

Perspective Study of E-learning in Secondary Education: Challenges and Opportunities in Secondary Schools in Rwanda

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ABSTRACT

This paper aimed to provide a perspective study of e-learning in Rwanda's secondary schools education and deeply described the facing challenges and opportunities available for e-learning in secondary education to succeed. The e-learning in secondary education in Rwanda has been accelerated after the outbreak of Covid-19 pandemic to facilitate the learners all over the country. E-learning is remained as vital to enhance the accessibility and improvement quality of education. In this way, Rwanda has invested more in ICT to support learning environment and initiatives Rwanda increased the internet coverage and bring ICT tools like computers to the students and teachers to support online learning. Besides that, challenges still arose and still need to be resolved for better success journey in e-learning. In this paper, we described and analysed the main challenges of e-learning and opportunities available in Rwanda's secondary education.

Keywords: - E-learning, Secondary Education, E-learning challenges, E-learning opportunities, Asynchronous E-learning, covid-19

I. INTRODUCTION

E-learning as an electronic learning defined to be a learner-centred instructional approach which delivers students with the opportunity for an in-depth investigation of a given topic and it can be defined as the use of computer network technology, primarily over the Internet to deliver information and instruction to individuals (Sadia, Tamim and Inayat, 2016; Welsh et al., 2003). For the past two decades, Government of Rwanda started ICT inauguration and launched vision 2020 with the aim of moving from the humanitarian assistance phase to one of sustainable development (Buhungiro, 2014). There is an improvement in the ICT in education especially ICT is used most in High school than primary school and because of the presence of internet there are many opportunities for exploring difficult lessons to gain a wide depth of understanding of the content from class room (Buhungiro, 2014). Welsh et al. (2003) declared that an e-learning can be a positive experience and then in term the technology does not work well and then it has the potential to become a very negative experience. It means that with the best ICT tools, awareness, and trainings to stakeholders about e-learning for success is very important in e learning implementation in secondary schools otherwise it can be the problem for secondary education improvement (Azliza et al., 2012).

The country's vision is now set to 2050 after ended of vision 2020 and Government of Rwanda has set ICT in Education Sector as fundamental key for achieving the socio-economic development outlined in Vision 2050 (Andrew and Jonathan,

2018). Communications Technology in secondary schools such as Television, computers, videotapes played vital role to help learners and they became useful in many ways as the students are creating e-mail, blogs to share information with their teachers and they follow instructions through Television from teachers (Appana, 2008). The learning evolved from the conventional to e-learning and in the developing countries some countries started to benefit from e-learning in secondary schools (Bizimana et al., 2020).

The world issue on the covid-19 pandemic also affected all sectors especially the schools to be closed just for avoiding the spread of the covid-19. It is in this way Rwanda Education Board launched an online learning platform. The platform can be accessible by using either computers, laptops, desktops and also smartphones as well as tablets. This e-learning platform is based on the Moodle system and it was created to help students continue with their studies at home where they could help by teachers as well as by their parents (The New Times, 2020; Reb, 2020).

II. LITERATURE REVIEW

2.1. E-learning and society

E-learning is known as vital to enhance the accessibility and improvement quality of education and it is very useful to help everyone who cannot attend class due to different circumstances like physical disabilities, pregnant women, pandemic issue, economic matters, time and transport cost issues and so forth (Bizimana et al., 2020; Watson et al., 2004). Researchers defined an e-learning as the use of computer network technology (ICT), primarily over an intranet or

through the Internet for delivering information and instructions to individuals or stakeholders who need to benefited from e-learning (Welsh et al (2003). E-learning needs ICT to make distance learning education and training possible and It opens wide areas opportunities in secondary education for teachers and students as they can access learning materials anytime and anywhere, they are (MINEDUC,2016; Ugwuda, Nwana and Egbe ,2017).

