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# Contribution of Smart Learning Status on Students' Academic Performance in Public Secondary Schools of Rwanda

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***Abstract:*** **The integration of smart learning in teaching and learning process can be successful as long as the student's performance interested in learning using smart learning, intention to use and interaction with ICTs. Even if there is distinctive contribution of smart learning on students' performance, the researcher still discovering the relationship between the two variables. This study entitled, "The contribution of smart learning on students' academic performance in public secondary schools of Rwanda" was guided through two specific objectives which are assessing the the status of smart learning on effective teaching and learning secondary schools of Rusizi and ascertaining the relationship between smart learning and students' performance in public secondary schools Rusizi. The sample size of 181 respondents using Robert and Morgan table where the respondents were made of 4 school managers, 4 assistant school managers 40 educators and 133 learners were sampled from 4 secondary schools with and without smart learning systems. The schools, head teachers and deputy head teachers were chosen purposively while teachers and students were selected using purposive and simple random sampling techniques. The results showed that schools with standard smart classroom with well equipped with smart learning tools has improved the students grades where 48% strongly agreed and 23.3% answered agree. The responses showed that students develop practical activities such as ICT skills and literacy, digital practices of their courses where smart learning is utilized as the electronic library and laboratory by using videos and others digital materials such as pictures, figures, audios and images. The results showed that there was a correlation between smart learning and students' performance where Karl Pearson coefficient of correlation was .751 which means the smart learning contributed to the students' performance.**

***Keywords:*** **Smart learning, ICT. E-Learning, Smart classrooms.**

## 1. INTRODUCTION

This chapter deals with the back ground of the study in which the researcher gave the information about the research topic. This chapter also deals with the statement of the problem in which the researcher clarified the problem. The researcher set the objectives which guided the research, the importance and scope of the research was presented assumption which governed the research.

### 1.1 Background of the study

In the 21st century the education was influenced by the information communication technology where it created the wide teaching and learning environment. The deal of using ITC in education has been encouraged by the new sustainable development goals where the utilization of electronic gadgets in school turned into smart learning system to make learning effective and potential. This brings to educational changes and more investments are put in to cope with economy and social mobility (Leech, 2008). According to the scholars, the purpose of the smart learning was confirmed to promote

smart education where student grow in the learning environment which favor them in transforming their competences and skills. The development of eLearning in education continues to develop strongly in (Jairak, 2009). Among varied schools and learning institutions, the computer is a main tool for delivering courses. In educational domain the ICT is influenced by factors like availability of tools and equipment, together with support (Al-Ruz & Khasawneh, 2011). Varied researches proved technology to increase quality of education in higher learning institutions (Sánchez & Alemán, 2011; Sosin, Blecha, Agarwal, Bartlett, & Daniel, 2004). Through survey by Sosin et al. (2004), there was discovery of positive influence in the self- driven learning. Sánchez and Alemán (2011) moreover recommend the utilization of ICT tools has transformed learners into self-driven people and was easier to get access on the information for promoting the quality education (Australasian Journal of Educational Technology, 2017). And studies are suggesting the investment in provision of tools and equipment (Teo & Van, S., 2009).

According to United Nations (2018), African people are most growing demographically and have the world's younger population. Recently, the flow of personalities from Africa to Europe and other parts of the world was found (The Economic Development in Africa Report, 2018). What are the causes of migration in Africa? There are unemployment, underemployment and famine among many other causes. That's why the leaders of the countries in Africa must equip the Africans, with skills and knowledge needed on the labor market. This allowed them to compete with the other countries and become self-employed to ensure the faster and continuing growth of economy than the one of Europe of North America.

One of the Sub Saharan region organizations which is called east African Community made of six independent countries located in the Great lakes region such as: Tanzania, Burundi, Kenya, Uganda, South Sudan and Rwanda Have done a lot to transform their education into smart teaching learning. Even if the way is too long to promote smart leaning but all Great Region Countries work together to boost their education and transform it into smart learning (2007). But the use of ICT was randomly introduced unprepared. Waema (2005), thus the new policies were made to fulfill the needs of the societies.

