology readiness (tr) and individual learners (il) is (mean tr (Mtr) = 3.48 > Melr = 3.41) and (mean il (Mil) = 3.59 > Melr = 3.41), respectively, which indicates that universities are not ready for E-learning and need to make improvements and development regarding social support and individual learners.

The mean scores of the variables can be utilized to recognize the areas of development in the participant universities. Initially, the mean score for social support (Mss = 3.37 < Melr = 3.41) shows that there is an overall deficiency of social support in the universities. Thus, they certainly should do some work.

Table 2. Cronbach's Alpha Coefficient in the Student Instrument

Categories	Number of Items	Cronbach's Alpha
Social support	5	.812
Technology readiness	5	.875
Attitude toward E-learning	5	.885
Acceptance of E-learning	5	.921
Individual learners	5	.948

Table 3. Average Values of the Research Factors

Variables	N	Means	SD
Social support	248	3.37	1.17
Technology readiness	248	3.48	1.22
Attitude toward E-learning	248	3.16	1.32
Acceptance of E-learning	248	3.31	1.27
Individual learners	248	3.59	1.21
Overall	248	3.38	1.23

Table 4. Social Statistics Results

No.	Social Support	Mean	SD	Description of Universities' Readiness
q1	<i>My family helps me to utilize the Internet for educational activities.</i>	3.72	1.17	Ready but need a few improvements
q2	<i>My family encourages me to use electronic devices (e.g., phone, tablet, and computer) for learning purposes.</i>	3.81	1.16	Ready but need a few improvements
q3	<i>My teachers support me in using the Internet for educational purposes.</i>	3.65	1.14	Ready but need a few improvements
q4	<i>My friends are motivating me to use the web for educational reasons.</i>	3.51	1.24	Ready but need a few improvements
q5	<i>The school offers us E-learning resources and the chance to study online.</i>	2.17	1.16	Not ready and need a lot of work

Table 5. Technical Readiness Statistics Results

No.	Technology Readiness	Means	SD	Description of Universities' Readiness
q6	<i>I may browse the Internet and/or intranet from outside the workplace (e.g., cafe and home).</i>	3.09	1.35	Not ready and need a few improvements
q7	<i>I have an essential ability to use computers.</i>	3.75	1.19	Ready but need a few improvements
q8	<i>I have a quite vital ability to utilize the platforms (e.g., email, chat, and browsing).</i>	4.02	1.06	Ready but need a few improvements
q9	<i>I can embrace technological advances (e.g., start using digital documents rather than paper documents) in daily tasks.</i>	3.48	1.31	Ready but need a few improvements
q10	<i>I have been using computers in my everyday job.</i>	3.10	1.21	Not ready and need some work

Table 4 shows that $Mq1 = 3.72$, $Mq2 = 3.81$, $Mq3 = 3.65$, and $Mq4 = 3.51 > Melr = 3.41$, which implies that social support is still in the ready category but “needs a few improvements.” The lowest value obtained with $Mq5 = 2.15 < Melr = 3.41$ means that universities do not provide students with E-learning resources and the chance to learn online. Thus, the Sudanese universities are “not ready and need a lot of work to be done.” Moreover, the respondents specified that the IT infrastructure at the schools is not dependable enough to sustain E-learning, with the mean score below the expected readiness level for E-learning ($Mq5 = 2.15 < Melr = 3.41$).

Table 5 explains to which extent the universities need to improve and develop technical readiness.

The respondents were questioned about their technical readiness regarding E-learning and access to resources, e.g., computers, network infrastructure, and laptops because learning is enabled by access to the Internet and resource availability. Questions regarding their technological abilities in using the internet, online database, and their attitude toward E-learning were also asked. The overall mean score for technology readiness is advanced as compared to the expected level of readiness ($Mtr = 3.48 > Melr = 3.41$), which means that the universities are “ready but need a few improvements.”