In Rwanda, currently situation of learning in secondary schools is paper based system and it is obvious that the teachers have to be in the class room during teaching time and learners have to attend class and follow instructions given by their teachers. Some students are internal in boarding and others externally which meant that they come daily to school and return back home after daily class. It is very crucial to use ICT in education to make things easier in teaching and learning matter (Andrew and Jonathan, 2018). In many countries in Africa like Rwanda, most secondary schools are settled in rural areas and still have the ICT Infrastructures challenges and it is obvious that this lacking of accessing ICT materials due to electricity and internet coverage becoming the challenges for most rural schools, private and some public secondary schools (Bizimana et al.,2020;MYICT,2012; MINEDUC,2016). To deal with some challenges in Secondary education in the use of ICT, there were opportunities that Ministry of Education (MINEDUC) in Rwanda intervened in ICT action and it started to resolve an issue step by step because ICT in education sector supported by the Government and it is well taken into account in national policy (MINEDUC,2016). Ministry of Education has addressed that more effort needed to scale up ICT in education and it is why MINEDUC has just identified ICT as an appropriate tool for teaching, and all sort of learning (The new Times, 2019).

The use of ICT in education became valuable and it is needed as the major key to improve the quality of education and training but it needed that the stakeholders such as students have self-motivation in their mind (Johnston et al., 2005). In this way, since 2008 MINEDUC provided computer labs support for secondary schools (MINEDUC, 2016). Normally, an e-learning system comes in two major types Synchronous and Asynchronous (Cube, 2019). E-learning can be in synchronous mode when the stakeholders are using virtual classroom to exchange learning information for example by talking through audio, texting instant messages and so forth. This synchronous e-learning means that the participants share notes, ideas, training at the same time with their instructors or between students themselves (Johnston et al., 2005).

Vaishali and Dayanand (2015) described that the synchronous e-learning has some advantages to learners that it provides ability to log or track learning activities and facilitates the training and collaboration opportunities among stakeholders. In this type of e-learning, an instructor has to be interacting with student at real time which means even for

online training, instructor needs to be there to provide supports for the participants. It can be very understandable when it comes to how video conferencing works, online class or any kind of chat messaging where more than one can chart in group chat and all are engaging to share their views in real time while they are texting, posting in group and get the answers between them as it is in real time. In synchronous e-learning, teachers have to know what motivated their students while teaching online class because this would allow teacher to provide any support for their students to be motivated by e-learning program (Nosseir et al.,2014, Johnston et al., 2005).

The asynchronous e-learning means that the participants students and teachers are not interacting at the same time (Cube, 2019). It means that teachers would give the work on the e-learning platform and students will access the works or notes at their availability. In asynchronous e-learning type, an instructor can set the expired work online which let the students have to think about the deadline of the works (Bizimana et al.,2020). Asynchronous allows the participants to complete the web-based training at their own pace without live interaction with the instructor which provides the convenience and flexibility (Cube, 2019).

To have a real view of this asynchronous e-learning, take a look at how web-based system training works and as it designed for training it can be also accessible in offline mode. It means there would no need internet to navigate the notes content for training and some asynchronous training content are software based which means it will be asked to install a software in ICT device like laptop, computer, tablets and most smart phones have ability to facilitate this but at the first time installation may require internet connectivity but after installation, not need internet to navigate the content and this depends on the software developer's objective (Bizimana et al.,2020).

This asynchronous e-learning can be suitable for many countries where ICT infrastructures still an issue but some content web based training would require the internet to perform which means that asynchronous e-learning training can be accessed with internet and without internet which depends on the objectives of the system's owners and the stakeholders based on the available resources.

The one of the common advantages among of asynchronous e-learning is that it provides flexibility of access from anywhere at any time and to understanding well, suppose that the application is installed in smart phone, tablet, etc. Previous research illustrated that e-learning's advantage is that kind of providing to the learners the information they need whenever they need it (Vaishali and Dayanand,2015). It is an obvious to choose what it is suitable to entire society of learners where technology moves fast far from west countries and Africa's education needs to follow so that not rest behind

and it is in this way Government of Rwanda invested more in ICT infrastructures to let the brilliant vision of education success and the new target is for the vision 2050 (The New Times, 2020; MINEDUC,2016).

It is then an opportunity for students to have such online platform with all content notes of public secondary schools (Bizimana et al.,2020). The situation looks good for some students who have the means to access the platform web-based training in time they are at their homes. In this paper, challenges for accessing this e-learning described.

