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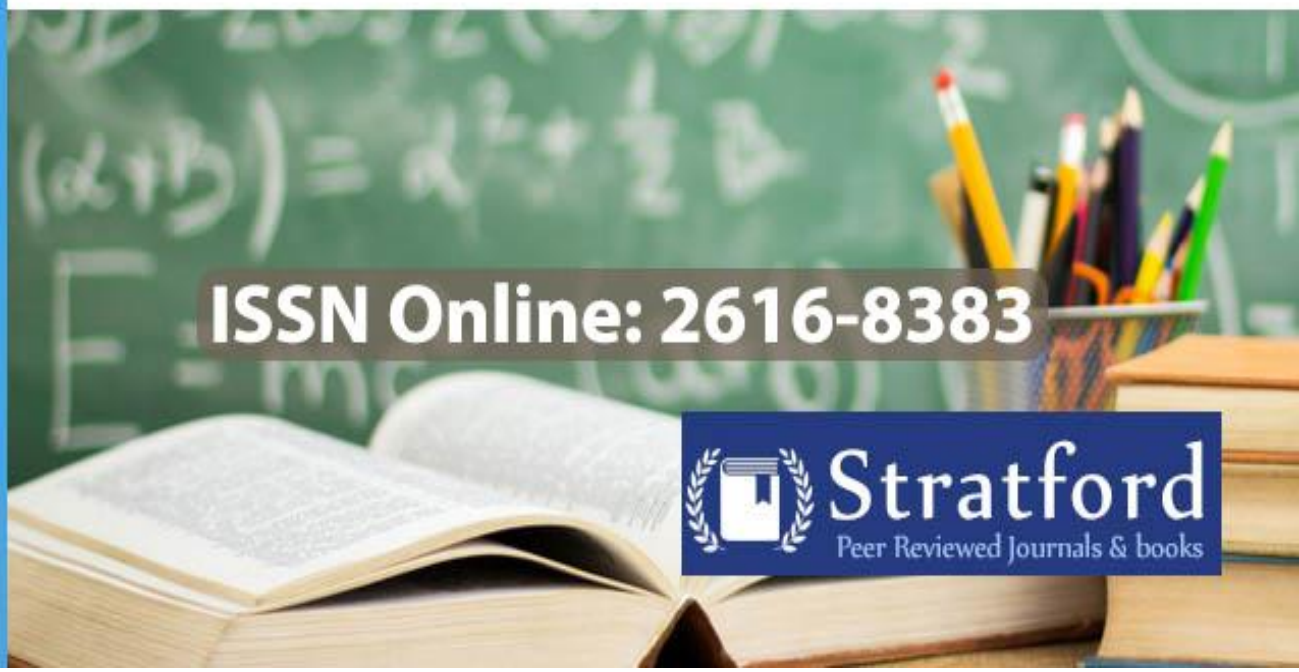

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E-Learning Instructional Strategies and Students' Academic Performance in Public Secondary Schools in Rwanda

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Abstract

Effective usage of instructional strategies through e-learning plays a significant role in improving students' academic performance though requiring teachers to have ICT skills. Therefore, the purpose of this paper was to evaluate the effect of E-learning instructional strategies on students' academic performance in public secondary schools in Kicukiro district. This paper employed comparative research design. The target population included 755 people, out of which 262 formed the sample size that was obtained using the Yamane formula. Questionnaires were used to collect the data. The analysis was done with the help of Statistical Package of Social Sciences (SPSS) version 16. The findings revealed that majority of students who managed to participate in E-learning were total passive in lessons. Another significant number of students indicated they did not have chance of participating in E-learning as their colleagues. It was generally revealed that a big number of students who studies through e-learning increased their performance compared to how they performed in face to face lessons. But there were also students who indicated that their academic performance was not affected by E-leaning in any way. The study concluded that E-leaning teaching and learning system affect performance of some students positively and others negatively. The study recommended that the ministry of education in partnership with school administrations should train teacher on how to teach using E-learning to equip them with techniques and methods that will help them to which will help them to involve all learners in E-learning lessons. Teachers should be more creative and must do deep research to make sure that they are equipped with enough content and appropriate methods which they use in teaching students in E-leaning classes. Further, students should create a sense of responsibility in them to avoid distractions during E-leaning classes because this will help them to follow well the explanation and other instructions given by teachers for them to understand what they are learning.

Keywords: *E-learning, Instructional strategies and students' academic performance*

1.0 Introduction

Globally, E-learning today, teachers stay at their home places or offices and instruct learners who are far away at different locations without the need of physical contact. For these high developing Economic Times where E-learning education increases, the use of the computer and internet forms the major component of E-learning. Nevertheless, the access to good computers and internet facilities causes many E-learning projects in African countries to be failed before they even begin (Danai, 2015). In Africa, there is an emerging market for E-learning, but the continent continues to lag behind developed economies in the effective implementation of E-learning. For instance, UN Broadband Commission reported 8 of the 10 countries with lower level of internet availability in the world and these countries are in Sub-Sahara Africa. They include Ethiopia, Niger, Serra Leone, Guinea, Somalia, Burundi, Eritrea and South Sudan (Danai, 2015).

According to different studies conducted about the challenges of E-leaning, East Africa faces the problem of internet connectivity and limited information technology skills. For example, a study conducted by Dorothy and Makokha (2016) found that in Kenya, internet connectivity in public universities was a big problem. Similarly, majority of teachers and students have limited information and communication technology. Indeed, there was also shortage of computers/ laptops, inadequate computer laboratories and insufficient time for online interactions. In Uganda also the study conducted by International Conference on Computer Education (CSEDU), on online leaning challenges in Academia found that despite the adoption of Information and Communication Technology (ICT) in teaching, ICT integration in teaching is still ad hoc and more work had to be done to realize full potential of E-learning. This is because it was discovered that in Uganda, like in Kenya, internet connectivity and power supply were not reliable, most especially in the schools situated in rural areas. Teachers also lacked the required skills for designing online courses and even in schools where infrastructures were not a problem (CSEDU, 2020).

