Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.
Divulging the efficacy of e-learning through the eyes of university students: Lessons from a third world perspective

Caleb Manjeese

Great Zimbabwe University, P.O. Box 1235, Masvingo, Zimbabwe

A B S T R A C T

The COVID-19 has resulted in the shift from the physical classroom education to online learning or a combination of both. At the height of the pandemic, over 1.2 billion children were out of the classroom as schools were completely shut across the world (Li and Lalani, 2020). This has dramatically changed education with the distinctive upsurge of e-learning, whereby teaching and learning is conducted remotely with the aid of digital platforms. This sudden shift from the traditional classroom in various parts of the world has left many not sure about the future of the education market. The question from all quarters is whether online learning will continue post the pandemic, and in response to the pandemic many online platforms are offering their e-learning platforms for free (Holmes, 2020) but there is need to see their applicability to the context of Zimbabwe or other third world countries. The research used qualitative data collection method in which 4th year students were asked to write an essay about their experiences with e-learning. 50 students took part in the research and their responses were evaluated using R qualitative data analysis (RQDA) software. The results were used to come up with a model that explains the critical success factors for the adoption of e-learning in higher learning institutions. The results show that a combination of organizational, technological, environmental and behavioral factors affects the efficacy of e-learning.

1. Introduction

The coming of COVID-19 has awakened the world to new means of doing business so that life continues in what has been termed the “new normal”. Life has not been easy with a lot of restrictions on the people’s way of life hence the need to accept new ways of conducting business. No aspect of life has been left untouched with changes occurring even in higher education as normal face-to-face lectures are deemed not suitable as the covid-19 is ravaging. Institutions of higher learning have adopted the use of e-learning platforms in conducting business as a way of giving access to learning to their students. Singh (2020) quoting Abernathy, says “Online learning is not the next big thing; it is now the big thing”. E-learning is known by a number of names such as online learning or electronic learning and it refers to the process of knowledge acquisition which is facilitated through electronic technologies and media. The simple definition of e-learning can be given as learning that is electronically enabled (Laurrayld, 2004).

The main advantages of e-learning in higher education have been listed as greater access, resource scalability, better results, improved pace, cost-effectiveness, quick lesson delivery, personalization, instant up-skilling, environmentally sound and traceable outcomes (Ahad and Dar, 2017).

In higher learning institutions e-learning have been conducted through the use of e-learning platforms. Though these tools have been existing before the covid-19 pandemic and have been included in many studies before, their use have been enforced by the coming of covid-19 as institutions world over tried to adjust life to the new normal. These platforms differ in many ways but they have one thing in common: they facilitate the need to learn new info without the need for direct contact (Bichsel, 2013). Examples of e-learning platforms used in higher education include: Docebo, Adobe Captivate, Google Classroom, Elucidat, Lectora Inspire, Blackboard Learn, Articulate 360, LinkedIn Learning, SHIFT eLearning, Udemy etc.

An e-learning platform can also be referred to as learning management system (LMS), pedagogical platform, course management system (CMS), or e-learning management system (eLMS). These consists of web and cloud-based software that allows institutions to deliver learning materials to their students, allowing 24/7 access to content and tailored education.

It is agreeable to say that e-learning is now becoming the missing link between improvements in current education and technological usage. Usually an e-learning platform provides the instructors with a chance to guide and manage learner achievements more effectively by developing resources that meets the experience and expectations of learners in a consistent and creative way. Learning institutions and researchers agree that technology alone will not bring major changes to educational institutions, but needs to be integrated consistently and comprehensively so as to bring better transformation to the way students conduct their learning (Ghavifekr and Rosdy, 2015). It is believed that with the use of e-learning platforms, students are capable of attending and tracking
their courses and content with a clear overview of the results.

All the tools available for use by mankind have their drawbacks and Tamm (2020) list e-learning’s disadvantages as:

- Limited feedback to students, No social interaction causing social isolation
- The need for self-motivation and time management skills on the part of participants
- The development of communication skills maybe hampered
- The prospects of avoiding cheating maybe difficult and complicated
- Instructors may focus on theory and neglect practice
- The absence of face to face communication, E-Learning lacks face-to-face communication
- It is applicable to certain disciplines
- It can only be done by those who are computer literate
- It may be difficult to accredit and ensure quality on online education.

Studies have been carried out in many parts of the world to determine the factors that influence the successful adoption and usage of e-learning in different institutions. The current study will look at the efficacy of online learning in a developing country context and what factors are relevant to its usage success. To determine what context is important for the measurement of the effectiveness of e-learning according to the students in this Covid-19 pandemic era.

2. Literature review

2.1. Definition of e-learning

In recent times the internet has been proven to be one of the indispensable tools for research and learning and is widely used by both instructors and learners to exchange information (Richard and Haya 2009). E-learning is composed of the use of internet and other relevant technologies in producing materials for the purposes of learning, teaching, regulating and assessing courses in an educational institution (Fry, 2001). There is no one agreed definition of e-learning and different authors have proposed several definitions with each revealing the specialisation and interest of the author (Dublin, 2003).

It should be realised that e-learning as a concept covers a lot of applications, learning methods and processes (Rossi, 2009) hence it is difficult to come to a common definition of the term (Oblinger and Hawkins, 2009).

According to Dublin (2003) many questions have been asked as to what is e-learning and some of the questions include:

- Is e-learning the provision of an on-line coursework for distant students?
- Does it refer to the use of virtual environments to enable the provision of camps tutoring?
- Is it an online tool that aid, enrich, extend and enhance collaboration?
- Does it use online means or it uses blended learning?