In Kenya, for example, the first regarding policy dated 1980 and by 2000 it did not reach its apex as said Bowman and Nduati (2005). The present ICT policies are comprehensive and focus on access to equipment and using them for storing information and internet connection (Hare & Farrell, 2007). In Tanzania, the development of ICT policy was referred to as e ThinkTank, a set accepted by UNPD. The report by ICT survey Twaakyondo et al. (2002), stated that goals were set to provide ideas for transitional period to the growing information era. In Uganda, the beginning of policy at national level dated to After 5 years, it was in 2002 the UNCST came with a draft policy presented to the cabinet and thereafter approved aiming on provision of education for all (Farrell, 2007).The Burundi 2004 update to the ICT policy was implemented in 2007 (Hare, 2007) especially focusing on allowing rural places to also have access to connection and computer Novatech, (Burundi Country Profile, 2008).

The government of Rwanda invested in the promotion of ICT and work hand in hand with other stakeholder and development partners in the increase of smart learning in public and private schools where the goal of education in Rwanda is to transform Rwandan citizens into knowledge based economy. Information Communication Technology is put at center for achieving Vision 2020 and Vision 2030 aiming at building a sounding economically developed nation based on educational perfection as says the Minister of education Murenzi (2009) and makes one of the components of the country policy planning practiced by 2000. One of the goal of the Rwanda was to become one of the middle-income countries in 2020 and this would not be achieved without enforcing smart learning in schools. The Rwandan Ministry of Education has the mission of distributing the computers among all primary and secondary schools so that the students and teachers and other school community benefit from the use of smart classrooms. Therefore, this research till evaluates the contribution of smart learning status on students' performance in the District of Rusizi, Western Province of Rwanda.

**1.2 Statement of the Problem**

According to Were, Rubagiza, (2007), the utilization of smart learning refers to the integration of smart learning in education serving learners for transforming their learning into application of their skills for the improvement of education outcomes. According to the scholars above, the engagement of ICT tools in the education has advanced the 21st century smart education through the implementation of the competence based curriculum where the information communication technology skills fits in the subjects and formal syllabus of the courses for delivering in the schools (Rubagiza *et al*,

2007). The use of internet connectivity, computer software and hardware, policy implementation and other practices related to smart education uplifted the use of smart classrooms into smart learning.

The Ministry of Education of Rwanda, in its Mission of Transforming People lives through quality education, has established many schools and learning centers which are likely to improve all categories of people either early childhood education and development, nursery education, primary education, secondary like twelve years education, TVETs schools and Higher learning education. This mission could not be achieved if the ministry does not invest in smart learning where every student got an opportunity to learning in groups or independently by using and interacting with ICT tools with Internet connectivity (Rwanda ICT Policy, 2016).

The Country of Rwanda has injected a lot of facilities in improving smart learning, the barriers are still persisting. The students and teachers in different schools of the country still need some capacity building in ICT activities. Some limitations on the utilization of the smart classrooms are related to lack of enough skills on the use of ICT, poor smart classrooms without enough smart learning equipment, poor leadership skills among the school leaders, poor internet connectivity in some schools, poor or lack of enough electricity in some schools especially in the removed areas of the villages and mountains (Were, 2010).

The statistics showed that the year 2018, among 42,145 candidates of students in the secondary schools who have sat in National Examinations, 37,184 being 88% passed the exams. This is due to that there was an introduction and strengthening of the smart learning. Even though, many schools of schools have been offered computer laptops and internet connectivity the way is still long. However, some schools fail to exploit the available smart learning activities others lack smart classrooms which hinder the success of the learners and teachers who fail to improve the effective teaching and learning. The researcher interested in evaluating the contribution of smart classrooms status on the improvement of the success of learners. This research is aiming at finding out the contribution of smart learning on students' academic performance and the other factors behind it in the education environment. The researcher needs to know if the students appreciate the interaction with computers and internet connectivity in their everyday learning. The report done in 2020 showed that Rusizi District has marked the boost in the use of smart learning like other schools secondary schools in order to improve students' performance. However, this district has faced some challenges in the use of smart learning which led to the moderate success of students due lack of enough equipped smart classrooms or lack of skills for teachers' use of smart learning.

### 1.3 General Objective of the Study

The purpose of this study is to evaluate the contribution of smart learning on students' academic performance in Rwandan public secondary schools in Rusizi District.

#### 1.3.1 Specific objectives of the study

i. To assess the status of smart learning in public secondary schools of Rusizi district-Rwanda.

ii. To ascertain the relationship between smart learning and students' performance in public secondary schools of Rusizi District-Rwanda.