Rwanda is one of African countries that are implementing online learning at a high speed and this was highly increased with the break out of COVID-19. It was indicated by Rwanda Ministry of Education that Rwanda Education Board (REB) has a functional E-learning platform that is used for distributing learning materials and resources for teachers and learners. This was most use during the period of COVID-19 when the government with development partners put together efforts to reinforce the use of this platform (Rwanda Ministry of Education , 2020). According to Phil and Samuel (2021), the government of Rwanda through REB implemented various online learning initiatives to ensure that students could continue to learn. Some of these initiatives include broadcasting lessons on radio and television and YouTube Channel was launched with educational learning materials.

However, although E-learning became the last resort for learning during COVID-19 lockdown periods, the study conducted by the Flemish Association for Development Cooperation and Technical Assistance (VVOB) in 2018 showed that there were a number of barriers to E-learning education. For instance, the study revealed that ICT infrastructure was still inadequate in a lot of parts of Rwanda. Many schools did neither have computers nor internet access. Equally, even 50% of schools were not having electricity connection. In addition, majority of teachers had inadequate knowledge on the use of technological tools used in E-learning and even students have difficulties to access on them (VVOB, 2018). Another curried was carried out to evaluate the

experience of postgraduate students on language of instruction, Mathematics and science education in online learning during Covid-19 pandemic in Rwanda. This study indicated that regardless the willingness of learners to partake in online learning, they met with several challenges of learning mathematics and science. Some of these challenges are the lack of practical activities, insufficient support of structured exercises, few open resources and inadequate access to online resources. There is also problem of internet access and connectivity English language ability and inadequate cooperation among students and facilitators.

1.1 Problem Statement

It is highlighted that Rwanda started encouraging schools to embrace the E-leaning system. This increased with the outbreak of COVD-19 when face to face learning was not possible. However, despite the efforts invested in encouraging the adoption of E-learning, it was brought out clearly in the background that there are different barriers like poor ICT infrastructures, internet connectivity, and expensive ICT tools, among others, both to the side schools, teachers and students. This was supported by the findings of the study conducted by VVOB (2018) and the report of Ariane published in Three Mountains Learning Advisors Organization Journal in 2019 demonstrating that even Rwanda Education Board (REB), the institution in charge basic education learning, had E-learning portal which seemed to be hardly functional in 2019. Because of the failure of this E-learning portal, in 2020 the government planned to merge it with the Mentoring Community of Practice Project (MCO), known today as Online Community of Practice Platform –TCOP. In addition, other information collected from different sources as they are highlighted in the background shows clearly that there are various challenges and loopholes found in E-learning to the side of schools, teachers and learners in Rwanda. These include the quality of technological tool used, internet connectivity, teaching and learning methods among others. However, there is no information found which explains how the E-learning, transmitted with such amount of challenges, affect the success of teaching and learning exchanges between teachers and learners in public secondary schools and how it affects the academic outcome of learners. The paper therefore, sought to evaluate the effect of e-learning instruction strategies on students' academic performance in selected public secondary schools in Rwanda.

1.2 Objective of the Paper

The objective of this paper was to evaluate the effect of e-learning instruction strategies on students'academci performance in selected public secondary schools in Kicukiro district in Rwanda.

2.0 Literature Review

2.1 The use of E-learning in schools

Worldwide, E-learning deals with information and communication technology (ICT) to improve learning in educational setting. In E-learning there are various tools and techniques that are applied such as e-mails, websites, blogs, social and business media, video conference and video calls, among others, to allow learners to access programs provided on internet (Saykılı, 2018). Bennett and Coleman (2021) conquered with Saykılı (2018) stating that E-Learning can be described as a network which enables the transfer of skills and information to students. In the same way, they argue that it is used for the delivery of education offered to a large number of recipients at the same

or different times. They further added that this educational system was not accepted totally before as it was anticipated that it lacked the human components required in teaching (Bennett & Coleman, 2021). Despite the prejudice attributed to the use of technology in teaching, the rapid development in technology and the progression in learning systems led E-learning to be embraced by the multitudes (Debi , 2019). The development of computers was the basis of this uprising; as we move in time, there is an increase of smartphones, tablets, among others and these devices now have a prominent place in the classrooms for learning (Ronghuai , Spector, & Yang, 2019) .

Moreover, Bennett and Coleman (2021) argued that it may be equally imperative to consider the notion of non-electronic instruction with the help of books and lectures, but the importance and efficiency of E-learning based teaching cannot be considered lightly or overlooked entirely. This is because it is assumed that the human brain can easily recall and connect to what is seen and heard via moving pictures or videos and E-learning is a good platform that facilitates this. Many areas, including agriculture, medicine, education, services, business, and government systems are adapting to the idea of E-learning as a way of improving production efficiency (ibid).

2.2 E-learning in Africa

African countries are massively entering the move of using E-learning in schools and this has been motivated and boosted by the outbreak of Covid-19 pandemic. This education system is being adopted in developing countries not because it is a better form of learning but because it is perceived as a rational form of leaning and cost effective means that provided wide leaning opportunities to high growing population in these countries (Stefan , 2018). However, online learning is being constrained by problems of technological infrastructures like internet and high cost of technological tools like computers, tablets, smartphones and others (Selira , Mustafa, & Hasan , 2014). The barrier to leaning has been noticed during this time of Covid-19 pandemic where the lack of access to technology has led to the closure of many schools in Africa. Here, rural communities were the most disadvantaged because of lack of electricity and absence and or affordability of internet connection (Corinne , 2020). Despite the importance of E-learning which can help the society accelerate education, making it accessible to many people and at their own pace, there are different barriers that hinder its success especially in African countries. These include poor technological infrastructures, low rate of technological literacy among educators and implementation difficulties (Nirmal , 2017)

Nhando (2021) also indicated that there are three major challenges that face E-learning in African countries. These challenges include the provision of low internet access or connectivity whereby to provide all students with internet become verry expensive and becomes imponsible for governments to teach all students online; the second challenge is that most of African countries use textbook and there no locally developed content and curriculum online which makes it difficult for teachers to develop their content in case there is a need to teach online; like during the time of the COVID-19 pandemic. Finally, teachers have no or little training and professional development on the use of technological tools. This is because teachers on the content have been trained in education programs with inadequate technology and they find it hard to use technology in involving student in E-learning activities (ibid)