Oblinger and Hawkins (2009) states that e-learning has evolved to become technology based in delivering all or part of the content of a course without the limitations of time and place. The European Commission (2001) gives its definition of e-learning as the use of emerging multimedia technologies and the internet to provide quality learning by improving access to resources and facilities to even distant students. Thus e-learning is the use of ICTs to enable access to online learning/re-teaching. Abbad, Morris, and de Nahlik (2005) gave the meaning of e-learning as any learning that is electronically enabled. This definition is narrowed to mean any learning that is inspired by digital technologies. Other researchers narrow it further to mean learning that only takes place on the web or internet (Keller and Cernerud, 2002; LaRose et al., 1998). Maltz and Deblois (2005) notes that the use of the term e-learning has several perspectives from which it can be viewed and these include: online distance learning, distributed learning, or hybrid learning. OECD (2005) defines e-learning as the use of ICTs in various educational processes to support and enhance learning in higher learning institutions and, their use includes as complementary to traditional classrooms, completely online learning or mixture of the two modes. Wentling et al. (2000) gave their own version of e-learning as the attainment and use of knowledge that are to a larger extend distributed and facilitated by electronic means. According to Wentling et al. (2000), e-learning is dependent on computers and networks but with additional systems comprised of wireless or satellite channels and other mobile technologies such as cellular phones.

2.2. Types and usage of e-learning in higher learning

Different authors have come up with different ways of classifying e-learning. Algahtani (2011) proposed two basic types of e-learning: computer based and the internet based e-learning. The computer based e-learning is comprised of a wide range of hardware and software for use and can be used as either computer managed instruction or computer assisted learning. In computer assisted-learning, computers replace the traditional methods by means of providing interactive tools that can be used in class or as self-paced learning outside the class. In the computer-managed instruction, computers are used for the purpose of storage and retrieval of information to aid the management of education process. Almosa (2002) asserts that internet-based learning is an improvement of the computer based learning by making resources available online and also links to knowledge centres which could be used by learners at any time and place even in the absence of the teachers. Blended/mixed mode, assistant mode or the completely online are the classifications given by Zeitoun (2008) based on the extent of use of technology features in education. The assistant mode is used to supplement the traditional mode as need arises. The mixed mode uses online and traditional methods together where a short-term course or degree can be offered for a partly traditional method. The completely online mode is the most advantageous with the use of networks for conducting learning (Zeitoun, 2008). Algahtani (2011) further split the completely online mode as “synchronous” or “asynchronous” based on whether the exchanges in online classes is occurring in real-time. The synchronous mode allows two way instant communications between learners and instructors using tools such video conferencing and chat rooms. The asynchronous mode allows learners and instructors to interact at different times using tools such as thread discussion and e-mails. The advantage of the synchronous mode is given as instant feedback which lacks in the asynchronous mode but the advantage of asynchronous is that learners can work at their own pace and time (Algahtani, 2011; Almosa and Almubarak, 2005). The online mode was further split into individual and collaborative (Zeitoun, 2008).

2.3. Theoretical framework

2.3.1. The Theory of Reasoned Action

TRA defines relationships between the constructs of belief, attitude, norms, intention and behaviour. One’s behaviour is influenced by his intentions, which in turn are influenced by attitude and subjective norm as elucidated in Fig. 1. An individual’s perception on whether those around him approve of the behaviour or action in question is what is referred to as subjective norm (Fishbein and Ajzen, 1975).

According to TRA, attitude is affected by beliefs and the effective assessment of the consequences involved. To reach a decision one has to understand the full consequences of a particular behaviour as guided by his/her beliefs. Evaluation is the response to a given action in terms of whether it is acceptable or not and thus attitude is not specific to any belief. It can thus be said attitude is a result of changes in a person’s beliefs (Fishbein and Ajzen, 1975; Dillon and Morris 1996).

The other determinants of intention other than attitude include
subjective norms and normative beliefs. In the end we get a generalized model for depicting the determinants of human behaviour in non-mandatory situations (Bowman and Fishbein, 1978).

2.3.2. The Theory of Planned Behaviour (TPB)

The theory by Ajzen (1991) extended the TRA and tried to explain consumers’ behaviour in situations where their behaviour is under their total control. When used in the study of adoption of IT systems or services, the TPB has five constructs. As compared with the TRA, TPB adds the construct of behavioural control. The perceived behavioural control (PBC) construct is assumed to be a predictor of the constructs of intention to use and the actual usage. Using this layout, the model introduces control aspects of the observation as shown in Fig. 2. Thus, TPB is more functionally applicable and has been used by researchers widely in the modelling of acceptance of a variety of IT innovations in various sectors as well as predicting the usage levels (Vijayan et al.).

TPB is a direct descendant of the TRA and adds a third intention construct of PBC to the model. PBC is regulated by resources and skills availability, and opportunities, as well as the assumed importance of those resources, skills, and opportunities to achieve desired goals. PBC is regarded as an external variable that has direct and indirect consequences on actual behaviour. Indirect effects on actual behaviour is realised through intentions or can be motivated by PBC. The assumption is people have little control over their behaviour if they lack resources, and their intention to perform certain behaviours is lowered even if the attitudes and subjective norm are positive (Ajzen, 1991)

2.3.3. The technology acceptance model (TAM)

Developed by Davis in 1989, TAM is specific to ISs but applicable to many areas. Derived from TRA, the theory is mainly used in the prediction of IS acceptance and diagnosis of design issues before users have used the system. It recognises PU and PEOU as the most determinant factors. PU can be equated to perceived benefits and can be defined as the extent of one’s beliefs on how important is the use of the innovation and how it will enhance their work. PEOU is the extent of someone’s beliefs on how easy it is to learn to use the application. PU and PEOU are anchored to specific beliefs a user has about the system thus they are specific perceptions in this model. PU and PEOU in this model have been shown to have a great influence on an individual’s attitude (A) toward using an innovation. Attitude is given as the feelings of favourableness or unfavourableness toward the system and is a general construct, thus it is not rootted to any specific beliefs about the innovation. Behavioural intentions (BI) are presented as being controlled by A and PU. BI affects actual use and various researches have consistently concluded that it is the best predictor of actual use (Davis et al., 1989). The theory is depicted in Fig. 3.