### 1.4 Research Questions

i. What is the status of smart learning on effective teaching and learning in public secondary schools of Rusizi District-Rwanda?

ii. What is the relationship between smart learning and students' performance in public secondary schools of Rusizi District-Rwanda?

### 1.5 Significant of the study

In the process of students' skills acquisition, this research will be beneficial to students who need improve their learning though the use of smart learning by interacting with computers and internet. Teachers in public secondary schools will benefit from the effective use of smart learning and will be able to describe the well-equipped smart learning area for their everyday lessons preparations. The Ministry of Education of Rwanda will learn on how to improve the quality smart classrooms for improving smart leaning materials and activities. The school managers of the secondary school will learn

how to use the smart learning and the types of equipment needed to establish the smart classrooms for effective teaching and learning of students.

### 1.6 Limitation of the Study

The students may not use the truth on their perceptions towards smart learning in their schools due to the fear that they would be punished by the leaders or their teachers. It is the role of the investigation to clarify the goal of study, which is to improve their learning and to move the barriers they meet with during their learning, in order to raise the freedom of the respondent. The population of Rusizi as a target population is very large to reach to every household and schools, so the researcher selected the sample size representing the whole population in order to generalize the findings.

### 1.7 Scope of the study

These research boundaries are composed by the conceptual, content, Geographic scope and time frame.

#### 1.7.1 Conceptual Scope

The study enrolled only in selected public schools of Rusizi district. The study was limited on only the smart learning and students' performance Advanced level.

#### 1.7.2 Content Scope

Precisely, this study evaluated the smart learning and students' performance, the devices they like; the websites they interact with, the flexibility and ease of use, the mostly used programs by learners in the public secondary schools of Rwanda, a case study of Rusizi District.

#### 1.7.3 Geographic Scope

In terms of space, it was confined to public secondary schools of Rusizi district- Rwanda.

#### 1.7.4 Time Scope

In terms of time, the research was carried out from January, 2022 to June, 2022 which means within 6 months.

## 2. LITERATURE REVIEW

This chapter discusses the literature put forwards in books, and other published documents available to the research in relation to the findings, ideas arguments and observation available during this study. It intended to show the link between this study and existing theories.

### 2.1 Theoretical Literature

The theoretical literature shows theories used by the other researchers on the related topic of the research which is contribution of smart learning on learners' performance.

#### 2.1.1 Smart Learning as a system

According to the "Systems theory" developed by Ludwing Von Bertalanffy in 2006, which is based on the concept of a system. The system is a set of parts which connects to fulfill a overall goal. Systems theory says that a system is composed by three significant factors which are input, process and output. If one part of the system is functioning it affects the others too. In addition, if one of the parts of the system does not function well, the overall goal not be achieved successfully (Olum, 2004). As adapted to this study, smart learning in secondary schools may be considered as a system which is made up of different parts such as students' positive attitudes, internet and resources availability, and homework as main elements of input factor, reading books and research findings from internet, interpreting simulations as main elements of process factor and becoming readers from internet library, improved academic achievement, raised creativity and innovation, lifelong learning as main elements of output factor.

#### 2.1.2 Flipped classroom's influence on students' performance

Students' performance was enhanced by Flipped classroom. Actually, "flipping the classroom' means the learners are exposed to videos or books to read in order to enrich their knowledge complementing the classroom content. The current

mode is opposed to the traditional which focused on delimitating the knowledge acquisition to the class by the teachers providing notes.

As Mattis (2014) argued flipped classroom is not a replacement method for traditional education. Instead, it should give a combination or mixture of traditional time on task, often with smart learning method for preparing before class. Mattis (2014) showed that lack of experience and knowledge is of less significance and that the time factor; meaning time on task in class with the teacher and friends, is the major factor deciding success or failure. The approach of flipped classroom was promoted in different subjects as recorded B. Walvord & Virginia Johnson Anderson (2008). Their suggestion is the students to firstly enter the classroom and learn some matter and finish in outside discoveries and addition as analyzing, engaging in synthesis and the process of handling difficulties. Which are defined as the way learners focus on their homework using digital materials first and then lecture. In order to make sure the learners make accurate preparation, they propose the prescription of tests which learners handle before class and they get the time for presentation and feedback (Brame. C, 2013).

