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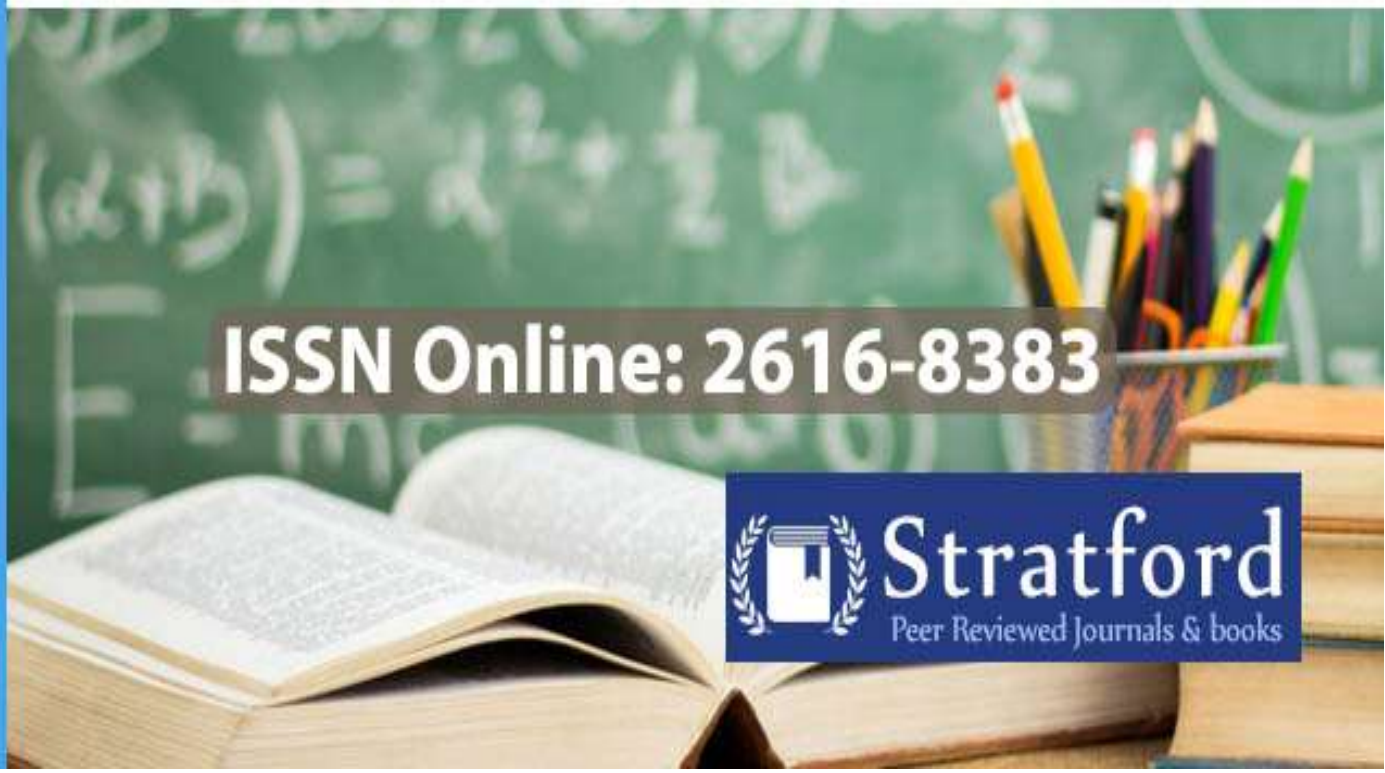

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Information and Communication Technology (ICT) Integration and Teachers' Classroom Pedagogy in Selected Secondary Schools in Nyanza District-Rwanda