2.3.4. Diffusion of innovation (DOI) theory

The DOI is applicable to both individual acceptance and organisational adoption analysis (Rogers, 1995; Zaltman et al., 1973). The model tries to show how innovation spreads from the invention stage to widespread use over time. The model is applicable at a global level and is not specific to IT exclusively (Dillon, and Morris, 1996).

According to the DOI theory, there are five main IT characteristics that affect its spread amongst consumers (Rogers, 1995) and these are given as:

- Relative advantage: This is the degree to which an innovation provides better service than the current tools.
- Compatibility: This is the extent to which the innovation will fit into the current processes and infrastructure with minimal disruptions

![Fig. 1. Theory of reasoned action (Fishbein and Ajzen, 1975).](image1)

![Fig. 2. The theory of planned behaviour (TPB)(Fishbein and Ajzen (1975)).](image2)
• Complexity: How easy the innovation is to setup and learn how to operate.
• Trialability: The opportunity provided by an innovator to try an innovation before actual use.
• Observability: How the results of the innovation are visible to would-be users.

Each of these characteristics cannot solely predict either the extent or rate of spread, but research has shown that innovation with these characteristics will be more widely and quickly diffused than the ones with opposite characteristics (Rogers & Everett 1962).

2.3.5. Technology acceptance model (TAM) 2

The model was developed by Venkatesh and Davis in 2000, explains Perceived Usefulness (PU) and usage as a function of two processes, the social influence and cognitive instruments processes and tested it in mandatory and voluntary settings with the results supporting its applicability (Venkatesh and Davis 2000).

In TAM2 the voluntariness, subjective norm and image constructs are given as the social influence processes. Output quality, result demonstrability, PU, and job relevance are given as cognitive instrumental processes. These two processes were considered to be critical in understanding the user’s innovation acceptance. As in other models both models consider attitude to be influential to behavioural intention as depicted in Fig. 4.

Davies argues that TAM2 reaches 60% in explaining IT innovation acceptance as compared to TAM which reaches about 40–50% in explanatory power.

Social Influence Processes: TPB recognises the effect of subjective norm. Venkatesh and Davis (2000) saw the need to differentiate the usage of innovative systems in their analysis on subjective norm. They brought about the concept of “voluntariness” and used it to distinguish between voluntary and mandatory settings. In TAM2 voluntariness is given as moderating element specifying that the decision to adopt is non-obligatory.

Cognitive Instrumental Processes: Cognitive instrumental processes have four elements in TAM2, which are determinants of PU in other models and these are: job relevance, result demonstrability, output quality and PEOU. Job relevance is when potential users determines consequences of adopting an innovation into their job and measures how much the target system is compatible with their job. TAM2 keeps “PEOU” from TAM as a direct determinant of “PU.” What it means is, for an innovation to be used to a greater extent, it should be used with less effort, consistent with the definition of PEOU.

2.3.6. Unified Theory of Acceptance and Use of Technology (UTAUT)

Validated by Venkatesh et al. (2003) the Unified Theory of Acceptance and Use of Technology (UTAUT) model brings together the studies related to TAM. UTAUT focuses on four factors which are key to acceptance of technology and these are performance expectancy, effort expectancy, social influence, and facilitating conditions; and four moderating factors, and these are age, gender, experience, and voluntariness. These are deemed important in the prediction of behavioural intention to use technology and 52 percent of the variance in technology use (Venkatesh et al. 2003).

2.3.7. Technology-organisation-environment model

At the organisational level adoption is influenced by several factors that may be similar or different to the individual technology adoption factors. Tornatzky and Fleischer’s TOE model of 1990 proposes three facets of an enterprise that influences how the organization handles its processes of adopting and implementing an innovation. These are organizational, environmental and technological contexts as depicted in Fig. 5. Figure below. In summary, the given elements of TOE framework present “both constraints and opportunities for technological innovation” (Tornatzky and Fleischer 1990, p. 154).

The technological context encompasses all the technologies internal to the organization and those external that may be of use to the firm’s
operations. The equipment and processes in an organization make up the technology of the organization.

The organizational perspective includes the resources available to an organization and its characteristics such as an enterprise’s size, level of formalization, amount of slack resources, human resources, structure of management, centralization degree and employee linkages in the organization.

The environmental context comprises of all the external factors that affect the operations of organization such as the industry’s characteristics like structure and size, prevailing macroeconomic circumstances, existing regulations and competitors (Tornatzky and Fleisher, 1990).

2.3.8. Other organisational theories

The institutional theory states that not all decisions in an organization are founded on realistic goals of efficiency but can be induced by factors that are social or cultural and other issues such as those driven by the need for legitimacy.

The Iacovou model by Iacovou et al., (1995) is best applicable to the adoption of inter-organizational systems (IOS). It identifies three key factors: organizational readiness, perceived benefits, and external pressure.

2.4. Factors affecting usage of e-learning

Noesgaard and Ørngreen (2015) in their research derived a model of the factors influencing the use of e-learning and used three perspectives: The context of use of the e-learning solution, the e-learning platform itself and they identified it as the artefact, and the people using the solution. The results showed that support and resources, the motivation of the individuals and their prior experience, the interaction between the e-learning and the individuals was important for its effectiveness.