Based on the results, the majority of the students agree to a great extent that they have the essential ability to use computers and the Internet. They also indicated that they are ready to accept technological innovations in their everyday task and only “need a few improvements” ($Mq7 = 3.75$, $Mq8 = 4.02$, and $Mq9 = 3.48 < Melr = 3.41$).

The respondents also indicated that they are not able to access the Internet or intranet outside their universities, as indicated by a mean score below the expected

readiness level for E-learning ($Mq6 = 3.09$; $Mq10 = 3.10 < Melr = 3.4$).

Table 6 shows the extent to which universities need to improve and develop the attitude toward E-learning, which are presented in further details in the following paragraphs.

Table 3 shows that the attitude toward E-learning is the lowest among all factors with an average value of 3.16, which means that the universities are “not ready and need some work.” Furthermore, the students indicate that E-learning is recommended as one of the alternatives for conventional teaching learning and it will be a wise move. Thus, the universities are “ready but need a few improvements,” as indicate with the following values: $Mq15 = 3.53$; $Mq14 = 3.41 > Melr = 3.41$. For q11, q12, and q13, the values are below the expected readiness level of 3.41, which means that the universities are “not ready and need some work.”

Table 7 presents the statistics on claims relating to the factor “acceptance of E-learning.” As shown in the table, the mean scores for all the elements were below the expected level of readiness ($M < 3.41$), which means that the universities are “not ready and need some work.” The respondents were asked to rate the five elements to assess their acceptance of E-learning. The result of q16 is $Mq16 = 3.64 > Melr = 3.41$, which implies that the participants have a positive attitude toward E-learning and they agree that E-learning would effectively boost their education. However, it “needs a few improvements.”

Table 8 shows the individual learners' statistics results. Individual learners at Sudanese universities are “ready but need a few improvements” for E-learning, with an overall mean of 3.59. The learners are willing to collaborate, share information and knowledge, can take accountability, manage time for their education, and are motivated and ready to utilize computers for education.

They also see the need for E-learning and consider E-learning as a practical alternative to old-style method, as shown in the responses (Mq22 = 3.81; Mq23 = 3.58;

Mq24 = 3.44; Mq25 = 3.59 > Melr = 3.41). Thus, the students are “ready but need a few improvements” for E-learning (Mq21 = 3.53 > Melr = 3.41).

Table 6. Attitude toward E-learning Statistics Results

No.	Attitude toward E-learning	Means	SD	Description of Universities' Readiness
q11	<i>I have heard about E-learning for a while.</i>	2.89	1.28	Not ready and need some work
q12	<i>I had used it, or I am using E-learning.</i>	2.80	1.34	Not ready and need some work
q13	<i>I find it convenient to use E-learning technology.</i>	3.21	1.23	Not ready and need some work
q14	<i>The collaboration of E-learning technologies into the Sudanese education system is a wise movement</i>	3.41	1.40	Ready but need a few improvements
q15	<i>I might suggest E-learning as one of the replacement methods for the conventional teaching learning approaches.</i>	3.53	1.39	Ready but need a few improvements

Table 7. Acceptance of E-learning statistics results

No.	Acceptance of E-learning	Mean	SD	Description of Universities' Readiness
q16	<i>I agree that E-learning is adequate for my research.</i>	3.64	1.26	Ready but need a few improvements
q17	<i>I agree that it is easy for me to utilize E-learning.</i>	3.30	1.34	Not ready and need some work
q18	<i>I agree that E-learning allows me to accomplish my learning more efficiently rather than the conventional classroom-based concept.</i>	3.06	1.31	Not ready and need some work
q19	<i>I agree that using E-learning can increase my efficiency.</i>	3.26	1.24	Not ready and need some work
q20	<i>I agree that E-learning can improve the quality of my education.</i>	3.29	1.22	Not ready and need some work