2.3 Efficiency of E-leaning in schools

The use of online education is understood in four major different ways: First, E-learning uses internet which increases learners' freedom from physical limitation of the real world because it is given with reduced constraints of place, space time and geography whereby learners are enabled to access high quality of learning opportunities and instructive materials regardless of local limitations (Murphy, 2012). Second, E-learning forms in the learner the sense of responsibility, creativity and innovation. This is because the internet is taken as supporting a new culture of learning. This learning is based on round bottom-up philosophies of collaboration exploration, play and innovation rather than top-down individualized instruction of collective exploration (Thomas & Seely , 2011). Thirdly, the internet used in E-learning supports different forms of knowledge construction and knowledge consumption that vary greatly from the epistemological beliefs of formal education and mass teaching. The internet learning therefore can be regarded in relations to capacity building rather than relating it to individual accumulation of prior knowledge in terms of what is currently known as face to face learning (Chatti, Matthias & Christoph , 2010).

Fourth, E-learning personalizes the way in which people learn by making education a more individually defined process relatively to how it was before. For instance, the internet is associated with improved social independence and regulator, giving people alternative choice over the nature and form of what they learn, how they lean and when they learn it. Through E-learning therefore, education has become an entirely manageable aspect of one's personal life, with the internet easing digital manipulating of education engagement alongside daily activities and other peoples' engagements (Subrahmanyam & Šmahel, 2011). However, E-leaning education is not the most effective option in all learning situations. This is because students in computer-generated schools show less development than those in conventional schools in attending. It has been also argued that language skills, highly technical subjects and the sciences are difficult to be understood and mastered by learners through online leaning (Mahmoud -Ahmed , 2014).

2.4 Effects of E-learning on learners' participation and concentration

It is argued that E-learning may be a platform that may enhance learning process. Nevertheless, different elements are considered to be obstacles in students' learning through online instructional platforms. These obstacles include decreased motivation in students, delayed feedback or help caused by inconsistent availability of the teacher at the moment learners may need this help when studying, or students feeling isolation due to physical absence of colleagues (Yusuf & Al-Banawi, 2013). There are many other downsides such as students being distracted by internet jungle materials, students losing focus or deadline for given works. In addition, E-learning depends on technology that relies on internet and computers, which students may not be having access to or may encounter interruptions and other system errors which can appear during learning time (Sadeghi, 2019). For the students' organization, the ability to organize how they study and the amount of time it takes them on monotonous computer learning with the absence of physical presence of their classmate may lead them to feel isolated and can decrease their motivation (Dhull & Saksh, 2017).

Other obstacle which is also observed in E-learning is the fact that learners and teachers spend several hours seated and in front of the computer screen. This may cause sight or back problem to both students and teachers and may cause them to drop out from the learning activities (Nazarlou, 2013). However, the obstacle to E-learning can be tackled with the help of teachers who can adapt

their teaching strategies to the need of students. But in order to arrive at this, there should be experience and knowledge about teaching online which is still not enough, especially in African countries (SchoolEducationGateway, 2020).

3.0 Research Methodology

This paper employed causal comparative research design. The target population was 755 students. The sample size was 262 respondents obtained by using Yamane formula and sampled by using stratified sampling technique. The study used questionnaires to collect the data. The validity of the research instrument was maintained by distributing the research instruments to the expert respondents in the area of the study while reliability was maintained by making pilot study that provided reliability of the research instrument and SPSS version 16 was for data analysis.

4.0 Research Findings

This paper was to evaluate the effect of e-learning instructional strategies on students' academic performance in public secondary schools in Kicukiro district in Rwanda.

4.1 Participants' participation in E-learning classes

Before collecting the information about the technological tool respondents used, the researcher first asked them if they have participated in E-learning. Figure 1 summaries the responses given by the participant on this point.

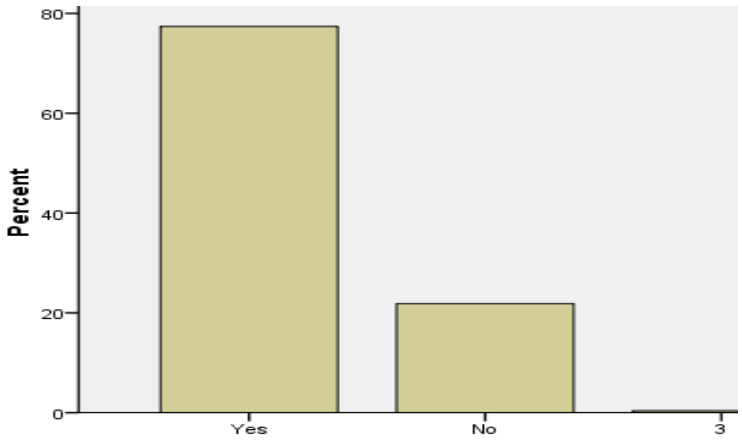

Figure 1: Respondents' participation in E-learning

The information shown in Figure 1 indicates that 78% of students who participated in the study affirmed to have participated in E-learning lessons while 22% indicated to have not got chance of participating in E-learning. The fact that a big number of respondents confirmed to have attended E-learning classes was a good indicator to the researcher that these respondents would provide right information about their experience in E-learning. Participation of students in E-learning was also supported by the two key informants who attested that they have used E-leaning to teach. They also added that E-leaning was used in especial way as an alternative to teach during the period of lockdowns in Covid-19 in order to take care of S3 and S6 students who needed special preparation for national exams. The information from these key informants led the researcher to

the interpretation that this E-leaning has not been used to all students as it is shown that more focus was on candidate students.