2.2. E-learning challenges in Secondary Schools' Education

Previous studied have shown that motivations are very important to students to follow better an e-learning instruction and benefited from it. However, the success or failure of online instruction is possibly related to learner motivation from their instructors and others who are in charge to promote motivation to learners (Khitam and Zuheir,2010; Nosseir et al.,2014; Johnston et al., 2005). The learners themselves have to build the courageous on the ICT use because if the students not interesting to use ICT tools for learning may resulted to failure motivation to them because self-motivation is one key to integrate and benefited from an e-learning. Nosseir et al. (2014) showed that the lack of confidence and experience in using ICT or other technology resulted in an obstacle matter for some students among others who are self-motivated and eager to learn new things in learning technology world. Another challenge may occur since the of e-learning in secondary schools is too new in Rwanda and teachers and students not have experience to work and collaborate within an e-learning and become big issue when teachers have not sufficient computer literacy or enough skills to computer usability (Nikolina, Atanas and George, 2014).

This might result to the technical problems for participants especially for teachers because they have to know and understand well the program before they provide support to students (Ali, Uppal and Gulliver, 2018). It is understandable that the awareness towards ICT use is crucial and without it may cause students motivation slow and this in combination of that students can resist to change from paper based to e-learning due to different circumstances likes lacking of ICT devices from home and lacking ability to afford the cost if it required for example buying internet may be costly for some students (Azliza et al.,2012; Ali, Uppal and Gulliver, 2018; Ugwuda, Nwana and Egbe, 2017). The students have to feel free to computer use so that they remove in the challenge of taking computer as the sacred materials which is illegal to approach. They have to see the computer usage as friendly material to help them increase their knowledge and open wide their mind towards learning innovation (Azliza et al.,2012).

Khitam and Zuheir (2010) in their research study have shown that teachers and students need an appropriate training in using ICT based learning so that they have basic understanding of using or be familiar with multimedia, blogs and related. Lack of computer labs may resulted in lacking basic skills on the computer literacy and in many secondary schools resulted in delaying of ICT skills because ICT labs mostly used to provide training for students and as well as to teachers and the teachers also use ICT labs to teach all courses related to compute literacy (Khitam and Zuheir, 2010). Because of some web content to provide e-learning need internet access and it is well known that in most developing countries internet is costly and even that it can be slow and becomes challenge to e-learning environment for example virtual classroom might require the good internet so that students be in good position to follow the instructions from teacher (Andersson and Gronlund, 2009).

2.3. Opportunities in Secondary Schools' Education

Information Communication and Technology (ICT) and the ICT use has shown that it is the best key role in the e-learning environment which illustrates as an opportunity to learners (Khitam and Zuheir, 2010; Vaishali and Dayanand, 2015).The students and teachers skilled in the ICT could have access and gain benefits of using e-learning with the use of basic ICT devices like smart phones, tablets, laptops. However, skilled to create blogs and chart room between students and teachers create a wide range for leaners to access e-learning services (Appana,2008). The internet accessibility facilitates the flexibility of e-learning and the students and teachers may interact from anywhere and anytime (Khitam and Zuheir, 2010). These opportunities cover the skilled in ICT use, internet access, computer labs in secondary schools, IT infrastructures, electricity and students and teachers' motivations (Ugwuda, Nwana and Egbe, 2017).

The main opportunity to students and teachers about e-learning is that the Government of Rwanda initiatively engaged to this e-learning and pushing that it could be used like another solution for learning and this remain as the future use for students especially in term there is a pandemic issue like Covid-19, what caused schools to be closed and let students went home (Igihe,2020; Reb, 2020; Bertrand, 2020; The New Times, 2020).

The online learning system can be accessible by using web browser or by using mobile application and install Moodle in the devices for example smartphone or tablets. However, teacher also can interact with students by using other tools with facilities of Google class and others like Quizlet, Kahoot and so forth.

III. METHODOLOGY

For the purpose of this research paper, researchers considered simple random sampling method to be used because researchers needed to have real view of e-learning in

secondary schools (Frerichs, 2008; Adebola and Ajay, 2014). Researchers selected the population of 120 where teachers and students with 30 teachers and 90 students have participated in answering questionnaire and interview through the phone calls interviews and electronic mail used to reach to the completion of this research. Face to face interviews and observations were both used. Many participants were from Lycée de Kigali, GS Saint Parrotin Gikondo, GS Gatenga, Gatenga Don Bosco TVET School, GS Saint Philippe NERI Gisagara, GS Kabuga and TVET School Nyamirama.