In the commentary done by (Barker, 2013), one can read comments about how many of their students that actually will take time outside school to prepare. Barker shows that those students who do not do any preparatory work outside school will not do that well unfortunately, but the students that do their preparatory work will earn twice the value. Those students that earn double value according to Barker are also those who are well prepared and able to explain to their classmates in terms of open discussion. Those students are thereby given a way to consolidate their new knowledge (Barker, 2013).

**2.1.3 ICT tools usage for learning**

The smart learning includes but not limited to the effective and efficiently manipulates ICT tools for acquiring new knowledge. The considerable importance of smart learning is to increase convergence of digital learning and teaching situation based on computers-based, multimedia and communication technologies and high speed of technologies changes that characterizes both technology development and their use (Pelgrum, 2001). Mobile devices like PDAs and smart phones quicken the copying and keeping of materials. They also permit accessing internet connectivity which brings students to exchange of ideas, distance debates and discussions as a group gain more understanding. ICT usage also compensate for burdens about several books carrying as the great number of content is easily stored and retrieved with one small tablet, phone or computer. The students can learn civics, social sciences, foreign languages and they can read newspapers and journals (Pelgrum, 2001).

Of course the risk behind may be distracting because during course students can be visiting other available data having nothing to do with scheduled time table and that could hinder their goal at school (Kuznekoff, 2015).

**2.2 Empirical Literature**

In this part, the researcher demonstrated the journals, theses, books and other publications and research carries out on the contribution of smart learning in secondary schools on the performance of students.

**2.2.1 Smart learning status for effective teaching and learning in secondary schools**

The modern education of the 21st century has marked the emancipation in the use of smart learning and teaching in many schools especially secondary schools. The use of electronic gadgets and internet connectivity as well as the use of the digital materials in teaching and learning has become a culture to many developed and developing countries (Anderson, 2010). Some of the electronic materials are computers, desktops, laptops, smartphones, Web technologies, electronic pads like tablets, broadband internet. Based on the world wide mission of improving the use of technologies in teaching and learning for e-smart education, the researcher Thomas & Stratton (2006), mentioned that most developed countries have adopted the use of smart learning in their everyday life where no countries has not introduced smart learning activities (Abedalaziz, Jamaluddin, & Leng, 2013).

In the Country of Singapore, the ministry of education (2014) has declared the times of boosting the implementation of one laptop per teacher and students in order to help them learning and teaching effectively. The aim of the Ministry was to provide possible equipment to learner for improving their quality education (Chung, 2011).

The study done by Davis (2009) showed that students in the polytechnic schools have benefited from getting laptops in the developed countries where now every students is able to interact with his/ her teacher with and without attending schools where the teacher can provide learning materials to them using internet by sending learning resources and assignment to them.

The study done by Silin, Y. & David, K., (2017) showed that students socialize and rejoice while interacting with the electronic materials. According to these couple of researchers, the teaching and learning process cannot be effective without the integration of information communication technology tools in it due to that they make learners and teachers excited in teaching and learning environment. The qualitative research done by these researchers showed that the use of technology in education is costly and need to be taken care do that I can provide positive achievement related to knowledge and skills (Silin, Y. & David, K., 2017).

**2.2.2 The relationship between smart learning and students' performance**

The findings showed that smart learning played a distinctive role in the acceleration of the students' academic competence. The research demonstrated that the use of books has been implemented for long time and has helped leaners and educators raising the process of teaching and learning. The coming of smart classrooms improved the engagement of the students in the effective learning for gaining scores and higher grades. According to Bong Cha (2012), the use of chalk and talk method has contributed a lot until the appearance of smart classrooms opened the students and teachers eyes to the new world of modern education in the use of ICT tools in the smart learning. The status of smart learning to the other hand, contribute a lot to the smart education for smart learners in the development of competences in the 21st century where the chalk and talk are no longer dominating the current education but leaners centers learning rather than teacher centered.

As said SungYoul Park, Min-Woo Nam and Seung-Bong Cha (2012), the benefits are many but researches must be done to investigate the smart learning on performance affecting students' adoption and use of smart learning. A research on sample of 288 Konkuk universities in Seoul students has been done. In the development of the Technology Acceptance Model, the researcher showed that there were factors influencing the relationship between smart learning and students' performance such as attitudes, students accomplishing factor, motivation factor and self-efficacy as well as self-driven. It had been showed that smart learning could not be well implemented without efficient and effective planning for effective achievement (SungYoul P. & Seung-Bong C., 2012).

