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E-learning System: An effective solution for improving learning environment performance in Rwanda's Universities

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Abstract:

Rwanda educational system has evolved for a decade and it is nowadays looking to new learning mode of providing education for many, especially for people with disabilities and those who have not enough time to sit in classroom. Mainly, this paper discussed five benefits of e-learning and it discussed and described why and how e-learning is more effective than conventional mode of teaching and learning.It evaluated some key challenges that may delay e-learning implementation success. It further analysed what is involving when a university needs to implement an e-learning system. It recommended to policy makers to set a good plan based on the resources, budget and technologies such IT infrastructures to make e-learning more successful. Based on the findings, this paper provides an evidence that e-learning system is an effective solution for improving learning environment.

Keywords—E-learning, conventional learning, IT infrastructures, e-learning performance, e-learning Effectiveness

I.   INTRODUCTION

E-learning is becoming the one of the most preferred subjects for the researchers as many studies have shown that effective use of e-learning could help to increase student motivation engagement, class participation as well as performance [1]. E-learning is the new tool to support distance learning environment even though it demands a range of contributions such as subject, technical, design and resources expertise ([2],[3]).This technology of e-learning mode demonstrated that it can boost the education sector and increase the number of people to return in

school but not sitting in class but in their own places especially for those whit disabilities and others who are busy working but have an idea of studying or improving the skills by using online learning system [4]. For a decade, the Rwanda ICT sector has evolved and this let huge number of people to have accessibility to the ICT tools such as computers, laptops, smart phones and others ICT tools which can help in their daily communication. It is in this way Government of Rwanda brought an outstanding improvement to provide ICT utilities to many Rwandans and the Ministry of Education has to make an assessment of the use of ICT in the schools from Universities to Secondary schools as distance learning facility [5].

II. LITERATURE REVIEW

Before the introduction of E-learning, it obviously to attend the class to everyone who need to graduate for awarding a degree or certificate and at that time a University had to build many class rooms and pay a lot for international visitors to teach at university [6]. According to [7] defined e-learning as instruction delivered on computer by CD-ROM, internet or intranet, and in asynchronous and synchronous ways depending on the availability of ICT tools during sustainable implementation of e-learning system.In the currently time, the e-learning system is to support people who need to study and do not have abilities to attend regular basis mode of attending classes such as the pregnant, the shifts

workers and so forth [8]. E-learning can be defined as the use of computer network technology, primarily over the Internet to deliver information and instruction to individuals [9]. In the time of learning environment when the short way to shortened the infrastructure and where you can interact with the learning situation by using combination of telecommunication and information technologies and ICT tools like tablets, smart phone, Mobile Phone and so forth just to have accessibility to online documents that could allow you to study remotely [10]. The distance learning would provide an assistance support in the learning sector where the number of classes will be increased virtually and minimize the classes as building materials will be transformed in the technology way [10]. The e-learning system can be synchronous which means at the same time. This involves interaction of participants with an instructor via the web in real time for example case of virtual classroom which is a real class room online and also asynchronous e-learning mode means not at the same time [3]. This allows the participants to complete the web-based training at their own pace without live interaction with the instructor and it is providing the convenience and flexibility on the stakeholders [11]. In the journey of the E-learning as distance learning solution where smart classrooms defined as important tool. The smart class room is the one thing to minimize the infrastructure cost as you build once the smart class rooms in the University

and this smart class will being used for a long time as you upgrade the system only [12].

III. METHODOLOGY

This research paper based on the qualitative and quantitative research approaches through the use of arranged questionnaires as data instrument and interviews to persuade information from the targeted population ([13],[14]). In this research paper our sample size targeted was 210 and calculated by using Slovin's formula where the accuracy is 10 % ([15],[16]). Among 220 questionnaires, 178 were received back which indicated the good response rate of 80.909 and they were some stakeholders decided to participated in the interviews as well as questionnaires and all records considered, their support took in consideration. The selection of the sample of responders required to have enough knowledge about e-learning and that's why students and lecturers, instructors participated in this research paper.