To reach to research paper objectives, the two important questions were addressed to the responders so that they provide the view of e-learning in Rwanda for secondary education.

- i. *What are the possible challenges to Rwanda secondary education in the use of e-learning?*

- ii. *What are the opportunities that Rwanda secondary education has today to support e-learning in secondary schools?*

Researchers developed the questionnaire to be completed by responders and send back the answers through electronic mail and through phone calls. In our literature, researchers aligned this research with previous studies to have deep understanding about the opportunities and challenges which are available in secondary education and referring to the Rwanda’s education sector where those opportunities and challenges were introduced and discussed in this paper. Hence, to answer the questions related to the e-learning challenges in Rwanda, a set of 10 questions were organized to help answering our research paper from Q1 up to Q10.

IV. DISCUSSIONS AND FINDINGS BASED ON OBJECTIVES OF THE RESEARCH PAPER

- i. *Challenges on the use of e-learning in secondary schools in Rwanda*

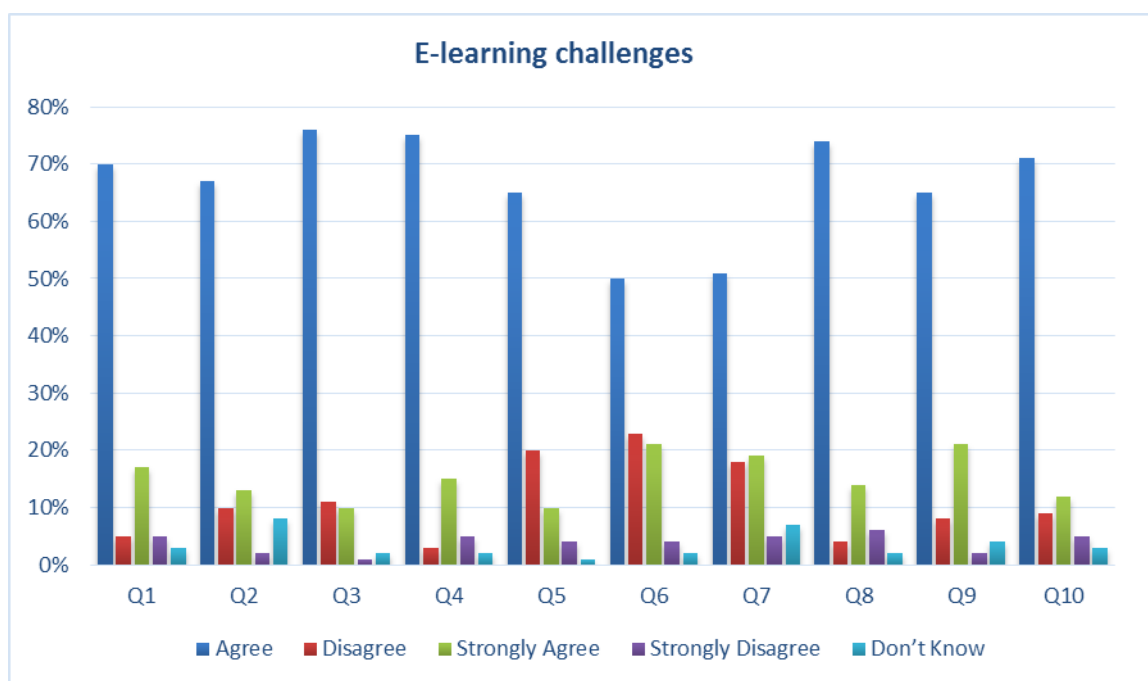


Fig 1: Challenges on the use of e-learning in secondary schools in Rwanda

The research findings covered in ten questions in **Fig 1** as rated by the responders and from Question one (Q1) to Question ten (Q10) are described and discussed.

Q1: The findings showed that “Lack of awareness and readiness attitude towards e-learning for students” is a challenge and they ranked at 87%. The most students do not understand why it is very crucial to read from home due to the covid-19 pandemic and some of them took this time like holidays because they did not be prepared before so that in case it is possible not to be in class that they could use an

alternative way for learning. The 10% of responders disagreed to this statement whereas 3% remained not sure for statement.