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Abstract

The aim of this research project was to analyze the influence of integration of ICT in education on teachers' classroom pedagogy in secondary schools in Rwanda, specifically in Nyanza District. This research project was guided by the following specific objectives: To assess the level of ICT integration in teaching and learning process in selected schools in Nyanza District; to determine the level of teachers' classroom pedagogy in selected schools in Nyanza District, and to establish the relationship between ICT integration and teachers' classroom pedagogy in selected secondary schools in Nyanza District. This study used a descriptive research survey design. The data in this study were gathered from head teachers and teachers from sampled schools. The sample size in this study was 84 respondents out of 132. Purposive and simple random sampling techniques were adopted to obtain the required number of respondents. Questionnaire and interview guide were used as main tool for collecting primary data. To ensure validity and reliability of research instrument a pilot study was conducted in schools, which were not included in the study sample. After data collection, the research analyzed the quantitative data with the aid of a statistical package for social sciences version 23.0 while qualitative data were analyzed using content analysis. The results of the study indicated that teachers integrate ICT in teaching and learning process as shown by the mean of 3.42 which expressed as high mean and the study found that both teachers and students use ICT tools and equipment during teaching and learning process. To the second objective, the findings of the study indicated that ICT is important tools that influence syllabus coverage, content delivery and record keeping in education setting. In this study, majority of respondents indicated that ICT had a positive impact on teachers' classroom pedagogy as shown by high mean of 3.84 on syllabus coverage; mean of 3.90 on content delivery and mean of 3.89 on record keeping. The findings on this objective suggested that level of teachers' classroom pedagogy has improved because of ICT integration in teaching and learning process. The results on the third objective

revealed that there is a strong positive relationship between ICT integration and Teachers' classroom pedagogy due to the correlation coefficient of 0.803**.

Keywords: *ICT integration, information Technology, Information Communication Technology, Teacher's classroom Pedagogy, Integration.*

1.1 Background of the Study

ICT have brought a robust change in society. It has connected the whole world and has influenced the economic and social sectors. ICTs have produced a brilliant change in both teaching and learning. UNESCO (2017) describes ICT as an educational tool that can complement, enrich, and transform education for the better. ICT can provide access to all kinds of global resources and can facilitate secure collaboration with education in the modern world. Different teaching and learning materials can be shared with teachers and students. Facilitators can discuss their ideas about innovative practices in the classroom and their research work related to this (Parvin, 2013). According to policymakers around the world, ICT in schools should lead to significant educational and pedagogical results, beneficial to both students and teachers (Jimoyiannis & Komis, 2007). Nowadays, the real impact of integrating ICTs into everyday classroom practices is an essential issue. A significant amount of research has shown that the use of ICT in education can increase student motivation and deepen understanding, promote active, collaborative and permanent learning, offer shared work resources and better access to information, and help them think and communicate creatively (Jonassen, 2000).

.ICT is considered an essential means to promote new methods of instruction in teaching and learning. In recent decades, many studies have been conducted on the implementation of ICT in education and the reform of instructional technology (Drent & Meelissen, 2008). Most of them found some positive impact on students learning due to the use of ICT (Hattie, 2009; Mumtaz, 2000). Technology has been identified as an innovative and exciting instructional tool that changes the paradigm to student-centered learning that helps students better understand the issues (Watson & Watson, 2011). Conversely, it is not possible to make such positive impacts using only the technologies in the classroom without creating an environment and without the effective use of ICT for learning. It is not possible to create new and exciting learning situations that can change the classroom environment by only putting computers in the classroom (IIEP, 1995, cited in (Sanyal, 2001), Darling-Hammond (2004) and Shulman (2007) affirmed that researchers have identified two types of teacher knowledge that can significantly improve their practice: their understanding of their subject matter and pedagogical knowledge about how students learn the subject and how it is best taught.

Teachers must have a thorough knowledge of their respective subjects, and then they can incorporate their pedagogical experience to present digital content through the use of ICT. The professional development of teachers in these areas is related to the effectiveness of instruction in the classroom. Each country needs a defined policy to achieve the vision of the use of ICT in education. The Rwandan government aims to transform Rwanda into a middle-income country by 2020. The achievement of Rwanda's economic and social development goals depends to a large extent on its most valuable resource (its people).