**2.3 Critical review and research gap identification**

Many years ago, in Rwanda, students and teachers believed that ICT usage is needed and taken into account in higher education more than in secondary schools. It is on this regard that the researcher examined the contribution of smart learning on student performance in secondary schools. The gap of the study was that smart learning on the students' performance which was performed and used by the higher education instead of focusing on the secondary schools which are the basic fundamentals of increasing learning. The research showed that the secondary schools and primary schools need to have well equipped smart learning in order to develop well educated learners ready for higher education but the concerned people failed to promote the use of smart learning and training the implementers for better education (Bong Cha, 2012).

**2.4 Theoretical Framework**

The section has composed by three theories including the theory of reasonable action, Expectancy value theory, and the Technology Acceptance Model (TAM).

**2.4.1 Theory of Reasonable Action**

The theory of Resonance Action developed by (Fishbein and Ajzen, 1975) was famous and describes the theory of learning through behavior expression where the individual is motivated by some behavior and other available resources for learning. This theory shows how the presence of technological tool can excite learning and teachers interact each other using different method for effective learning. When the tools are usable the users are motivated to learning and using them for positive achievement through learning new behaviors. This creates connection between the electronic gadgets and the users to improve the outcomes.

### 2.4.2 Expectancy value theory

The theory of expectancy value has shown that the behavior developed by learners brings about the consequences and when this was not controlled may result to the negative outcome. But to the other side when the integrated behavior involved and controlled in the process of education may result to the great achievement. That is why the theory indicated that smart learning well implemented by all concerned parts such as students, teachers, school leaders in the secondary schools and the educational officials result to the developed competences of students and their performance in their lessons increase. The theory shows how much learners are motivated in the learning using ICT tools like computers and smart phones (Wigfield, 2008).

## 3. RESEARCH METHODOLOGY

Third chapter describes the method and the process which were adopted in this study to collect data. It presents the framework, concerned people, the simple size, tools, data analysis procedures and ethical consideration and conclusion.

### 3.1 Sample Size

As Denscombe (2008) asserted, the sample must be carefully selected to be representing the whole population to provide the information that can scientifically be tested. Random sampling technique was used to select teachers and, purposive sampling was used by selecting the respondents' leaders of the schools. According to Morgan and Robert table, when the population size is 340, the required sample size which is 181. The number of the respondents was sampled using the Morgan table of sampling.

$s = X^2NP\ (1 – P) \div d^2\ (N -1) + X^2P\ (1 – P)$

s = required sample size.

$X^2$ = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size.

P = the population proportion (assumed to be 0.50 since this would provide the maximum Sample size).

d = the degree of accuracy expressed as a proportion (.05).

According to the formula and the table, the sample size is 181 and the sample size for the study is summarized in the table 3.2:

**Table 3.1: Targeted population and sample size**

| Group of respondents | Targeted population | Sample size |
|---|---|---|
| Head teachers | 4 | 4 |
| Deputy head teachers | 4 | 4 |
| Teachers | 74 | 40 |
| Students | 258 | 133 |
| **Total** | **340** | **181** |

**Source:** Researcher (2022).

The researcher has selected the respondents for this study made of 181 population including 40 teachers, 4 school managers, 4 assistant school managers and 133 students in over 4 public secondary schools of the district of Rusizi-Western Province.

### 3.2 Sampling Technique

The sample techniques which are defined as the procedures utilized to select the elements of the population in such areas that they show the present characteristics of the entire population (Frankel & Wallen, 1990). Sampling procedure that is demonstrative organization of getting and gathering the sample size from the population. So, the sample size is defined as the part of statistical population whose properties are studied to gain information from the entire population. When searching the people this may show a set of informant selected from a large population for the purpose of the survey. The

researcher used purposive sampling techniques to select the schools, head teachers, deputy head teachers in Rusizi District. Simple random sampling was used to select students and teachers and everyone was given equal chance to participate in the study. These techniques of sampling were used in smart learning fields and interaction with smart classroom to for online learning. The purposive sampling is the choice of the researcher to decide who participated in the research for the propose that he/she has particular information to provide than others (Bernard, 2002).