4.2 The place where respondents got E-learning facilities from

The summary of the place where the respondents attended e-learning from is presented in Figure 2

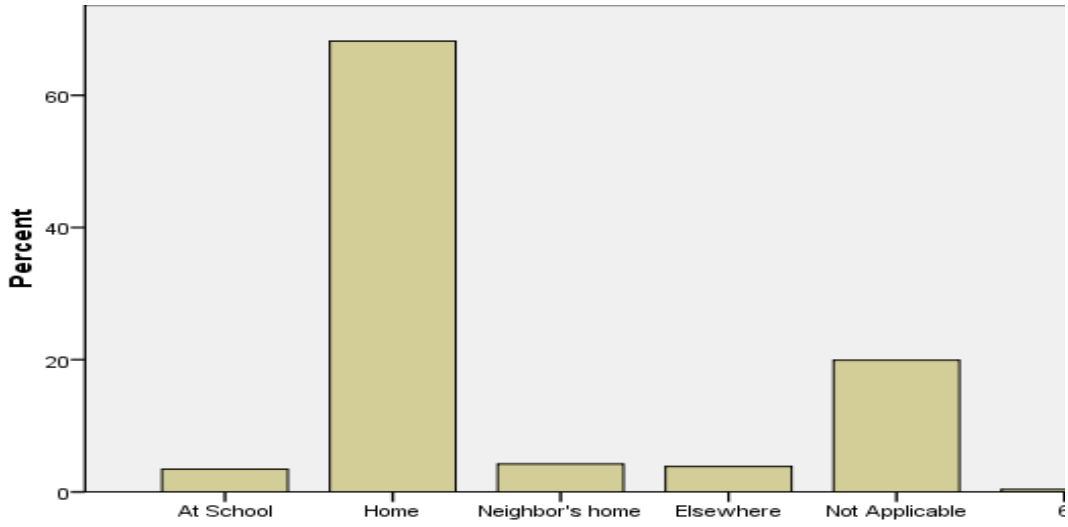

Figure 2: The place where the respondents attended E-learning from

The information in Figure 2 indicates that 66% of respondents attended E-learning classes from their home, 4% attended E-learning from their neighbors' homes, 3.8% attended E-learning from other places like parents' job place, 3.4% attended E-learning at school while the remaining 20% were not precise about where they attended their E-learning lessons. This shows clearly that the majority of respondents attended their E-learning lessons at home and the researcher was curious to know the platform and technological used to facilitate this E-learning at students 'home place. Table 5 shows the responses that were given by respondents on this point. The fact that E-learning was followed by students being at their home was confirmed by the 2 key informants who certified that E-leaning was used only during the lockdown of Covid-19 when students could not move from their homes. They added that E-learning was used as a way to help students, who were at home, especially those who were preparing for national exams to continue learning.

4.3 Platforms and tools used by students in E-learning

The descriptions of the platform and technological tool used by participants in E-learning is depicted in Table 1

Table 1: The platform and technological tool used by participants in E-learning

The platform used in E-learning	**Technological tools used**							
	Compute r	Smart phone	TV Screen	Radio gadget	Other	Not applica ble	Used all tools	Total
Video Zoom	5	5	5	0	0	0	0	15
Video Google Class	2	7	0	0	0	0	0	9
Televised lessons	7	10	121	0	0	0	1	139
Radio Broadcasted Lessons	0	7	2	29	0	0	0	38
Other platform	0	7	0	0	2	0	0	9
Not Applicable	0	0	0	0	44	7	0	51
Total	**14**	**36**	**128**	**29**	**46**	**7**	**1**	**261**

Source: Fieldwork, 2021

The statistics in Table 1 shows that the majority of respondent, that is 139 out of 261 (53.5%) attended televised lessons. 121 (46.4%) of them attended these lessons on TV screen, 10 (7.2%) used smart phones while 7(5%) used computer. Other 38/261 attended radio broadcasted where 29 of them used radio gadgets, 7 used smart phones and 2 used TV screen. The next 15 respondents out of 261 attended lessons on zoom video call with 5 of them who used computers, other 5 used smart phones and remaining 5 who used TV screens. Among the remaining respondents, 9 of them attended E-learning using other platforms where 7 of them indicated that they have learning on YouTube using smart phones while two used the system of phone code which was given by Rwanda Education Board, to access lessons. Lastly, there were 51 respondents, who indicated that they did not attend any E-learning lessons, with 44 among them who indicated that they learned using books while 7 did not indicate the means they used to learn. This information again shows that the big majority of 210 out of 261 respondents has participated in E-leaning in one way or another and gives them grantee to have information about this E-learning outcome.

Among the 2 key informants who responded in the study, one indicated that he used photos, recorded sounds and video zoom using computer and smartphone. Another said that she used YouTube video records, whatsApp video and sound record and radio to teach. These findings from the key informants show that there was no precised E-leaning platform which was selected to help students have common way of learning. It therefore led the researcher to question the efficiency and effectiveness of these platforms that were used in helping learners in mastering what they were being taught in E-leaning.

4.4 The extent at which students participate in E-learning at Camp Kanombe Secondary School

On this objective, the researcher assessed the student participants' attendance level, punctuality, participation level: looking at how they followed the explanation from the teacher, how the asked questions and the means in which feedback was given to them as well as note taking. Their responses below revealed how their overall participation in E-learning was.

4.4.1 Attendance level in E-learning classes

Table 2 shows how the responses got from participants indicated their attendance level in E-leaning classes.

Table 2: Participants' attendance level in E-learning

Key: SA (Strongly Agree**), A (**Agree), **D (**disagree**), SD (**Strongly Disagree**), N (**Not sure)

Statement	SA	A	D	SD	N
Attended all planned lessons	34	94	51	16	66
Missed majority of planned lessons	18	116	53	19	55
Missed only few of the lessons	24	110	42	19	66

The participants' responses summarized in Table 2 shows that the big number of participants missed most of the planned E-learning lessons. This is indicated by their statistics which revealed that 134(51.3%) student respondents indicated to have missed the majority of planned lessons. On the other hand those who agreed to have attended all E-learning sessions are 128 (49%) and are the minorities considering 261 respondents who participated in the study. However, the researcher found the inconsistence in the responses of the respondents because other 134 again showed that they only missed few lessons, 67 (25.7%) disagreed to have attended all planned E-learning lessons, 72 disagreed to have missed the majority of the lessons while 61 disagreed to have missed only few of planned E-learning lessons. This inconsistence led the researcher to make a conclusion that there has been a confusion of the in interpreting the question based on the language barrier of the respondents. The responses from the key informants indicated that the attendance of students in E-learning was low and they justify this low attendance indicating that the schools has majority of students whose parents had difficulty to access E-learning tools like laptop, good smartphone and or internet. The researcher's interpretation from this fact therefore was that E-learning was not prepared and created inequality in learning.