To achieve these goals, Rwandans must be given opportunities to develop knowledge, skills and attitudes to compete in the labor market and contribute to the social and political life of their country (ICT Policy Framework, 2015). Vision 2020 places ICT at the center of transformation in all sectors. The use of ICT in education is considered a strategic level to achieve this transformation. To improve the quality of education in all subjects and at all levels, the Rwandan government has formulated an ICT policy framework and has initiated several new initiatives, such as the provision of smart classrooms and the training of ICT teachers and a competency-based curriculum.

According to the policy framework, smart classrooms are technologically enhanced classrooms that foster opportunities for teaching and learning by integrating learning technologies, such as computers, digital content and specialized educational software, assistive technologies, such as equipment and network equipment. A technology is introduced into the classroom instead of a student going to a computer lab and each subject is taught using technology. Meanwhile, only the formulation of policies does not guarantee the correct implementation of ICT in education. Regular and effective practices can guarantee the successful implementation of the policy at a very high level of education. The purpose of this study was therefore to investigate the impact of the integration of ICT in education on teachers' classroom pedagogy in selected schools in the Nyanza district, Rwanda.

1.2 Statement of the Problem

The rapid growth and implementation of ICT have led to the diffusion of technology in education. The integration and infusion of ICT in the teaching and learning process is increasing more and more in many learning institutions. Many researchers, such as Albirine (2006) argued that the incorporation of ICT in the delivery of the curriculum has a significant impact on teaching and learning in the area of various subjects. Introduction of ICT in education in Rwanda is expected to improve the quality of teaching and learning process. According to quality education enhancement awareness campaign phase II, many teachers in visited schools including those of Nyanza District showed weaknesses in pedagogical aspects. The results of the campaign revealed that many teachers did not prepare well their pedagogical documents, did not carry out assessment and evaluation (MINEDUC, 2019).

Meanwhile , in order to improve the quality of teaching and learning process, the Rwandan government has implemented several initiatives, such as the establishment of ICT policies in education, the provision of technological tools in some schools, such as computers, projectors, Internet connection and teacher training in integration of ICT in education all subjects; and in the competency-based curriculum. Despite these interventions, high school teachers, including those in the Nyanza district, continue to show poor classroom pedagogy. In addition, through the review of the literature, the researcher did not find any study that talk about the integration of ICT and teachers' classroom pedagogy in Rwanda secondary schools, especially in the Nyanza district. Therefore, the present study aims to fill the gap by conducting a study on the integration of ICT in education and teachers' classroom pedagogy in secondary schools in the Nyanza district.

1.3 The Purpose of the Study

The general objective of this research project was to determine the influence of integration of ICT in education on teachers' classroom pedagogy in selected secondary schools in Nyanza District.

1.4 The Objectives of the Study

i. To assess the level of ICT integration in teaching and learning process in selected schools in Nyanza District.

ii. To determine the level of teachers' classroom pedagogy in selected schools in Nyanza District.

iii. To establish the relationship between ICT integration and teachers' classroom pedagogy in selected secondary schools in Nyanza District.

1.5 Research Questions

i. What is the level of ICT integration in teaching and learning process among secondary schools in Nyanza District?

ii. What is the level of teachers' classroom pedagogy in secondary schools in Nyanza District?

iii. Is there any relationship between ICT integration and teachers' classroom pedagogy in secondary schools in Nyanza District?

2.0 Literature Review

2.1 Theoretical Literature

2.1.1 Concept of information and communication technology

There is no agreement on the definition of ICT since these technologies evolve almost daily. In this research project, ICTs include, among others, personal computers, laptops, desktop computers, printers, projectors, Palm devices, iPods, fax machines, cell phones and the Internet (UNESCO, 2002). This includes the ability to use technology as a tool to conduct research, evaluate and communicate information (UNESCO, 2002). Its general definition covers any product that can store, retrieve, manipulate, send, or receive information electronically in digital form, as indicated by the World Bank (2002). However, there have been misconceptions that ICTs in general refer to computers and computer-related activities, although the computer and its application play a vital role in modern information and communication technology.