### 3.3 Data Collection Methods

The data collection methods are described as the process of preparing and organizing the information or data. Kombo and Tromp (2006) agreed that the researcher collect the information from the population through systematic method of gathering the data and the information related to the research objectives, research questionnaires (Burns & Grove, 1993). The educational institutions (schools), learners and teacher from all public secondary schools. The researcher used the combined method that consisted of descriptive survey and interview. The descriptive survey was selected by the researcher because of limited of research project to deal with the big number of the population in a given area. The interview was also utilized to collect the information from deputy head teachers and school leaders due to the fact that the researcher needed to identify more factors that influence students ' performance towards using ICT for learning. Because of the shortage of financial means of researcher to reach every respondent of target population and stay with him or her during investigation time, questionnaires were administered to the sampled teachers and students.

### 3.4 Data collection instruments

The overall purpose of the research is to evaluate the contribution of smart learning in Rwandan secondary schools. The researcher used the questionnaires and the guided interview.

#### 3.4.1 Questionnaires

The questionnaires were the main instruments of the data collection in this research which were structured, and self-administered. The researcher used designed questionnaires for the teachers and students to find out views and opinions on how smart learning contribute to students' academic performance in Rwandan public secondary schools. Questionnaire is also preferred as the main instrument in this study because it was easier to be used on large number of respondents. The questionnaires were composed of closed-ended questions.

#### 3.4.2 Interviews

The interview was used considered appropriate to the school managers and assistant head teacher. Therefore, it was used to get the supplementing data from them. The purpose of the interview was to get data which supplement the information from the returned questionnaires for the purpose of identifying more contribution that influence learning' academic performance towards using smart learning.

#### 3.4.3 Administration of the Data Collocation Instruments

In this study, the researcher had administered the data collection instruments; the researcher distributed the questionnaires to judge their face validity. The researcher checked the clarity, appearance, layout, legibility, relevance, anonymity and privacy before administration of questionnaires. The data collection procedure and ethical considerations were discussed with the respondents. The returning time for completed questionnaires took 30 minutes. The researcher personally conducted interview with the head teachers and deputy head teachers. Recording the answers during interviews may be done because the respondents may wish so in order to keep their anonymity safeguarded. The dates to conduct interviews and to administer questionnaires were agreed upon by researcher and respondents.

### 3.5 Reliability and Validity

The researcher defined the reliability and validity of the data collection instrument s or tools of the research.

#### 3.5.1 Reliability

In the establishment of the data collection instruments the reliability has been defined and used as the degree of the element which should provide the consistent result and if the use of it has been repeatedly overtime to the same person (Polit & Hungler, 1995). The questionnaire was used as the instrument in terms of establishing the reliability. The investigator carried out piloting in one of schools of Rusizi District which was not included in sample size, to strengthen

the reliability of the data collection instruments which were used to collect data to the same population characteristics. The reliability should show the correlation of the instruments with the population to whom the researcher gathered information from. The expert measurement and judgment was done to discover the elements to confirm the level of the reliable instrument to make a right and scientific judgment on the reliable instruments. To maintain the reliability of instrument, the researcher considered various conditions which might disturb the respondents to use properly the skills and knowledge during filling in the questionnaires. The questions set was clear and precise to the respondents.

### 3.5.2 Validity of the research instruments

Validity qualifies instruments and it is necessary to check whether it is respected in order to constitute instruments which can be utilized to gather the information and data. The research considered validation as precising goals and sampling for representatively. If instruments are valid, then the provided data ought to also be valid. For instance, in case tools were brought to the field as valid and used to gather data, those are also validated.

### 3.6 Data analysis procedures

The data analysis procedures involve scrutinizing of the acquired information and making inference as said by Kombo and Trompo (2006). The quantitative data were analyzed to meaningful representation. Qualitative data also were gathered and interpreted, illustrated and elaborated. Kombo and Tromp said in (2006) that the content analysis is a systematic procedure which designed to examine and analyze the recorded information and utilization of IBM/SPSS by analyzing, presenting data then interpretation and discussion were made. The analysis of the data was carried out in two stages. The qualitative information from the open-ended questions and quantitative data in the questionnaire were analyzed. The remaining qualitative comments were coded, conceptualized and categorized.