In the conceptual models developed by Ely (1999), Grunberg and Summers (1992), and Mumtaz (2000) to explain factors that impact usage, they identified the factors as manipulative and non-manipulative. The non-manipulative factors are the ones that the institution cannot influence such as gender, age, national policies, funding and experience. They may also include technological characteristics such as unreliability of equipment and need for technical support. The manipulative factors include those that can be influenced by the institutions and individuals and these include beliefs, culture and attitudes.

Al-Mobaideen et al., in their study identified the dimensions influencing the usage of e-learning and its effectiveness as training of users, availability of infrastructure, privileges granted to users in the system, and technology acceptance model.

Osman et al. (2018) in their e-learning usage model, used a research framework for studying the factors influencing the efficacy of e-learning and included the factors of system quality, service quality, content quality, as technological factors; learner’s attitudes, teacher’s attitudes, teaching method, computer literacy as human factors and collaboration between library and faculties as the factors that affect its effectiveness.

Many studies have been carried and have used various adoption models such as the TOE, UTAUT, and TAM with varied results.

3. Research questions

The use of information technology to perform various activities have been on-going for longer periods especially in developed countries and developing countries have been joining in the crazy shift. In developing countries the use of information technology for transacting has been applied mainly to other businesses and has been lagging in education. The covid-19 induced lockdowns have forced learning institutions to quickly jump into using e-learning as it is no-longer possible to carry on with the traditional face to face classroom learning. Learning has been restricted to online platforms and the shift has been instant. The research seeks to answer the following questions:

• What should be defined as effective learning using e-learning platforms?
• What are the minimum requirements for effective learning to take place on e-learning platforms?
• What are the critical success factors for the successful adoption of e-learning?
• What is the state of preparedness of higher learning institutions in adopting e-learning?

4. Methodology

An explorative qualitative data analysis was used to determine the factors that influence the effectiveness of e-learning according to level four university students. Exploratory data analysis was chosen as the researcher sought not to make assumptions before looking at the data. Narrative analysis was used to analyse the data: This method is used to
analyse content from various sources, such as interviews of respondents, observations from the field, or surveys. It focuses on using the stories and experiences shared by people to answer the research questions. The selected students were asked to write an essay based on the Topic “Basing on your experience, discuss the effectiveness of e-learning during the covid-19 induced lockdown period and make recommendations to improve its usefulness”. 50 students agreed to participate and submitted their essays written in English as agreed. All students consented to their participation. 

The study seeks to: 
Deduce the critical success factors for e-learning adoption from university students and this will be achieved by:

- Defining the effectiveness of e-learning as organised in the context of university learning.
- Deducing the minimum requirements for effective e-learning in higher learning institutions.
- Measuring the readiness of institutions in developing countries in embracing e-learning technologies.
- Propose a model of factors influencing effectiveness of e-learning in higher institutions.

5. Results

The analysis method was a combination of content analysis and framework analysis. Content analysis categorise verbal or non-verbal data, summarize and tabulate the data (Caulfield, 2019). Framework analysis goes through the stages of familiarization, identification of a thematic framework, coding, charting, mapping and interpreting the results, which goes beyond describing what participants have said, to analysing the data (Hackett and Strickland, 2018).

5.1. Identifying themes, patterns and relationships

The 50 essay scripts where made into plain texts documents and loaded into R Qualitative Data Analysis (RQDA) software. Themes and codes were created based on emerging theories. The researcher relied upon two approaches in this phase and these include:

- Word and phrase repetitions was used by the researcher to scan the primary data to find the words and phrases commonly used by the respondents as well as identifying unusual emotions in the words and phrases.
- Primary and secondary data comparisons was also conducted, in order to compare the findings of essay data analysis with findings presented in literature with the aim of uncovering differences or similarities between them.

A number of themes emerged from the responses given by the students and these are discussed.

5.2. Qualitative research results

This section presents the results of the thematic analysis process, which was based on data coding.

5.2.1. Technology characteristics

This category refers to the characteristics of technology internal and external to the organisation that are important for the use of e-learning and how they affect its use in higher learning. Technology in itself can be an enable or hindrance to its adoption if its characteristics meet or fail to meet the expectations of the intended users. The factors that were proved to be important for its use by higher learning institutions are compatibility, relative advantage, availability and usability.

5.2.1.1. Availability. Availability is important because it judges the amount of effort that is required for an innovation to be acquired for adoption. Availability usually affects the costs related with acquisition of technology and cost is the most understood method of reaching a decision on adoption, hence the researcher saw it important to include this construct. The factor was given by the theme accessibility and availability of ICT equipment for learners and teachers.

It is important for the students and instructors to have the resources that will allow them to access and use the platforms. The major resources required are in the form of hardware, software and connectivity equipment. Internet, laptops/phones are crucial for the success of e-learning. Access can be guaranteed by government/institutional provision of these to students and staff for free or at subsidised prices. 38 respondents mentioned this, and a summary of the quotes is provided below:

“Government should provide resources”, “the institution should provide free internet bundles for Google class”, “Some live in remote area where there is no internet or phone network is bad”, “The students can’t afford to buy the required devices such laptops and phones to use or to pay for internet access”.

These are some of the quotes which show that access to and availability of technology is important for the success of online learning.

5.2.1.2. Usability. This defines the extent to which the technology can be used with less effort and meeting the desired goals. This factor is composed of characteristics such as good interface design, functionality meeting the needs of the users, required technology to run the systems. It was given by the theme system features and characteristics.

The features and characteristic provided by the e-learning technologies are also important in supporting the success of e-learning. System features refer to the components that make the system and characteristics refer to user evaluation of the system. 39 respondents said something related to this theme. The quotes to support the theme follow:

“E-learning systems must be user friendly”, “We don’t know what the features are available to support e-learning”, “The system must have features to support personalisation”, “Some of the interactions we want are not available using the e-learning systems”, “The systems must simplify our learning experiences”.