According to Cuttance (2001), ICT is a generic term applied to the technologies used to collect, store, edit and pass data in various ways. Toomy (2001) argues that ICTs include hardware, software and Internet connectivity, of which information technology is an important part. Toomy (2001) believes that the broader term ICT covers aspects such as electronic

technologies, online technologies and computer technologies, and includes the use of computers and CD-ROMs and Internet facilities, with one of the main components of ICT as the computer in teaching that is key to this study. The use of the computer is defined as the ways in which teachers work with computers in the instruction of their students, either through computer-assisted learning or computer-administered instructions.

2.1.2 The Concept of ICT Integration in Education

The integration of information, communication, and technology (ICT) in education refers to the use of computer-based communication that is incorporated into the daily instruction process in the classroom. Along with the preparation of students for the current digital age, teachers are the key players in the use of ICT in their daily classrooms. This is due to the ability of ICTs to provide a dynamic and proactive teaching-learning environment (Arnseth & Hatlevik, 2012). While the goal of ICT integration is to improve and increase the quality, accessibility and cost-effectiveness of delivering instruction to students, it also refers to the benefits of networking among learning communities to address the challenges of current globalization (Albirini, 2006). The process of adopting ICTs is not a single step, but rather continuous and continuous steps that fully support teaching, learning and information resources (Young, 2003).

The integration of ICT in education generally means a process of teaching and learning based on technology that is closely related to the use of learning technologies in schools. Due to the fact that students are familiar with technology and will learn better within the technology-based environment, the issue of ICT integration in schools, specifically in the classroom, is vital. This is because the use of technology in education contributes a lot in the pedagogical aspects in which the application of ICT will lead to effective learning with the help and support of the elements and components of ICT (Jamieson *et al.*, 2013). It is correct to say that almost all subject ranges, from mathematics, science, languages, arts and humanities and other major fields, can be learned more effectively through technology-based tools and equipment.

In addition, ICTs provide complementary help and support for both teachers and students when it involves effective learning with the help of computers to fulfill the purpose of learning aids (Jorge *et al.,* 2003). Computers and technology do not act as a replacement tool for quality teachers but are considered complementary complements necessary for better teaching and learning. The need for integration of ICT in education is crucial, since with the help of technology, teaching and learning not only occur in the school environment, but can also happen even if teachers and students are physically in distance. However, the integration of ICT is not a one-step learning process, but rather a continuous learning process that provides a proactive teaching-learning environment (Young, 2003).

ICT can be used in various ways in which it helps both teachers and students to learn about their respective thematic areas. A technology-based teaching and learning offer several interesting ways that include educational videos, stimulation, data storage, the use of databases, mind maps, guided discovery, brainstorming, music, World Wide Web (www) that will make the learning process more satisfying and meaningful (Finger & Trinidad, 2002). On the other hand, students will benefit from the integration of ICT where they are not limited to the curriculum and limited resources, but the practical activities in a technology-based course are designed to help them stimulate their understanding of the subject. It also helps teachers

design their lesson plans in an effective, creative and interesting approach that would result in active student learning. Previous research has shown that the use of ICT in teaching will improve the learning process and maximize the skills of students in active learning (Finger & Trinidad, 2002).

Hermans, Tondeur, Van-Braak and Valcke (2008) identified three main stages for ICT to be highly valued and considered by teachers: Integration, improvement, and complementation. The integration approach consists of implementing the correct use of ICTs in a particular thematic area that involves complex concepts and skills to improve student achievement and achievement. In addition, the revision of the curriculum is also necessary so that only the resources related to ICT and the appropriate software are installed for the main objectives and objectives of the curriculum to be achieved. The improvement approach consists of using ICT to give great emphasis to the presented topic. For example, Microsoft PowerPoint can be used to present the subject in a very innovative and creative way that will lead to the discussion and exchange of ideas and thoughts. Finally, the complementary approach is when ICTs are used to help and support student learning. This approach allows students to be more organized and efficient in which they can get the notes from the computer, send their work by email from home as long as they meet the deadline and look for information from various sources provided online to meet with the task assigned to them (Hermans *et al.*, 2008).