4.4.2 The level of respondents' punctuality in E-learning

The participants have indicated how they have been punctual in their E-learning lessons. This was indicated in their responses summarized in Table 3.

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Table 3: The Level of participants' punctuality in E-learning lessons

Statements	SA	A	D	SD	N
I always started the lesson on time with the teacher	41	65	67	23	65
I was punctual to start the lesson with the teacher for most of E-learning lessons	38	81	56	24	62
I was most of the tame late and could not start the lesson on time with the teacher	15	62	78	41	65
I never started the E-leaning lesson on time	27	57	72	37	68

Key: SA (Strongly Agree**), A (**Agree), **D (**disagree**), SD (**Strongly Disagree**), N (**Not sure)

The findings in Table 3 reveal that student respondents who have been punctual to start all E-learning lessons with the teacher are 106, which is 40.6%, out of 261 who participated in the study. Other 119 (45.6%) out of 261 participants started the majority of E-learning planned lessons on time, 77(29.5%) out of 261 indicated that they were late in most of the lessons while 84 (32.2%) never started E-learning lessons at time. This information indicates that a big number of respondents who managed to participated in E-learning classes have been punctual in these lessons because it is clear that if the number of those who were punctual in all lessons is added to the number of those who were punctual in the majority of planned lessons it reaches to the percentage of 86.2% of all participants. This is to show that participants were motivated to follow E-learning lessons and enthusiastic to learn from them. The motivation and punctuality of student in E-leaning was justified by the information given by the key informants who indicated that students who managed to get ways of participating in these E-leaning classes participated well. One of them certified that students were punctual at 100% while another indicated that they were punctual at 80%. These facts indicate that if students are given right equipment and are well prepared, E-learning can still be a good learning system for learners.

4.4.3 Participants' level of following teacher's explanation during E-learning

The summary of the respondents' acceptance level on how they got teachers' explanation in e-learning is presented in Table 4

Table 4: Respondents' acceptance level on how they got teachers' explanation in E-learning

Statements	SA	A	D	SD	N
I followed well all explanations from the teacher	47	82	48	19	65
I only understood some concepts in E-learning and others skipped you	27	102	41	23	68
I did not get any from what the teacher explained during E-learning	42	88	46	26	59

Key: SA (Strongly Agree**), A (**Agree), **D (**disagree**), SD (**Strongly Disagree**), N (**Not sure)

The statistics summarized in Table 4 revealed that 130 (50%) out of 261 student participants in the study affirmed to have not got anything from what the teachers explained in E-learning. 129 out of 261 respondents showed to have followed all the explanation and 129/261 indicated that they only understood some concepts from what teachers explained in E-learning lessons. On the other hand, 67 respondents out of 261 disagreed not to have followed the explanations of the teacher in E-learning lessons 64/261 disagreed to have only understood some concepts in E-learning explanation while 72 disagreed with the statement that they did not get anything from what teachers explained in E-learning. Furthermore, a number of 65 out 261 did not show their position on whether they followed all the explanation of the teacher, 68/261 respondents did not show their position on the statement about whether participants understood only some concepts from teachers' explanation in E-leaning while 59/261 were neuter on the statement of not having got anything from what have been explained in E-learning.

The interpretation of the researcher from the facts revealed by participants' responses was that half the number of those who responded in the study demonstrated to have not followed the explanation given by teachers in E-learning classes. This is demonstrated by this 130/261 who attested that they did not get any of the lesson explanation given in E-learning lessons. On the other hand the researcher found that there was also a considerable number of respondents, close to another half , that is 129/261 respondents who indicated to have followed well the explanation given by teachers in E-leaning lessons. Lastly, the researcher's observation of respondents who were undecided about showing their position in agreeing or disagreeing with the statements that were given in relation to how E-learning lessons' explanations were followed, is that all these people may those who are included among the respondents declared to have not participated in any E-learning classes.

The key informants did not clarify well how explanations were given to students. However, both of them have clearly indicated that they sent videos, pictures and recoded sounds, the materials which need more attention and good editing in order to transmit intended message rightly. The way these materials were made might have been therefore one of the barriers which prevented students not to follow well the explanation given. More explanations about why many of the students did not follow well teachers' explanations in E-leaning were given by the responses of participants about the challenges they faced in E-learning.

4.4.4 Participants' possibility of asking question during E-learning

The summary of the participants' possibility to ask question and get the feedback during e-learning lessons is depicted in Table 5

Table 5: Participants' possibility to ask question and get the feedback during E-learning lessons

Statements	SA	A	D	SD	N
I was able to ask oral question and get immediate answer from the teachers	23	44	84	45	65
I only asked questions through written chats and could get immediate answers from teachers	26	58	72	38	67
I was totally passive because there was no room to ask questions	32	71	59	30	69
Questions were sent to the teacher through email and answers were given to you after some days	40	88	40	27	66

The findings from the participants responses summarized in Table 5 reveals that 67 students, out of 261 participants in the study, could be able to ask oral questions and get immediate answers from their teachers during E-learning lessons. Other 84 students out of 261 declared that they could only ask questions through written chat and were able to get direct answers from their teachers. On the other hand, there are 103 respondents who revealed that they were totally passive in E-learning lessons because there was no room for them to ask questions while other 128 indicated that their questions were sent to teachers using email of their teachers could give them feedback after some days.

These statistics indicate clearly that the majority of respondents were passive in E-leaning lessons as they could not have immediate interactions with their teachers. This justifies the findings in table 5 in which the majority of respondents testified to have not followed well the explanation given by teachers in E-leaning lesson. The fact of students being passive in E-learning classes also was supported by the responses given by the 2 key informants who indicated that it was difficult for teachers to involve students directed in asking questions and giving them responses. The reason given was that, both teachers and students have cheap E-learning tools, mostly smartphone, which they could use to send videos, pictures and recorded sounds to students using whatsapp or email. Students also could ask question and or respond to those of teachers using the same channels of whatsapp and or email. The key informants therefore declared that it was difficult for the majority of students to ask questions or to do given works because it required students to have laptops or smartphone and internet, the materials which were not affordable to some of the students.