IV. FINDINGS BASED ON THE OBJECTIVES OF THE RESEARCH PAPER
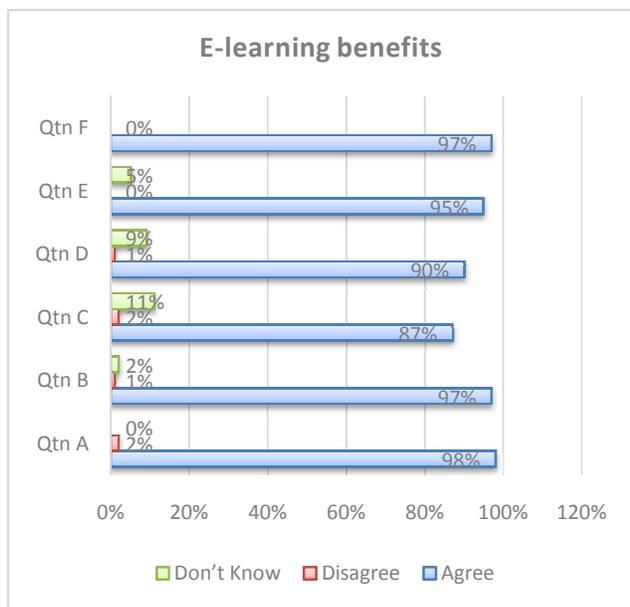
This paper is based on the main objective which is to find out that e-learning system is an effective solution for improving learning environment. This paper also covered four specific objectives which are following:

i. To examine the available benefits on the University which adopt e-learning system.

ii. To investigate the effectiveness of e-learning in the learning environment.

iii. To promote interlocutors to know what is involved in implementation of an e-learning system.

iv. To identify the main key challenges preventing E-learning success in Universities and high schools.

A. *The available benefits on the Universities in term of using an e-learning system*

In this research paper, we analyzed six questions as covered in our research survey questionnaire to answer our research question about the benefits of e-learning in the universities. Those questions are the following as shown in Figure 1. QtnA: E-learning increased learner's convenience as the leaners have access to asynchronous e-learning at any time. QtnB: E-learning system has ability to track learner activities and mastery of material for example through Quiz score. QtnC: E-learning support delivery training to many stakeholders. QtnD: E-learning appeals to organization that has a strong need or desired to deliver consistent training across multiple locations. QtnE: E-learning has the potential to manage the growth in the amount of information that stakeholders need to learn. QtnF: Organizations also need the use of e-learning as cost saving measure, particular when they want to reduce travel and classroom cost.

Fig.1Available E-learning benefits.

From **QtnA**: In our research, the findings showed that stakeholders understood how an e-learning increases learners' convenience well at higher level. It shows that an e-learning can increase the convenience especially when it comes in asynchronous matter as rated at 98.0%. Some individuals who did not agreed or disagreed to this question as they rated at 2.0% and it is not a big number but not also to be ignored and this meant that some individuals such as students and instructors would need more clarifications to know about e-learning so that everyone has an idea about e-learning convenience.QtnB: The findings showed another benefit of an e-learning system that it has ability to track learner activities and mastery of material for example through Quiz score and this question rated at 97.0%. In the e-learning world,
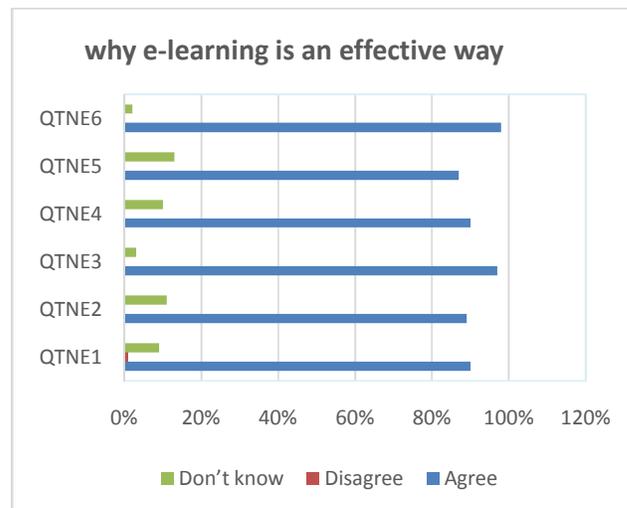
an organization such as university can tract easier and keeping information of all that have participated in the e-learning training for example when it required. In this way, records would be kept easier as they use electronic materials and tracking learners become an easier way. QtnC: The findings showed that E-learning supports delivery training to many stakeholders and rated at 97.0%. By using e-learning for training, at once you can train more stakeholders than in conventional mode. This brought the best way of many organizations which need to provide training for many stakeholders and this way also reduces cost and infrastructures. QtnD: The findings showed that E-learning appeals to organization that have a strong need or desired to deliver consistent training across multiple locations and rated at 90.0%. The e-learning can support online training and this training can be accessed to many from different multiple locations. It is no need to be at the same class but you have to be in good position of having ICT resources that can help you to access such online training. QtnE: In this research, the findings showed that University could use e-learning as cost saving measure, especially when they want to reduce travel and classroom cost and rated at 97.0%. Not only for reducing travel and classroom cost but can reduce all cost that should went through infrastructures as they build once smart class rooms and only what remaining

is to upgrade the system as many good technologies arise day to day. QtnF: the findings showed that e-learning system has the potential to manage the growth in the amount of information that stakeholders need to learn and they ranked at 95.0%. As it is easier to track what stakeholders need through online than conventional mode.