Q2: The findings showed that “Lack of training on the use of e-learning for teachers” is a challenge and they ranked at 80% and 12% of the responders disagreed to the statement whereas 8% of the responders do not sure to the statement. While interviewed teachers said that they are encouraged to use ICT as they can but they are lacking training for some new technology. The new technology software of e-learning requires that to be well succeed in the secondary education

every teacher not only from ICT teachers would have training on the use of software.

Q3: The findings showed that “Disparities in computer Access: Some students with disabilities could have the problem of access to computer use, or smart phone.” is a challenge and they ranked at 86% and 12% disagreed whereas 2% of the responders neither disagree or agreed means that they are not sure to this statement or they don't know what to choose. This statement showed that it is not easy for students with disabilities to use an e-learning software. In another hand, e-learning can be the solution for them whereas other students with disabilities e-learning become the big challenge for e-learning for example those with blindness and those with mental health.

Q4: The findings showed that “Insufficiency ICT Tools like computers and computer labs in most secondary schools” is a challenge and they ranked at 90% and only 8% disagreed with 2% of the responders who are not sure to the statement. To success in e-learning required great effort in the use of ICT tools and this is essential for learning. In January, Minister of Education mentioned that the use of ICT in secondary education is at 55% and that the objective of Ministry of Education is to promote the use of ICT in secondary education and built smart classroom in every public secondary school to reach to 100% before the end of this year (Kigalitoday, 2020; Igihe, 2020). This means that this challenge would no longer be a barrier to e-learning journey.

Q5: The findings showed that “Lower level of ICT Skills among students and teachers” is a challenge and they ranked 75% and 24% disagreed to the statement and 1% not sure to the statement. ICT skills is essential for students and teachers to facilitate learning in general. Every teacher needs to have basic use of ICT tools and devices like smart phone, tablets, laptop and so forth and needs to be familiar with all applications that could help in providing the course easier for students. Once the teacher is in advance would teach well new technology for students. The lack of enough computers could also facilitate lower level of ICT skills because it is essential that ICT theories go with the practices (Kigalitoday,2019; Kigalitoday, 2020).

Q6: The findings showed that “Lack of strong motivation to access online content” is a challenge and they ranked at 71% and 27% of the responders disagreed whereas 2% of the responders not sure to the statement. Observed that some students would not have ability to learn independently and the way it is crucial that Students and teachers have to be self-motivated and this showed that self-motivation is essential to build strong motivation in learning environment especially when it is to adopt e-learning like new facility to learners (Johnston et al., 2005; Nosseir et al., 2014).

Q7: The findings showed that “Varity of language used in learning: Inability to use ICT tools due to language” is a challenge and they ranked at 70% and 23% of the responders

disagreed whereas 7% not sure to the statement. Most of ICT devices and software use foreign languages like French and English. The findings showed that there do exist the students who have the problem of using English in learning due to the background of students from nursery to secondary education, the language is barrier to many. It could be good when software used in learning have different language to help students be familiar with the software and possible in their native language (Khitam and Zuheir, 2010).

Q8: The findings showed that “Poor level of IT infrastructures (Virtual classrooms, smart classroom) in most secondary schools” is a challenge and they ranked at 88% and 10% of the responders disagreed whereas 2% not sure to the statement. Virtual classrooms and smart classrooms are very important to facilitate e-learning in secondary school education and there is a hope to be resolved (Andrew Zeitlin and Jonathan, 2018; Igihe,2020).

Q9: The findings showed that “Most students' lack of Information Technology devices like Smart Phones, Tablet, Television and radio at Home to facilitate e-learning when they are at Home” is a challenge and they ranked at 86% and 10% disagreed to this statement whereas 4% of the responders not sure to the statement. Due to family economy, parents do not give their students smart-phones and tablets to help them in their studies. Most of them would wait the computers of their schools and starting to use them. Meanwhile, some secondary schools do not allow students to bring mobile phone at school. Students from poor families may lack electronic devices also due to different circumstances like electricity issue and cost for devices because smart phone is costly. Government promoted the giving away smart phones for poor families to help them accessing e-government services and and also to support an e-learning for students (Kagire,2019; The New Times, 2019). Possibly this would be the solution as this smart phone would be also used together with students in family in learning situation while student is at home (The New Times, 2019). The findings revealed that most students living in rural that their families have no television at home and this could not facilitate students to learn as the television is the great device to facilitate learning when students are at home.