Though the students were not explicit about the features and characteristics they desire, their comments suggest it has a bearing on the success of e-learning and would wish for features that will simplify its use and replicate the physical classroom.

5.2.1.3. Relative advantage. This construct explains what the user believes are the benefits of adopting an IT innovation over other possible systems or the current system in use. Simply put it is how the proposed system is an improvement over the current way of operation. Relative advantage theme was mentioned 33 times in the essays thus stressing the importance of the advantages an e-learning technology brings to students and teachers. The respondents mentioned the benefits that will accrue from the innovation and the researcher broke down the theme of relative advantage into 2 subthemes, namely spread of boundaries and decreased costs.

5.2.1.3.1. Spread of boundaries. The use of e-learning technologies allows learning to take place regardless of distance and geographical location of the student or teacher. It allows both teacher and student to take advantage of technology and contact their learning activities which would not have been possible. This can allow learning to take place together with other activities seamlessly. The selected quotes support the subtheme.

“Many students can learn from wherever they are without worrying about borders”; “No need to come to school, hence I can learn from home”; “I can go and stay in any country and still be able to attend
school”; “Learning can be afforded by anyone regardless of location”; “I can do my income generating projects at home and be able to attend online classes”

The few selected data extracts show that e-learning brings advantages in that it removes the challenges of distance and boundaries.

5.2.1.3.2. Decreased costs. Relative advantage can also be shown through decreased costs. The data extracts to support this subtheme are given in this passage:

“Easy access to data, remote access of services reduces costs”; “I guess the institution will be able to reduce operational costs or pursue other operational channels that will require few resources”; “I guess the institution will be able to reduce operational costs”; “… it will help to reduce costs; “Reduction in stationery and redundancies, reduced communication costs etc”; Reduction in travelling and accommodation costs will help save money.

If the organisation and its employees understand the relative advantages of an innovation over their current operations, this will influence them to adopt an innovation. This points to the fact that relative advantage is important in the decision to adopt e-learning technologies by students.

5.2.1.4. Compatibility. The construct of compatibility describes how easily an innovation can be assimilated into the organisation or into one’s life. The amount of change required by the organisation or the individual in order to successfully use the new innovation can be used as a measure of compatibility. The theme is given as systems and equipment compatibility.

It is a measure of new equipment required for the new system to run. The data extracts for the sub-theme are given below.

“The few technologies should be able to host the new e-learning systems”; “We are not sure what is in the organisation can be used for the new system and we are not sure if it is not complicated and easier to achieve its implementation”; “The other worry is if the new technology can run on our current equipment”; “We can be worried about whether the new technology can be operated using our current technology and procedures”.

If the new system can be used with the current hardware and software then it is easy for it to be successfully deployed in an organisation.

5.2.2. Environmental factors

This refers to all the factors found in the teaching and learning environment that affect the learning process and mostly they can be regarded as external factors. The factors in this category are working environment, curriculum needs, and government support.

5.2.2.1. Working environment. Noise is one of the key factors that arose from the students’ responses. Noise is defined as the amount of disturbances to an on-going activity. If the students and instructors cannot focus on online education, the effectiveness of e-learning classes will be jeopardised. Students and instructors face a lot of challenges when they are working from home as they need to come up with entirely new schedules that accommodate otherwise tasks and programmes that are not relevant to their goals of learning. This construct was given by the theme disturbances to learning. The theme was identified from 29 respondents who showed the success of e-learning can also depend on the learning environment available to students and teachers. The selected quotes support this theme:

“Will the students and teachers find it comfortable to work from home or away from class”; “will there be convenient facilities to use for learning free from disturbances”; “there will always be challenges to effectively learn as you can be surrounded by those not appreciating what you are doing”; “Is the environment free from disturbances”; “Challenges from competing needs especially at home”

Guaranteeing a convenient environment for learning is key for effective learning to take place in online learning. If the environment is full of disturbances this may hinder effective learning.

5.2.2.2. Government support and regulation. In all states, all activities are controlled by the state using a set of guidelines, regulations, policies and laws. In this study, government regulations refer to government policies on the use of the said technology. Government support and regulation is the theme to this construct and given by 32 respondents. Government intervention is sometimes needed in promoting the use of new technologies. Governments can help by coming up with laws to promote use of technology as well as support for the acquisition of the technology through favourable taxes and subsidies. The following quotes support this theme:

“Government should assist in acquiring the technology for use”; “Government can assist in regulating the price of data so that it is affordable”; “Authorities should lower taxes for technology so it becomes affordable to everyone”; “Government should assist by providing technology in institutions either as grants or subsidies”; “Government can assist by establishing laws for the establishing of technology companies”; “Government intervention is needed to make technology costs and acquisition easier for institutions, students and teachers”

These are some of the quotes that show that government can use its power to improve the usage of technology in higher learning institutions either by providing resources or promulgating regulations and laws that support its acquisition and use.

5.2.2.3. Curriculum needs. This refers to the content of the subject and has an effect on whether lessons can be carried out online or they require physical participation. Each subject area has its own needs for teaching and learning and the theme has been split into two subthemes: Learning requirements of students and Practice. 34 respondents said something related to the theme.

5.2.2.3.1. Learning requirements of students. The online platform in use, content and methods of interaction are also important for the success of e-learning. These should be able to meet the learning requirements of the students as its failure will lead to rejection by the students and the staff. 21 students gave statements related to that, and the following summary of quotes support the theme:

“There is need for personalised feedback using the system to allow for maximum learning”, “The system does not allow for student interaction as we do with the classroom learning”, “the lecturers cannot give specialised attention to some students as desired by certain situations”, “The system does not satisfy the learning needs of students”, “As part of our learning we also need to socially interact with our lecturers”, “We need to interact as peers to enhance our learning”

The quotes suggest that it is important to consider the learning requirements of the students and check whether the platform being used is satisfying these needs for the success of e-learning.