Table 8. Individual Learners' Statistics Results

No.	Individual Learners	Means	SD	Description of Universities' Readiness
q21	<i>I am ready for E-learning.</i>	3.53	1.36	Not ready and need some work
q22	<i>I am enthusiastic about cooperating and sharing information and knowledge.</i>	3.81	1.10	Ready but need a few improvements
q23	<i>I will take accountability and handle my own learning time.</i>	3.58	1.20	Ready but need a few improvements
q24	<i>I am motivated and ready to utilize computers for education.</i>	3.44	1.23	Ready but need a few improvements
q25	<i>I see E-learning as a practical method of learning.</i>	3.59	1.20	Ready but need a few improvements

Table 9. Obstacles to E-learning

Items	SA	AG	UN	DA	SD
Sustaining motivation in an online course is an extra challenge that online students could face.	9.2	25.3	20.2	30.7	14.6
A shortage of adequate funding critically prevents universities in Sudan from switching to this mode of learning.	40.0	35.9	10.2	9.7	4.2
The majority of people in Sudan will not accept E-learning.	27.4	20.2	18.7	20.4	13.3
Connectivity to the Internet and power failure will affect E-learning productivity.	50.6	46.0	1.5	1.0	0.9
Many people are not well familiarized with the use and application of ICTs in day-to-day activities, and hence their knowledge and skills in ICT-related work are low compare to those in developed countries.	23.8	19.6	22.9	15.3	18.3
The lack of ICT infrastructures will delay the implementation of E-learning in Sudan.	33.4	47.3	12.3	5.1	1.9

5. Obstacles of E-Learning

Although industrial countries have achieved substantial progress toward integrating E-learning platforms in HEIs, developing countries still have not fully deployed such solutions [38–42]. Explicitly, there is a significant delay in E-learning acceptance in most educational systems in the Middle East [43, 44] and Africa. Despite the efforts of developing countries to incorporate E-learning into HEIs, this has not been achieved successfully. Many obstacles impede the successful incorporation of E-learning into the system of higher education. All the technological software and hardware accessible for learning are not enough to establish an E-learning course. Institutions need to outline clear and complete policies for incorporating E-learning in their delivery procedures to respond to the innovative student market demands, their varying requirements, and prospects [45].

Studies have recognized significant problems that threaten the effective implementation of E-learning in higher education [38, 46]. Therefore, while recognizing the advantages of E-learning as a method of improving education delivery, obstacles to adopting this technology should also be addressed, particularly in Sudan because corresponding research has been exceedingly scarce in the country.

Part (3) of the form aims to investigate the expectation of potential difficulties in setting up an E-learning system in Sudan's universities. Students responded to the statement of major obstacles to an E-learning system on a graded scale.

Table 9 demonstrates the ratio of respondents who agree on the possible barriers to adopting an E-learning system in Sudan's universities.

Table 9 shows that sustaining motivation in an online course seems to be another obstacle for students (34.5% of the respondents agree (SA and AG)). Learners who required independence and self-motivation generally had lower performance rates compared to their counterparts [47]. Students with a lack of self-regulation appeared not to give adequate time for completing homework, consequently turning intense quality work or delay in submitting assignments [48]. Apparently, "good learners seem to have higher confident; they will succeed, raise self-responsibility, boost self-organization skills, and improve technical knowledge and access" [47]. Learners must also determine the driving factors that will lead to the continuance of motivation for the remainder of the course. Students who are deficient intrinsically or extrinsically motivated can easily lose focus of their initial goal, rapidly lose their interest within the course, and eventually withdraw [49]. To determine their success in undertaking an online course, understanding learning styles and self-behavior is relevant.

According to [50], lack of ICT infrastructure and insufficient funds are challenges deterring E-learning approval in developing countries. The results show that 75.9% of the students agree (SA and AG) that E-learning systems could face a shortage of funding needed to switch to the E-learning mode.

Moreover, 47.6% of the students agree (SA and AG) that most Sudanese will not accept E-learning systems.

Figure 2. Obstacles to E-learning from the Students' Perspective

This finding is similar to the result conducted by [51], which showed that learners' behavioral intention to admit and use E-learning in emerging countries is significantly impacted by their preconceptions of its ease of use, usefulness, and social influence.