These findings confirmed the obstacle highlighted by Yusuf & Al-Banawi (2013), who indicated that in E-learning there is a decreased motivation in students, delayed feedback or help caused by inconsistent availability of the teacher at the moment while learners may need this help when studying and or students may feel isolation due to physical absence of colleagues. This led the researcher to make a conclusion that assimilation during this E-learning might have been difficulty for students and their revel of understanding should be questioned.

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4.4.5 Leaners' ability to take notes during E-learning classes

The overview of participants' ability to take notes during E-learning classes is presented in Table 6

Table 6: Participants' ability to take notes during E-learning classes

Statements	SA	A	D	SD	N
I was able to take my own notes from the E-learning lessons	30	58	78	24	71
I was not able to take my own notes	29	87	51	26	67
Notes were digitally given by teachers	37	60	78	22	64
No notes were given	31	84	57	24	65
Teachers gave clear orientations for taking notes and further	40	96	42	22	61

Key: SA (Strongly Agree**), A (**Agree), **D (**disagree**), SD (**Strongly Disagree**), N (**Not sure)

Table 6 shows the summary of responses given on the statements about the ability of student participants to take their own notes during E-learning lessons. The findings from these responses indicate that 130 out of 261 affirmed to have been provided with clear orientation by teachers for them to take their own notes and or to do further research. Other, 118/261 indicated to have not got chance of taking their own notes but got notes from teachers while 105 indicated that there were no notes which were given. Only 88 indicated to have been able to take their own notes during E-learning while other 97 confirmed that notes were given by teachers digitally. The inconsistences which are found in the responses of participants, as shown in the statistics above, indicate that some students have got opportunity to take their own notes while others could not take note in their E-learning. These findings got on students taking their own notes during E-learning supplement the findings in table 9, where some students indicated that they were active while others were passible, unable to ask questions and get feedback. The fact that students were found to be passive, unable to ask question, or to follow the explanation the teacher and take their own notes led the researcher to question the level of assimilation that students have had during this E-learning.

4.4.6 Discipline of learners during E-learning classes

The synopsis of the student participants' discipline during e-learning classes is illustrated in Table 7

Table 7: Student participants' discipline during E-learning classes

Statements	SA	A	D	SD	N
During E-learning you were very concentrated for you to lose nothing from teachers' explanations	46	74	52	23	66
During E-learning you could do nothing which is not related to the lesson to avoid distraction	61	80	39	16	65
During E-learning you could leave the lesson and come back anytime you wanted	26	56	85	34	60
During E-learning you could do whatever you wanted as the teacher was not able to control you	33	72	68	27	61

Key: SA (Strongly Agree**), A (**Agree), **D (**disagree**), SD (**Strongly Disagree**), N (**Not sure)

The information summarized in Table 7 indicates that 120 out 261 respondents agreed with the statement that they were concentrated for them not to lose anything from E-learning lessons. Other 141/261 respondents indicated that they could do nothing unrelated to the lessons they were studying as a way of avoiding distractions. However, 82 students indicated that they could leave the lesson whenever they want and come back when they wish while other 105 agreed with the statement that they could do whatever they want during lessons since they were sure that there was not teachers' control over them. The information got from the student respondents were supplemented by the responses of the key informant teachers whereby one indicated that the discipline of students during E-learning was at 80% while another one indicated that it was 100%. The reason the first key informant gave on the students' discipline being good was that all senior six were active doing the work given and submitting them to the deadline given. However, he added that the students of senior three were not committed to do the works given in an indicated way. On the other hand, the second key informant indicated that what showed the discipline of student to be good was that she was sending tests and exercises to students and they could submit the answers within the instructed time. However, these two informants failed to indicate the method the used to monitor and evaluate the discipline of students during E-learning lessons.

The researcher's general point of view from these findings was that learners did not have full direct participation in E-learning lessons as the majority indicated to have followed televised lessons on TV screen and others on radios, the platform through which it could not be possible to have a direct interaction with teachers. This concurred with the findings from the study conducted by Nick (2019) who revealed that the absence of teachers' direct presence and that of needed subject matter knowledge or preparation by students was given as the significant barrier to effective paricipation in online involvement in topic discussions and problem solving activities.

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4.5 Effect of E-learning on students' grade marks

The researcher has asked the questions to the respondents who participated in the study to examine how their performance, especially grade marks, has been affected by the E-learning system. Their responses summarized in Table 8 give a clear image of how students' Performance has been affected.

Table 8: The students' performance in E-learning

The way E-learning affected your academic performance	**Effect rate**							
	Your grade mark increased between 1-5%	Your grade mark increased between 5-10%	Your grade mark increased above 10%	Your grade mark decreased between 1-5%	Your grade mark decreased between 5-10%	Your grade mark decreased above 10%	No effects	**Total**
My grade mark increased	24	63	71	0	0	0	0	158
My grade mark decreased	0	0	0	16	43	39	0	98
No effects demonstrated	0	0	0	0	0	0	5	5
Total	**24**	**63**	**71**	**16**	**43**	**39**	**5**	**261**

The findings on the performance of students in E-learning as presented in Table 8 indicate that 158 (60.5%) out of 261 participants in the study indicated that their grade marks have increased when they studied through E-learning than in face to face learning. In this number of respondents who affirmed to have had increase in their marks, 71(27.2%) of all respondents in the study indicated that their marks increased more than 10%, other 63(24.1%) indicated that they got grade mark increase between 5 and 10% while 24(9.2%) of participants indicated that their grade mark increase between 1 and 5%. On the other hand, those who showed indicated that their grade marks have reduced because of studying through E-learning were 98(out 261 respondents. Among them 43(16.5%) indicated that their grade mark reduced between 5 and 10%, other 39(15%) affirmed their grade mark to have reduced more that 10% and 16/261(6.1%) respondents indicated that their got between 1 and 5% decrease in their grade marks. Nevertheless, there 5 respondents who also showed that studying through E-learning system did not have any effect on the grade mark they had in face to face learning.