5.2.2.3.2. Practice. This refers to the subject content and how it will be taught to the students. Some subjects are practical based and others are theory based whilst others are a combination of the two. As such it is important to determine what kind of teaching and learning can be carried out online as it might be difficult to do e-learning with practicals. 13 respondents mentioned this. The following summarised comments support the theme:

“We have difficulties when it comes to practical subjects”, “In some areas there is need for physical interaction with lectures”, “The teaching methods being used do not suit the required learning for
some areas’, “It is difficult for us especially with practical areas”, “We need face to face learning as some of our subjects are practical based”, “Need for the lecturers to adapt their teaching so that it suits the platform and subject being taught”.

It should be noted that the type of content is crucial in determining whether e-learning will be a success.

5.2.3. Organisational factors

This category refers to the resources available to an organization and its characteristics that are important to the use of the technology in question. The factors that were seen to be important are management support and, ICT skills and knowledge.

5.2.3.1. Management support. As they are the representatives of the institution at higher levels this can be described as institutional support. Management support refers to the activities of management in support of the adoption agenda by an organisation. Management activities give the direction in the organisation and as such they are important. This can be described as the support being offered to students and the instructors in order for them to access the system and meet their objectives. The construct of management support is derived from the theme Management support and priority.

It is the responsibility of top management to cultivate the vision of the organization and encourages success in adoption processes. The acts and priorities of management have a bearing on the outcome of adoption of e-learning in higher institutions. Management can show support by providing resources and funds required for the setting up and running of the systems. Their support is of paramount importance as it can set the tone for everyone in the organisation on the way forward. The following statements show how management’s influence is important: 35 respondents agreed with this and a few quotes are given below to outline this:

“There is need to make sure everyone is trained; so they know what they are doing”; “...additional training and staff beefing-up”; “... need for training on both staff and students”; “IT phobia workforce”; “ICT expertise refers to the knowledge and capabilities of the current users in operating ICT system, the better the workers are in using ICT systems the faster it will be for the organisation in adopting new technology”; “Those who fear the use of computers needs to be trained”.

5.2.3.2. User and technical know-how. This sub-theme tries to measure to what extent does the knowledge of ICT or system use can impact on the success of the system. The following data extracts are given to support the sub-theme:

“Most of the lectures do not know how to use the systems so they won’t use them”; “Most students are not capable of using the systems so they may just be worried on how it will impact on their learning”; “The people might not be comfortable with new technology”; “IT incompetent workforce” “people not being able to operate the new system”; “Most of us are not comfortable around IT”; “We also have those older people who are in our staff and students, who have challenges with tech-gadgets such as even mobile phones, they face challenges in using these systems”; “The other issue has to do with the experience of the users with the technology as some have never used it before or don’t know how it works thus they see its use as complex thus they favour less technology in their work and learning environment.”;

The two subthemes show that it is important to have ICT skilled staff and students in order to improve the chances of success with e-learning and this can be achieved by offering training to users.

5.2.4. Human factors

This refers to the characteristics and/behaviours of the people using the system, and how these can affect the success of the learning process. This is a measure of the contribution of the human inward characteristics and their potential to affect the learning processes. Those that came out of the student responses are motivation, adaptation and ethics.

5.2.4.1. Motivation. Motivation, simply put, is the reason one has for doing something. There are a number of people who are involved in the use of e-learning and these are the students, instructors and administrators. Consequently the motivation for using e-learning is to gain knowledge, or the desire for learning from the perspective of the student. The motivation for using e-learning from the instructor’s perspective is to deliver knowledge to the student or to allow for acquisition of knowledge by students. The motivation for the administrator is to provide a suitable environment for the interaction between learner and student. All these people should have the right motivation for e-learning to succeed otherwise the end result would be pseudo learning, a situation where all the participants claim learning is taking place but actually no learning is taking place. It is the responsibility of administrators and instructors to create good enough reason for learners to use e-learning otherwise they would participate half-heartedly or they may not have interest in the process

“The students should be motivated enough to use the platform”, Students and lecturers should be prepared to use the new system”; “It is advisable to make the users happy to use the system”; “Providing of resources is important for motivating the users to use the system”; “It is important for real teaching and so that students are motivated to learn online”; “Are the lectures and students motivated to use the new system, training and provision of resources can help in this regard”;

The selected data extracts examples show that motivation can be an impact factor in the success of e-learning. There is need to find ways of improving acceptability of system as it increases the motivation of staff and students in using e-learning.

5.2.4.2. Adaptation. Adaptation to e-learning is important if learning is to take place. The two involved parties needing to adapt are the students and the instructors. The instructors would need to adapt their content
and teaching methods so that they are suitable for the mode now in use. The students would need to adapt their skills so that they are in-line with the new mode in use. This is especially important for the student as the restrictions imposed by the classroom approach may not be available in this mode hence it can lead to waywardness and derail learning.

“There is a lot of changes that comes with the use of e-learning, staff and students need to adjust to the new environment”; “The new environment is challenging but the users can adapt so that learning can take place”; “The expected changes are bigger but necessary so that teaching and learning takes place”; “If the student fails to adjust then will fail to learn”; “The lecturers need to incorporate a lot of changes in their way of operations so that they can accommodate all students”; “New mechanisms for delivering content and monitoring students will have to be found, otherwise it becomes a disaster”; “Students have to find ways to adjust to the new ways and make sure they have enough resources”; “Students need to be responsible and self-regulated to the new freedom of doing things, otherwise they will be lost forever”

From the above data extracts it can be concluded that there is need to adapt the content and techniques to the new environment as well as students adapting to the new way of life so that teaching and learning can take place.