Q10: The findings showed that “Few Number of ICT teachers in Secondary Education” is a challenge and they ranked at 83% whereas 14% of the responders disagreed and 3% of responders not sure to the statement. In most secondary schools, it can happen that teachers who did not graduate in ICT courses teaching the ICT courses students due to the lack of qualified teachers (Kigalitoday, 2019). This would not facilitate the students because teacher may lack some skills and this would delay students to have skills on the ICT use because the teachers are not enough capable to help students improving their knowledge.

ii. The available opportunities in supporting e-learning in secondary schools

Government has demonstrated that it is crucial to facilitate the use of ICT in Secondary education. Many research studies illustrated that there is a potential to use ICT in education (Khitam and Zuheir, 2010; Vaishali and ICT delivers chances for self-learning and distance-learning to remove distance learning obstacles and let the learners remain independently for time or place and this how ICT in education plays vital role. (MINEDUC,2016).

Five statement to be voted by responders as opportunities have set like Opportunity One (Opp1) to Opportunity Five

Dayanand, 2015). In this research paper, five statement questions were provided so that the responders may rank them to see what the opportunities available in this journey of e-learning in secondary school education.

(Opp5) whereas **Opp1**: “Commitment from Government to support ICT in Education” and **Opp2**: “ICT Literacy training for teachers at all levels” and **Opp3**: “Teachers ability to access quality tools to create innovative in learning” and **Opp4**: “Availability of Online Digital Content and finally” **Opp5**: “Most teachers have access to internet”.

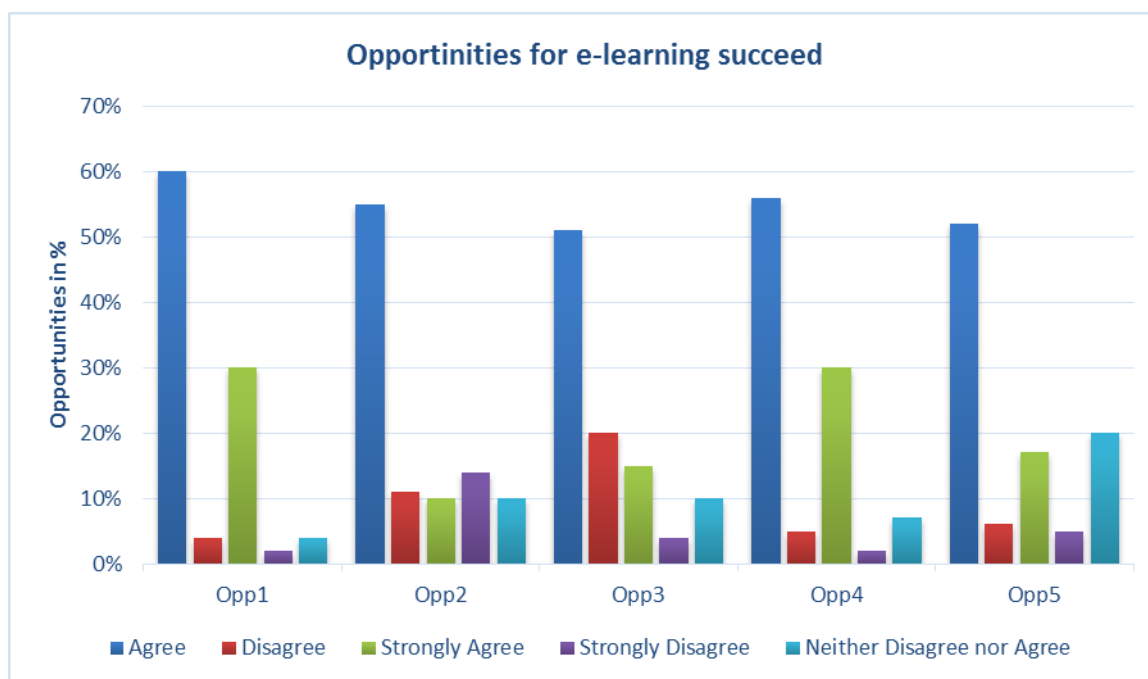


Fig 2: Opportunities for e-learning succeed voted by responders

From the **Fig 2**, the findings showed that **Opp1**“Commitment from Government to support ICT in Education” is an opportunity to support e-learning and it ranked at 90% and 4% of the responders disagreed to the statement whereas 4% neither agreed or disagreed to this statement. Due to the Government commitment, the use of ICT would grow up for sustainable education in secondary education and previous studies showed that ICT in secondary schools was at 55% (The New Times, 2019; Andrew and Jonathan, 2018).