The key informants' information also showed that student performed well from E-learning. One of them indicated that 50% of senior three students passed national examination at above 60% while 100% of senior six students passed their exams at 70%, the success which had never happened in the school before this E-learning system was used. On the other hand, the second key informant indicated that the performance of students in general increased. Because based results

from the national exams done by finalist students, it was clear that their score increased between 10 and 12% compared to students who were taught in face to face classes.

The researcher's general conclusion from the findings above was that the majority of students who studied in E-learning performed well academically compared to face to face learning as a big number of respondents confirmed it. These findings concurred with those in the study conducted in Palestine by Yousef & Basem (2020) which found that students who used E-learning to study had their grades increased by 2.188 points on average. The findings also confirmed what was found from the study conducted by Elena, Svetlana, Natalia and Yana (2021) in different Russian institutions which revealed that studying using information and communication technology (ICT) has a significant favorable impact on students' overall success. They also confirmed the finding from the study of Muzafar , Suhail Molvi, Maaruf and AbdelRahman (2014), which was conducted in India and showed that students who studied through E-learning paradigms perform significantly better academically than students who follow traditional teaching approaches.

However, the fact of students who showed to have got a decrease in their grade marks also supported the findings from the study conducted in Nairobi by Odhiambo in 2013 which indicated that E- learning has not had favorable impact on academic accomplishment. The poor performance of these students can be solve by the conclusion made by Ananta and Kabita (2017) in their expermental study conducted on collaborative mobile learning and found that students do better academically in E-learning when they use collaborative mobile learning and individual E-learning rather.

4. 6 Effects of E-learning on students' academic performances

4.6.1 The Academic performance from E-learning

Figure 3 indicates the academic performance of the students who participated in the study whereby they were to provide the relationship between their grade marks after E-learning in relation to the grade marks they were getting in face to face learning.

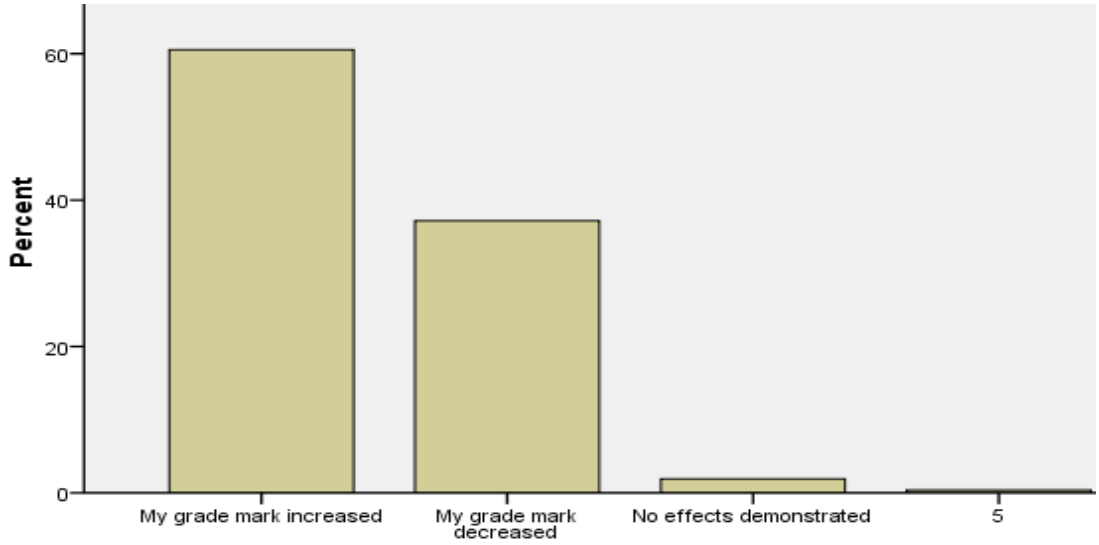

Figure 3: Academic performance in E-learning

The information in Figure 3 indicate that 61% of respondents registered the grade mark increase from E-learning than face to face learning, 37% registered a decrease in their grade mark from E-learning than when they were studying face to face lessons while 2% indicated that E-learning did not bring effects on their grade marks. This implies that more students performed better in E-learning than in face to face classes as it is shown by the big number of respondents who confirmed to have increased their marks in E-learning.

These findings about E-learning increasing the academic performance of students agree with the findings of the study conducted by Elena , Svetlana , Natalia , & Yana (2021) which revealed that learning using information and communication technology brings significant favorable effects on students' overall success. The increase in performance from E-learning shown by majority of respondents also supports what was found by the study conducted by Muzafar , Suhail, Maaruf and AbdelRahman (2014) which indicated that using teachology as a learning tool aids youngsters in learning faster and improving their attention span and helps student who employ E-learning paradigms to perform significantly better academically than students who follow traditional teaching approaches. The key informants also certified that E-leaning boosted the performance of students because there has been an increase which have been registered by students in their score marks, especially in national exams, compared to those who did exams after studying in face to face classes. Nevertheless, it cannot be possible to ignore few individuals whose academic that their performance has been negatively affected by E-learning.

The negative effect results from E-learning came from the obstacles that have been highlighted by Yusuf & Al-Banawi (2013), who argued that E-learning study has obstacles which decreased motivation in students, delayed feedback or help, caused by inconsistent availability of the teacher at the moment learners may need this help when studying, or students feeling isolation due to physical absence of colleagues. This failure also may come from the downsides of E-learning indicated by Sadeghi (2019) among which he mentioned students being distracted by internet jungle materials, students losing focus or deadline for given works and E-learning depending on technology that relies on internet and computers, which students may not be having access to or may encounter interruptions and other system errors which can appear during learning time. When considering this challenging obstacle to E-learning, teachers and other parties will know how and which better technology that can be used during a particular time, in particular areas and on particular individual students to help them get appropriate benefit from E-learning in case this become the option for learning.