## 4. RESULTS

### 4.1 Demographic Characteristics of the Respondents

The researcher has demonstrated the background of the respondents and their characteristics. As the study was conducted in schools and other areas of learning, the respondents were students in upper secondary levels, teachers of the secondary schools and the school leaders and their deputy head teachers in charge of academics where the researcher has sampled the total respondents of 181 comprised of 4 head teachers and 4 deputy head teachers, 40 teacher and 133 students in upper secondary levels on the contribution of smart learning on students' academic performance in public secondary schools of Rwanda.

### 4.2 Presentation of the findings

In this section, the researcher presented the study findings, analyzed them, interpreted them and discussed them into figures and tables regarding to the three specific objectives which were: "To assess the status of smart learning in public secondary schools of Rusizi district-Rwanda, to examine the students' academic performance in public secondary schools with and without smart learning in Rusizi District-Rwanda, to ascertain the relationship between smart learning and students' performance in public secondary schools of Rusizi District-Rwanda".

### 4.2.1 to assess the status of smart learning in public secondary schools

In the first objective, the researcher assessed the status of smart learning in public secondary schools of Rusizi district, Rwanda where the students, teachers and leaders of schools provided their views.

**Table 4.2: Place where students use internet the most**

| Items | Frequencies | Percentage |
|---|---|---|
| School ground | 34 | 25.56 |
| Smart classroom | 121 | 90.97 |
| Home | 28 | 21.05 |
| Cyber café | 12 | 9.02 |
| **Total mean** | **49** | **36.65** |

Source: Primary source (2022).

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The respondents students were asked about the place where internet was mostly used for smart learning and the majority of them responded school smart classrooms were mostly used at 90.97%, schools ground at 25.56%, home at 21.05% while few of them at 9.02% were using public cyber café which was rare due to the use of smart phone and other personal electrical gadgets.

**Table 4.3: students' views on the status of smart learning on students' academic performance**

| Statements | SD | | D | | N | | A | | SA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fre | % | Fre | % | Fre | % | Fre | % | Fre | % | Mean | Sd |
| My school got standard smart learning, I get higher marks | 6 | 4.5 | 18 | 13.5 | 16 | 12 | 64 | 48 | 31 | 23.3 | 20.2 | 18.1 |
| Availability of a well-equipped smart classrooms | 19 | 14.2 | 7 | 5.2 | 10 | 5.7 | 51 | 38.3 | 46 | 34.5 | 19.5 | 16 |
| Consulting Google while doing my homework | 26 | 19.5 | 20 | 15 | 41 | 30.8 | 20 | 15 | 26 | 19.5 | 19.9 | 15.3 |
| The school smart learning tools help in learning effectively | 2 | 15 | 3 | 2.2 | 5 | 3.7 | 69 | 51.8 | 54 | 40.6 | 22.9 | 18.2 |
| My school smart classroom has enough computers | 16 | 12 | 38 | 28.5 | 14 | 10.5 | 27 | 20.3 | 38 | 28.5 | 19.9 | 14.6 |
| Using internet connectivity helps to complete assignment on time | 12 | 38 | 14 | 10.5 | 24 | 18 | 52 | 39 | 31 | 23.3 | 25.8 | 20.1 |

Source: Primary source (2022).

The respondents were asked about the status of smart learning on the improvement of the students' performance and the majority responded that having standard smart classroom with well equipped with smart learning tools has improved the students grades where 48% strongly agreed and 23.3% answered agree. The students were asked if they consult Google web while doing their homework where 15% responded strongly agree and 19.5% responded agree. The respondents students were asked if the school smart learning tools helped them learning effectively 51.8% responded strongly agree while 40.6% responded agree. They were asked if their classroom has enough computers where each student has access to them and 20.3% responded strongly agree while 28.5% responded agree. Finally, the students were asked if the use of internet connectivity helps them to complete their assignments 39% responded strongly agree and 23.3% responded agree. The high mean was 25.8 while standard deviation was 20.1 which showed that the information provided by the respondents was relevant and responses clearly showed the role of smart learning in the improvement of students' effective learning to success.

The study done by Silin, Y. & David, K., (2017) showed that students socialize and rejoice while interacting with the electronic materials. According to these couple of researchers, the teaching and learning process cannot be effective without the including information communication technology tools in it because they make learners and teachers excited in teaching and learning environment. They confirmed that teaching and learning by including smart learning increases students' performance where the students improve their scores, retentions and participation in teaching and learning process.