B. *The main reasons why e-learning is an effective way*

In this research, we studied the key reasons to provide why an e-learning system is keen to be used an effective solution to learning environment. When you compare to the current mode of learning mostly paper based, there is an improvement in the learning environment among users as it is likely to be more convenient than current mode class room teaching. This research based on the research survey where we brought five questions to the responders so that they discuss about why e-learning is effective way in learning environment. Therefore, the rankings were noted. Here are the six questions are analyzed from the findings. QTNE1: E-learning Technology is good effective than classroom mode as it is the greener option. QTNE2: E-learning tools such as Moodle, eLeap deliver effective services to learners. QTNE3: Students learn more than they do in traditional courses. QTNE4: Retention rates are higher with online

learning. QTNE5: Online learning requires less of a time investment. QTNE6: More frequent assessment can reduce distractions. The findings are shown in Fig. 2.

Fig. 2 Reasons why e-learning is an effective way.

As indicated in Fig. 2 the findings described as follow: For **QTNE1**: The findings showed that e-learning technology is more-good effective than classroom mode as it is the greener option and ranked at 90% as it is good effective than class room teaching mode and 10% added for the rest who would require some more clarifications as some may think the technology relatively new to know everything about it. **QTNE2**: In our research paper, the responders have to balance the e-learning management platforms tools such as Moodle, eLeap and consider also to the current mode of learning and see what it can deliver effective services to learners between the e-learning and conventional

learning. The findings showed that e-learning system delivers effective services to learners in good position as it ranked at 89% compared to rest of 11%. **QTNE3**: In this research paper, the findings showed that students learn more than they do in traditional courses as they ranked at 97% and the rest for 3% in total. This means that online services such as courses are more attractable when you compare to the conventional learning. **QTNE4**: The findings showed that retention rates are higher with online learning and ranked at 90%. Many stakeholders especially students said that they are more attractive in the online content as they have full control. They can control what their instructors posting to their platform and know when coursework arrived to the platform and when it needed to submit the work as they access to the online contents. Here the communication between the students and lecturers become very close and easy.**QTNE5**: The findings showed that online learning requires less of a time investment as they ranked at 87%. In another way, how students use less time when you compare to the conventional mode is how they can set their goals according to the time they spent when they waiting instructors and time they spent to arrive to school, even the time they will stay with instructor in the class room. In the online learning, as they see the course on their platform, they read the note from their place and follow the instruction according the deadline if it is the coursework to submit. We have discovered
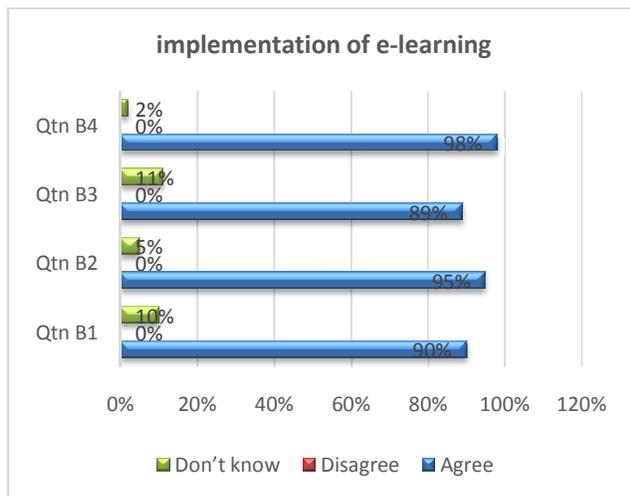
that many students like this as they can even work on their online course in their time set as they want in term there is no deadline.

QTNE6: The findings showed that more frequent assessment can reduce distractions as ranked by responders to higher level of 98%. In this research, we discovered that as the students like the process work assessment as that in term of the assessment to submit they can work for it in progress time and they supervisor could check what they are doing to be sure the progress of the assessment. The lectures also like this as they check how their students are progressing in the courses work and this is a very good when it needs more days to go for submitting the thesis, the supervisor would check a week per week the progress of the students he/she supervised as provide assistance as needed which is very important when it comes early.

C. *What is involved in implementing an e-learning system?*

In this research, we provided four questions that would answer our research questions. Those questions are noted like **QtnB1**: To developing a workable plan by analysing the current situation by gathering factual data. **QtnB2:** Evaluate the system's effectiveness and user satisfaction. **QtnB3**: Arrange the resources available with the budget to fit with the number of stakeholders. **QtnB4**: To list the features as required or desired so that you are sure to get the necessary elements before using up your budget. The Fig. 3 illustrates what involved in

implementing an e-learning system as ranked by responders.