4.6.2 Learning system that students prefer for better learning

Table 9 presents the summary of participants' learning system preference and reason of the preference

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Table 9: Participants' Learning System preference and reason of the preference

Learning system of respondents' preference for better learning	The reason for respondents 'learning system preference							Total
	Facilitate more and quick understanding	Increases the autonomy in learning	Increases creativity in learning	Leads to freedom in learning	Saves time	Facilitate collaboration with teachers and colleagues	Other reasons	
Face to face learning	80	16	17	6	10	3	1	133
Direct Visual E-learning	28	22	21	11	8	0	0	90
Visual recorded lessons	4	3	8	1	2	0	0	18
Direct Audio E-learning	2	3	5	0	0	0	0	10
Audio recorder lessons	5	2	2	0	0	0	0	9
Direct audio and or visual learning	1	0	0	0	0	0	0	1
Total	**120**	**46**	**53**	**18**	**20**	**3**	**1**	**261**

The information in Table 9 indicates that 133 students out of 261 who participate in the study responded that they prefer face to face a good learning system. Among them, 80 indicated that face to face learning facilitate their quick understanding, 17 showed that face to face learning increases creativity in them, 16 indicated that face to face learning increases autonomy in them, 10 specified that face to face learning saves time, 6 responded that face to face leaning increases their freedom in learning, 3 showed that it helps them to collaborate with teachers and their colleagues while 1 indicated that there are other reasons of selecting this learning system to be the best. On the other hand, those who selected the options related to E-learning as a good learning system for them accounted to 128 out of 261. The findings from these figures revealed how student have not yet been familiar with E-learning system despite how they demonstrated it to have improved their academic performance in terms of score marks. The researcher also found in the responses given by the students who participated in the study, the inconsistencies that justified the challenge of language barrier which they have shown in the findings in figure 3

This big number of students choosing face to face as a better leaning system than E-leaning is justified by Mahmoud -Ahmed (2014) who argued that E-leaning education is not the most effective option in all learning situations because students in computer-generated schools show less development than those in conventional schools in attending. He also added that language skills, highly technical subjects and the sciences are difficult to be understood and mastered by learners through online leaning. However, the SchoolEducationGateway (2020) indicated that this obstacle to E-learning can be tackled with the help of teachers who can adapt their teaching strategies to the need of students. Therefore, teachers should have experience and knowledge about teaching online which is still not enough, especially in African countries and in Rwanda in especial

way. From these findings therefore, the researcher's point of view was that students were not prepared for E-learning and the E-leaning techniques which have been used might have not been adapted to the level of student to motivate them and make them like this teaching and learning method.

The explanation of the findings summarized in this chapter, where it was found that some students who followed E-leaning improved their academic performance positively while others failed from it, was justified by the E-learning success theory of DeLone and McLean (2003) which indicated that the overall success of E-learning initiatives depends on the attainment of success at each of the three stages of E-learning systems development. That is, design, delivery, and outcome analysis. This means that the E-leaning to be successful the content should be well designed and delivered using right and good channels where every students can access to them. After this content delivery, the outcome should be analyzed and measure and the system of improvement must be put in place. The findings got from this study therefore gave a clear image of how the E-learning system which was used in Rwanda was not prepared as it was an unplanned method of teaching students during lockdown. The researcher found that the results that came from this unplanned E-leaning to have been more if it could be a system which was planned and budgeted for to give it all required equipment and resources.

5.0 Summary of findings

The objective of this paper focused on evaluating the effect of e-learning instructional strategies on students' academic performance in public secondary schools in Kicukiro district in Rwanda. In general, the findings of the study indicated that E-learning affected positively the academic performance of students. This was indicated by the majority of students who responded showing that their grade marks have increased at different levels. It was also confirmed by the teachers who responded as the key informants whereby they explained that the big number of students who managed to follow E-learning lessons had increase in their marks. Nevertheless, the findings also indicated students who experienced a decrease in their academic performance because of E-learning.

The analysis of this failure was that E-learning was not prepared and both students and teachers did not have chance to have it in the same conditions. Some of teachers and students could not find good technological tool to teach and or learn and the participation of students was hard. The information given by the key informants indicated that some students who were used to face to face learning lost interest and motivation in E-learning because of different obstacles like home disturbances, poor quality of technological tool like phones, TV screen and radio gadgets and the language barrier that could not allow most of them to follow the lessons given. This therefore led these students to remain behind other who managed to follow the lessons well and because of this staying behind; they could not have goop performance. What was revealed in the finding therefore was that E-leaning did not affect all students positively because it was not planned for thus, it could not be given in the same condition for it to give same result.

6.0 Conclusion

The study concluded that majority of students increased their performance from E-leaning compared to how they performed in face to face lessons. However, since this E-leaning was not

planned to be adapted to the capacity (financial and intellectual), of teachers and students, some of the students indicated that they have performed poorly academically in E-leaning because of various reason which include challenges like lack of materials to use, language barrier which could not allow them to grasp the content taught in E-leaning, home disturbances and low internet connectivity among others. On the other hand, there are those who also indicated that their academic performance have not been affected by E-leaning in any way. The findings on the relationship between E-leaning and academic performance of student indicated that this teaching and learning system affected positively or negatively the performance of students. This different ways in which E-leaning affected on the academic performance of students was justified by the fact that it was not prepared for to be adapted to the capacity of all students and teachers in terms of resources and learning ability. Some students were in the good position of getting facilities to learn while others were not and this was the same to schools and teachers.

7.0 Recommendations

Based on the study findings, the study recommended that;

i. The ministry of education in partnership with school administrations should train teachers on how to teach using E-learning to equip them with techniques and methods that will help them to involve all students actively in E-leaning lessons.
ii. Parents should always set conducive environment that facilitate their children to study at home anytime students are following E-leaning classes being at home. Parents should also set ways of controlling the behaviors of their children who may be following E-learning lessons at home to help them in their concentration.
iii. Teachers should be more creative and must do deep research to make sure that they are equipped with enough content and appropriate methods which they use in teaching students in E-leaning classes.
iv. Students should create a sense of responsibility in them to avoid distractions during E-leaning classes because this will help them to follow well the explanation and other instructions given by teachers for them to understand what they are learning.

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