**Table 4.4: teachers views on the status of smart learning on students' academic performance**

| Statement | SD | | D | | N | | A | | SA | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % | Freq | % | Freq | % | Mean | Sd |
| Students learn effectively when using ICT gadgets | 0 | 0 | 0 | 0 | 3 | 7.5 | 28 | 70 | 9 | 22.5 | 20 | 18.5 |
| Students learning using smart learning increase their scores and grades | 2 | 5 | 0 | 0 | 1 | .25 | 16 | 40 | 21 | 52.5 | 19.4 | 16.1 |
| The use of smart classrooms helps students completing homework | 4 | 10 | 1 | 2.3 | 5 | 12.5 | 22 | 55 | 8 | 20 | 19.6 | 18.3 |

Source: Primary source (2022).

The respondents teachers were asked about whether the schools which use smart succeed perform well more that those without it, and the majority confirmed that students learn effectively when using ICT gadgets where 22.5% responded strongly agreed and 70% responded agree. The teachers were asked if students learning using smart learning increase their scores and grades where 52.5% responded strongly agree and 40% responded agree. The respondents teachers were asked if the use of smart classrooms helped students completing homework where 20% responded strongly agree while 55% responded agree. The high mean was 20 while standard deviation was 18.5. This showed that the evidences provided by the respondents were relevant and result showed that schools which use smart learning improve their students grades and scores.

According to Ludwing (2006) who developed the "Systems theory" which was based on the concept of a system for learning. The researcher related this system with the effective process of learning where each tool and activity within a school plays a part in supporting students learning and succeeding. This study highlighted that the more a school has enough equipment, well used by school leaders, teachers and students, the school performance increases more that the schools without them.

**Interview analysis on the status of smart learning:**

During the interview, the researcher interviewed school leaders on how many computers they received, types of them and the time of accessing smart classrooms for learning, and responded:

*There was a project working with the Rwandan Ministry of Education distributing computer Positivo BGH and others of HP types which are provided to schools where teachers and students have access to them. The respondents outlined that each school that has a smart classroom to install the computers and internet receives the number of computers depending on the number of students the school has. They confirmed that the students access smart classrooms during teaching hours and other periods determined by the school leadership.*

**4.2.2 Relationship between smart learning and students' performance in secondary schools**

As shown, the researcher was interested in ascertaining the relationship between school smart learning and students' academic performance in secondary schools of Rusizi district. As the results described, the different variables were assessed and the findings showed that the P-value was.04 which was significant, due to that if P-value is less that .05 then it is significant. This is interpreted that contribution of smart learning was very significant to the secondary students' academic performance. As to whether there was a correlation between smart learning and students' academic performance, the result showed that Karl Pearson coefficient of correlation was .751 which means the smart learning contribute to the students' performance. Therefore, when Karl Pearson coefficient lies between 0 and .5 there is low positive correlations while when it lies between .5 and 1, there is high positive Karl Pearson correction. This was concluded that schools which have smart learning well equipped and functioning where teachers and students have access to interact with it, they perform well more than those without using them effectively.

The results described with different variables to find out the relationship between smart learning and students' performance where the Karl Pearson correction coefficient was .823 and the P-value was .02 which was significant. If P-value is less that .05 then it is significant. It was interpreted that contribution of smart learning was very significant to the secondary students' academic performance. It was concluded that schools with functioning smart learning improve the performance of students.

**4.3 Recommendations of the study**

The study was well conducted and the respondents provided their views on the contribution of smart learning and students' performance in secondary schools. Therefore, after identifying the areas need improvements the researcher has addressed the recommendations:

It has identified that schools of Rusizi district perform well due to the use smart learning though some schools lack smart classrooms and all schools did not get computers or smart phones (tablets). Therefore, the researcher has recommended that the Ministry of Education should extend its project of distributing computers to all schools of the district and the whole country.

The Rwanda Basic education Board should encourage its intensive monitoring and evaluation on the effective use of smart classrooms for teachers and students performance due to that some schools do not have clear plan to use their smart classrooms others lack basic skills on the implementation of the smart learning.

The schools and teachers should allow the al students interact with computers and smart digital tools in order to get familiar with them due to that the findings showed that the students did not get enough time to visit smart classrooms independently for their research and exploration for their daily learning.

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