5.2.4.3. Ethics and user qualities. Although advantages of e-learning have been given in many studies, still some view it as inferior in quality as compared to traditional classroom learning. Brown (Retrieved 2020) states that students now find it easy to acquire their degrees without feeling any shame for breaking ethical rules. The categories of academic fraud identified in the research includes cheating during online exams by getting unauthorised assistance, Inappropriate assistance in writing and tutoring, misrepresentation of data collected in research and many others. Both students and lecturers should be principled in order to promote high standards of teaching and learning that would allow for knowledge exchange. This construct is given by two subthemes: Student capabilities and personalities and Instructor qualities.

5.2.4.3.1. Student capabilities and personalities. This theme showed that the student capabilities are also important for the success of e-learning. Forty respondents pointed that technology alone is not enough as the students should be able and be prepared to use it for their learning otherwise it will be a waste of resources. The theme was supported by comments such as: “learning maybe hampered as the students may end up just copying”, “some of the students’ background would not allow them to use e-learning”, “some students are not able to use computers and these e-learning platforms”, “E-learning needs a high degree of self-discipline on the part of the students otherwise they will end up wasting resources on non-essential things”.

These comments show that the success of e-learning could also be affected by the students’ characteristics and way of life. Their human aspects such as motivation, ethics, ICT competence, self-organisation and economic statuses are important for the success of e-learning.

5.2.4.3.2. Instructor qualities. The instructor is one important part of the puzzle when it comes to online learning as they are responsible for guiding students in their learning. The instructor should be able to reproduce the classroom environment on the online version and this will go a long way in encouraging learners to accept and embrace the new methods. Twenty two students were in agreement with this as supported by sampled comments such as: “The lecturers are not helpful when it comes to using the platform”, “The lecturers are not flexible with their timetables and teaching methods”, “We are only getting notes and we can’t call that learning”, “The lecturers don’t care about how the students fare on-line”, “we are teaching ourselves and the lecturers are just giving us materials”,” Some of the lecturers don’t even know how to use the platforms so how do they expect the students to use them”.

The above quotes show it is important for the instructor to be competent of the technologies and must be able to compensate the lack of physical presence by creating a supportive environment in virtual classroom, where all students can feel comfortable participating. The instructors should understand their students’ needs so that they can be able to help them. There is need for instructors to be accommodating and be flexible with their teaching methods and timetables. Resourcefulness of the instructors can help in their teaching of students on-line. Instructor capabilities is important for the success of e-learning.

5.3. Critical success factors

From the themes discussed it can be deduced that there are a number of encompassing factors or categories that can be deduced and these are depicted in Fig. 6.

6. Conclusions and recommendations

E-learning is useful especially in this era of restrictions on gathering and movement as it has allowed learning to progress. It should be noted for the success of e-learning a number of factors and actors must come together. Each actor must fulfill their responsibility for the e-learning to be successful.

To management: It is their responsibilities to make sure resources are availed to meet the needs of the players these being the students and the instructors. There is a tendency for management to portray things in a favourable way just for the image of the institution and for social or political reasons but things on the ground are different. In such a scenario the students and the instructors are forced to improvise and this in reality reduces the usefulness of e-learning and places the instructors and students on a disadvantage. Management must make decisions on e-learning based on tangible facts, thus decisions must be informed by data not intuition or grandstanding so that the real needs of the instructors and learners are addressed. For this to be possible there is needed to know the status of the intended users and whether they can afford the new way. There is need to take stock of the competency of the instructors and learners, and if they have the required technologies suitable for e-learning taking into account the heterogeneity of the needs of users and existing digital divide. Management should be considerate about the cost of resources and the difficulties that the instructors and learners may face in trying to shift to the online learning and can help by finding ways to help them acquire necessary resources such as entering into partnerships and agreements with service providers or subsidizing the costs.

To the instructors: Learning can only be claimed to have taken place when exchange of knowledge have taken place between the instructor and the learner. It is the responsibility of the instructor to create an environment that encourages learning to take place. The instructor can incorporate the recommendations that the instructor must grab the learners’ attention, improve the learners’ engagement, boost the learners’ confidence, increase the learners’ satisfaction and encourage social interaction as much as is experienced in physical classrooms. The instructor must choose rightly what can be done online or what needs to be done physically. The instructor must prepare content that is suitable for the platform that has been chosen for the teaching and learning process. Not all practises needs to be done electronically some needs to be done physically and therefore it is recommended that the area that needs theory must be done online and that which needs practises must be done physically.

To learners: The success of online learning does not lie in the ability of the instructors and the nature of resources availed for the learning processes, but also depend on the learners’ motivation and ethical standing. The abundance of electronic resources has brought a new scourge of plagiarism and copyright infringements from students and this has been a known reason that can hinder possibilities of learning to take place. Learners should motivate themselves to learn and desist from copy and paste.
To national leaders: It is the responsibility of national government to help in provision of adequate resources or come up with policies that help to promote e-learning. This could be in the form of incentives, policies or legislation that promote the use of e-learning technologies and make them accessible to all and remove the digital divide.

Author contribution

Caleb Manjeese: Conceptualization, Methodology, Validation, Formal analysis, Investigation, Resources, Data Curation, Writing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Abbad, M.M., Morris, D., de Nahlik, C., 2009. Factors affecting student adoption of E-learning systems in Jordan. Int. Rev. Res. Open Dist. Learn. 10 (1), 7–17.