This meant that the use of ICT in secondary has significant role to promote e-learning success. The findings showed that **Opp2** “ICT Literacy training for teachers at all levels” is an opportunity and ranked at 65% and 25% disagreed whereas 10% neither Disagreed nor Agreed. Training in ICT in secondary education showed that is crucial and increase the skills on the use of e-learning content. Meanwhile, lacking training on the ICT literacy may delay teachers and student’s adaptability to new software and online content that can facilitate learning capability. The findings showed that

teachers need more training at all levels which could increase the knowledge in ICT use and this could help teachers to teach well students (MINEDUC, 2016; The New Times, 2019).

The findings showed that **Opp3**: “Teachers ability to access quality tools to create innovative in learning” is an opportunity and ranked at 66% and 24% disagreed whereas 10% neither disagreed nor agreed. The findings showed that certain teachers are eager to have and increase skills for knowledgeable capacity for good performance while they are teaching (MINEDUC, 2016).

The findings showed that **Opp4**: “Availability of Online Digital Content” is an opportunity for secondary education and ranked at 86% and 7% disagreed to this statement whereas 7% Neither Disagreed nor agreed. Officially an e-learning which covers online content launched by Rwanda Education Board and it covered all courses that teachers could need to provide students. Teachers and Students can full access e-learning platform from anywhere and anytime and this is a great opportunity for secondary education (The New Times, 2020; Reb, 2020).

The findings also showed that **Opp5**: “Most teachers have access to internet” is an opportunity and ranked at 69% and

11% of the responders disagreed whereas 20% neither disagree nor agreed. Certainly, internet is available but it can be costly but in most secondary schools there is wireless internet and fibre optic and even modem devices used in secondary schools to help students and teachers making their research studies (Welsh et al,2003).

In 2016, Ministry of Education illustrated that 18% of public secondary schools were connected to internet and due TVET School Nyamirama with students 349 and teachers 24 and they use modem when they need internet and wireless facilities planned to be available for upcoming days.

CONCLUSIONS AND RECOMMENDATIONS

In general, most teachers are ready to use an e-learning system but students not yet ready and research findings showed that students not well prepared.

In this perspective study of e-learning in secondary schools in Rwanda, the main purpose was to show the complete possible view of learning environment from convention learning to online learning (e-learning). We described possible challenges that many secondary schools, teachers and students are facing in learning environment.

In this paper, we described and analysed the main challenges of e-learning in Rwanda's secondary education. This paper described also opportunities which Rwanda has today to provide e-learning services to the secondary education.

This research paper is for academic purpose to describe an image and review of an e-learning attractiveness in the secondary school. IT infrastructure still in need and its improvement in secondary education especially for schools named twelve years basic education. Ministry of Education in partnership with Rwanda Education Board would provide continuity training for all secondary teachers at all levels and smart class rooms have to be built in all public secondary

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the improvement of the smart classroom implementation, the internet would be at higher level today in secondary schools (The New Times, 2019; MINEDUC, 2016). For example, is GS Saint Philippe NERI Gisagara, it is a public secondary school which has 701 students and teachers 31 and they are accessing internet by using fiber optic. Another example is

schools. Most of students interviewed were surprised to learn from home during the covid-19 lockdown. Ministry of Education and Rwanda Education Board (REB) have to make an effort to let students aware of learning from home and how they could use online content platform provided by REB.

It is good to use Radio broadcasting and Television because the findings showed that most students have radio from home, some may have both and some they have one at time. Only few students said they have not any at home.

However, most teachers said they are ready to use e-learning but still need trainings for awareness to bring an improvement and quality in an e-learning education routine not only in the time of pandemic issue like what Covik-19 or corona virus prevented schools to be closed.

ACKNOWLEDGEMENT

Researchers thanked all who participated in this research paper including teachers and students. Special thanks to participants from GS Saint Philippe NERI Gisagara and TVET School Nyamirama and those from Lycée de Kigali.

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