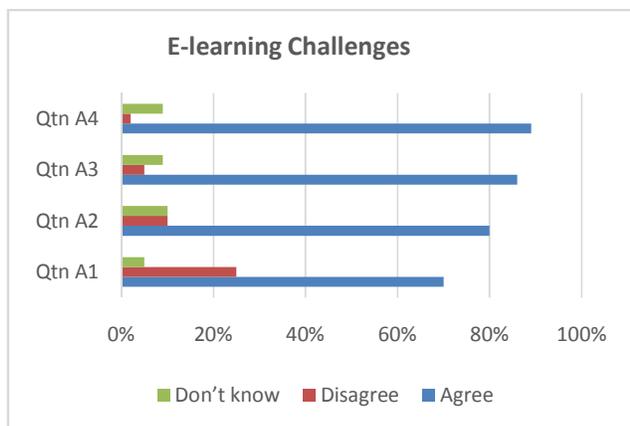**Fig.3** what involved in implementation of e-learning

In **QtnB1:**The findingsshowed that developing a workable plan by analyzing the current situation by gathering factual data is the good action as they ranked at 90%. Here, an organization or a university has to set a plan based on the current situation and know what they will need in place by referring to the number of the courses they will implement and as well the number of stakeholders who will involve in this stage as well as students and their instructors. **QtnB2**: The findings showed that by evaluating the system's effectiveness and user satisfaction involved in the implementation of e-learning as they ranked at 95%. It is crucial to evaluate the system's effectiveness and check what to add according to the current conventional mode of teaching and that the stakeholders will be satisfied as long as you set well your system to meet user satisfaction.

QtnB3: The findings showed that it is very important to arrange the resources available with the budget to fit with the number of stakeholders as they ranked at 89%. We discussed before that as you have set the goal, the institution has to arrange the resources available and balances the resources to see if they fir in their plan according to what the number of stakeholders will use the system. It is essential to look for the budget it will fulfil the needs. **QtnB4**: In our research, the findings showed that it very nice to list the features as required or desired so that you are sure to get the necessary elements before using up your budget and it ranked at 98% by responders. The essential is that once you have to go in the new system, online learning environment for example that is very important to manage the budget with what the institution needs by setting up a list of all features to implemented.

D. *The main key challenges preventing e-learning success in the universities*

In this paper, we have set four questions as indicating in Fig.4 for the responders to help us find what are the challenges preventing an e-learning success in the universities. QtnA1: It is Relatively new. QtnA2: Wrong Approach to content development. QtnA3: Wrong authoring tools and Wrong system employed for training. QtnA4: Wrong level of investment.

E-learning Challenges

Fig. 4E-learning challenges

In **QtnA1**, the findings in Fig.4 show that e-learning as it relatively new and it the challenge as mostly in many countries that it can be the challenges in some universities and they ranked at 70% and total of 30% disagreed to this statement as they think about another challenge. 30% of the responders not agreed to this statement as they think in another way. It is a big number not to be ignored and it was explained as for example in the University of Rwanda, they have this e-learning for a decade which means they are experiencing it whereas other universities such as Kigali Independent University and Unilak still in the last phase of its implementation and that is why some agreed that the e-learning is relatively new in their institutions. In **QtnA2,** the findings showed that the wrong approach to content development is the challenge that preventing e-learning success in the university and they ranked at 80% and the rest stayed for 20% for the responders who have seen this in another side. It is obvious to know that

wrong approach to content development becomes the challenge as if the institution does not care to putting important ideas or actions intended to deal while implementing the e-learning system.In **QtnA3,** the findings showed that wrong authoring tools and wrong system employed for training is the challenge and they ranked at 86% and the rest of responders have seen this in another side. In **QtnA4**, the findings showed that the wrong level of investment is the challenge and they ranked at 89% whereas the rest of 11% have seen this in another side.

V. CONCLUSIONS AND FUTURE STUDY

This paper presentsthemain objective which was to find out how e-learning system is an effective solution for improving learning environment and our research questions helped to find answer. We discussed and described why and how e-learning is more effective than conventional mode of teaching and learning and we evaluated some key challenges that may delay e-learning implementation success. We also described the benefits available in the use of e-learning in the universities and we further analysed what is involving when a university needs to implement an e-learning system. It needs to set a good plan based on the resources, budget and technologies such IT infrastructures to make e-learning more successful.The e-learning would not totally replace the current mode of teaching but both modes are important to be used because some

people with disabilities could not access to e-learning materials easily which means that they will continue to need current mode of teaching in their learning system. Based on the findings, we conclude that e-learning system is an effective solution for improving learning environment. In our future research projections, more data shall be added and analysed to go in deep for more clarifications.

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