Ajzen, I., 1991. Organizational Behavior and Human Decision Processes: the Theory of Planned Behavior. 50. Elsevier, pp. 179–211.

Algahtani, A.F., 2011. Evaluating the Effectiveness of the E-Learning Experience in Some Universities in Saudi Arabia from Male Students’ Perceptions. Durham University, Durham theses.

Al-Mobaideen, H., Allahawiah, S., Alkhawaldeh, A. (n.d). Factors influencing organisational adoption of e-learning systems in the educational process (“electronic learning system”) (eduwave): Jordan case study. Eur. Sci. J. vol.8, No.28.

Almosa, A., Almubarak, A., 2005. E-learning Foundations and Applications. Riyadh, Saudi Arabia.

Almosa, A., 2002. In: Use of Computer in Education, second ed. Future Education Systems, Riyadh.

Bichsel, J., 2013. The State of E-Learning in Higher education: An Eye Towards Growth and Increased Access. Louisville: EDUCAUSE Center for analysis and research.

Brown, C.H., 2000. Understanding Public Reaction to Energy Proposals: an Application of the Fishbein Model. American Psychological Association.

Caulfield, J., 2019. How to do thematic analysis. Retrieved 9 24, 2021, from https://www.scribbr.com/methodology/thematic-analysis/.

Davis, F.D., Bagozzi, R.P., Warshaw, P.R., 1989. User acceptance of computer technology: a comparison of two theoretical models. Manag. Sci. 35 (8), 982–1003.

Dillon, A., Morris, M., 1996. User acceptance of new information technology: theories and model. In: Williams, M. (Ed.), Review of Information Science and Technology, 31. Information Today, Medford NJ, pp. 3–32.

Dublin, L., 2003. If you only look under the street lamps……. Or nine e-Learning Myths. eLearn. develop. J. http://www.eLearningguild.com.

Ely, D.P., 1999. New Perspectives on the Implementation of Educational Technology Innovations. (Report No. IR-019-432). National Center for Research on Teacher Learning. (ERIC Document Reproduction Service No. ED427775), East Lansing, MI. European Commission, 2001. The Learning Action Plan: designing tomorrow’s education. Retrieved 9 14, 2021, from elearningeuropa: http://www.elearningeuropa.info.

Fishbein, M., Ajzen, I., 1975. Belief, Attitude, Intention, and Behaviour: an Introduction to Theory and Research. Addison-Wesley, Reading, Mass.

Fry, K., 2001. E-learning markets and providers: some issues and prospects. Ed. Train. 233–239.

Ghavifekr, S., Rosdy, W.A.W., 2015. Teaching and learning with technology: effectiveness of ICT integration in schools. Int. J. Res. Educ. Sci. (IJRES) 1 (2), 175–191.

Grunberg, J., Summers, M., 1992. Computer innovation in schools: a review of selected research literature. J. Inf. Technol. Teach. Educ. 1 (2), 255–276.

Hackett, A., Strickland, K., 2018. Using the framework approach to analyse qualitative data: a worked example. Nurse Res.

Iacovou, C. L. et al., 1995. Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology. MIS Q. 19, 465–485. https://doi.org/10.2307/214625.

Keller, C., Cernerud, L., 2002. Students’ perception of e-learning in university education. Learn. Media Technol. 27 (1), 55–67.

LaRose, R., Gregg, J., Eastin, M., 1998. Audio graphic tele-courses for the Web: an experiment. J. Comp. Mediat. Commun. 4 (2).

Laurillard, D., 2004. E-learning in Higher education. In: P. Ashwin, From Changing Higher Education. RoutledgeFalmer.

Malte, L., Debbios, P., 2005. The EDUCAUSE current issues committee. Top Ten IT Iss. EDUCAUSE Rev. 40 (1), 15–28.

Mumtaz, S., 2000. Factors affecting teachers’ perceptions of e-learning: an exploratory study. J. Educ. Media Libr. 38 (1), 50–56.

Osman, M.A.F., Wahid, A.K., Zakria, A.R., 2018. Assessment of Factors Affecting E-Learning: Preliminary Investigation.

Richard, H., Haya, A., 2009. Examining student decision to adopt web 2.0 technologies: theory and empirical tests. J. Comput. High Educ. 21 (3), 183–198.

Rogers, E.M., 1995. Diffusion of Innovation. The Free Press, NY.

Rossi, P.G., 2009. Learning environment with artificial intelligence elements. J. e Learn. Educ. Res. 1 (1), 23–41.

Singh, T., 2020, May 2. What is eLearning and how is it important for our education system? Retrieved 9 22, 2021, from elearningindustru: https://elearningindustry.com/what-is-e-learning-important-education-system.

Tam, S., 2020. Ten biggest disadvantages of e-learning. Retrieved 08 15, 2021, from E-Student: https://e-student.org/disadvantages-of-e-learning.

Vijayan P, Vigneswar P, Bala S (n.d.). Multimedia Banking and Technology Acceptance Theories, JIBIC.

Tornatzky, L.G. and Fleischer, M., 1990. The Process of Technology Innovation. Lexington Books, Lexington.

Venkatesh, V. and Davis, F. D., 2000. A theoretical extension of the technology acceptance model: Four longitudinal field studies. Manag. Sci. 46 (2), 186–204.
Wentling, T.L., Waight, C., Gallagher, J., La Fleur, J., Wang, C., Kanfer, A., 2000. E-
learning - a review of literature. Knowle. Learn. Sys. Group NCSA 9, 1–73.
Zaltman, G., Duncan, R., Holbekk, J., 1973. Innovations and Organizations. John Wiley
and Sons, New York.; NY, p. 4.

Zeitoun, H., 2008. E-learning: Concept, Issues, Application, Evaluation. Dar AlSolateah
publication, Riyadh.