Elzawi and Wade [52] pointed out that poor Internet access and Internet connectivity are obstacles delaying E-learning uptake in developing countries. 96.6% of the respondents agree (SA and AG) that connectivity to the Internet and power failure will affect E-learning productivity.

Various problems impact the pedagogy of E-learning in a developing country [53]. Such problems include educational background, poverty levels, social and ethical orientations, and religious predispositions, which all together generate a wide range in the educational situation. The results show that 43.4% of the respondents agree (SA and AG) that many people are not well familiarized with the use and application of ICTs in day-to-day activities. Hence, their knowledge and skills in ICT-related work are low compared to those in developed countries. However, their skills come from the use of basic applications and/or games played on the computer. Many people have certificates in computer applications, but their skills have degenerated due to the inaccessibility of computers, so they need to learn again. Simultaneously, many people with low economic class cannot afford to take computer studies because the tuition is much higher than those of other study programs.

Gulati [54] studied the integration of technology-enhanced learning in diverse emerging countries. The research presented that E-learning initiatives can progress in the educational field in these countries. However, poverty and deficiency of ICT infrastructure are the core matters that have been exposed. In this study, 80.7% of the students agree (SA and AG) that the lack of ICT' infrastructures will hinder E-learning employment in Sudan (Figure 2).

6. Conclusions

Educational and government institutions are attracted to utilizing E-learning, yet they are not sure of the restrictions to measure their E-learning technology readiness. Hence, developing a model for E-learning readiness evaluation is essential to guide the establishments and administrations in embracing E-learning technology.

This study developed a model for E-learning readiness evaluation for HEIs. The model offers institutions with procedures on readiness for E-learning technology. According to this study and the literature review, a modified model is suggested to include social support, technology readiness, attitude toward E-learning, acceptance of E-learning, and individual learners.

The study utilized surveys as a tool for data gathering. Descriptive statistics scrutinized the quantitative data through the Statistical Package for the Social Sciences. The sample was composed of 248 students from various faculties and schools in Sudan. After the distribution

and retrieval of the survey, the data were analyzed and found suitable for investigation.

The results show that the overall mean score is lower than the expected level of readiness (Moverall = 3.38 < Melr = 3.41). Based on this result, it can be inferred that universities in Sudan, within the limits of the universities surveyed, are overall not ready for E-learning and need some work.

The goal of this research was also to investigate the perceptions of probable difficulties in the setting up of an E-learning system in Sudanese universities. The respondents were asked to answer a graded scale statements regarding the potential obstacles of an E-learning system. The study recognizes serious barriers that constrain the effective incorporation of E-learning in HEIs in Sudan. The most significant concern that will affect E-learning productivity was connectivity to the Internet and power failure.

Study Limitations

There were not many boundaries or weaknesses recognized in this study. The primary limitation was the number of respondents that responded to the survey. Having more participants could be better. However, this limitation is common to any study. One more limitation was that this study was exclusively performed in Khartoum State, and responses were based on the students' perspectives only.

Recommendations

This study proposes integrating E-learning into HEIs by breaking down the recognized complications into smaller solvable parts. Further work needs to be done to familiarize the E-learning technology in Sudan's education system, particularly regarding the low level of computer literacy, unstable power supply, problem with connectivity, and low level of E-learning awareness. E-learning strategies, policies, work plans, work instructions, and budgets should be prepared for a successful implementation. According to the research results, the government has to develop clear ICT policies to back up E-learning's outlines in Sudan's education system. Moreover, funds should be provided to universities from the private sector, contributors, and the government.

Appropriate university management administration in line with the acquisition of the essential E-learning infrastructure, besides establishing E-learning centers in HEIs, is also important. It is also imperative to consider the readiness of teachers and technical staff. Learners should be E-learning-ready by having the necessary ICT literacy skills to focus on learning, not the technology.

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