2.1.3 Teachers' Classroom Pedagogy

According to Mishra and Koelher (2006), Pedagogy is the art (and science) of teaching. Effective teachers use an array of teaching strategies because there is no single, universal approach that suits all situations. Different strategies used in different combinations with different groups of students to improve their learning outcomes. Some teaching strategies are better suited to teaching certain skills and fields of knowledge than are others. Some strategies are better suited to certain student backgrounds, learning styles and abilities. Becker (2014) added that Pedagogy, incorporating an array of teaching strategies that support intellectual engagement, connectedness to the wider world, supportive classroom environments and recognition of difference, should be implemented across all key learning, and subject areas. Pedagogical practice promotes the wellbeing of students, teachers, and the school community. It improves students' and teachers' confidence and contributes to their sense of purpose for being at school; it builds community confidence in the quality of learning and teaching in the school.

2.1.4 Benefits of ICT use in education

It is generally agreed that ICT is a crucial resource in education. Where a country has high levels of ICT skills and expertise, society will be better placed to combat social exclusion and the information divide, as well as to identify opportunities for economic growth (Hawkridge *et al.,* 2013). Hawkridge also argue that from the individual standpoint, access to certain forms of ICTs may increase the choices available to individuals. With increased access to information, individuals are able to make more informed decisions. UNESCO (2007) points out that ICTs are an important component for all in today's information society. In the area of education, UNESCO argues that ICT can be used to: improve administrative efficiency, disseminate teaching and learning materials and improve the ICT skills of teachers and students and allow them to access to sources of information from around the world.

Glennan and Melmed (2006) conducted a study on the effectiveness of computer technology on teaching and learning. Glennan and Melmed had three major findings. First, that student usually learns more in classes in which they receive computer-based instruction. Secondly, they found out that students learn their lessons in less time with computer-based instruction. Thirdly, they noted that students prefer classes where they receive computer support. Dexter on the other hand found out that through repeated analyses, on average, technology reduces by about 30% the time required to reach criterion levels of knowledge and performance. Advocates of technology use for classroom instruction argue that computers and the internet offer more than just faster access to more information. They believe that ICTs provide an opportunity to fundamentally change the processes of learning by particularly allowing teachers to create more constructivists learning environments (Orlando, 2011).Constructivist practices have been predicted as the most suitable for use of ICTs, and it has been widely assumed that the introduction of ICT will be accompanied, more or less automatically, by the adoption of this approach to teaching (Khirwadkar, 2007). Constructivist practices entail student-centred learning. In the practice, there is more of teacher-student and student-student collaboration and co-construction of knowledge, in contrast to teacher-centred practice which involves explicit instruction, knowledge transmission, linear knowledge development, and more directly observable learning outcomes. Constructivist teaching fosters critical thinking which a 21stcentury skill (Orlando, 2011)

2.1.5 Constraints and barriers to pedagogical ICT integration

An examination of literature on ICT integration reveals that ICT is not being used to its full potential in education. Several researchers have cited various barriers that curtail the effective use of ICT to enhance the quality of teaching and learning. According to Mumtaz (2000), among these are insufficient or obsolete hardware and software, inadequate facilities and support services, lack of time and money, un- appropriate reward system, lack of information about good practice, and underestimation of the difficulty in adopting new information technologies. Means et al. (2004) argued that although so much has been done to increase the technological infrastructure in schools, institutions are far short of providing a seamless, convenient, robust, and reliable technology support structure for all students and teachers.

Gilbert and Green (2007) identified no stability, mismatched rates of change, unrealistic expectations, school attitude, and mismatch of resources as part of the obstacles to full-scale academic integration of ICT. No stability is associated with unpredictable changes in the kinds of ICT applications for educational uses; a mismatched rate of change is the difference between times taken for arrivals of new ICT applications. This was compared to new experiments in approaches to teaching and textbook publishing. Unrealistic expectations that technology is about to transform education happens every now and then with the support of the media. Teachers' attitude is central where they feel vulnerable, disempowered, and frustrated when confronted with new technologies that may not be easy to use or reliable. These include mismatches of resources that make students caught in a bind due to insufficient knowledge of student-owned technology resources and insufficient coordination among teachers and technology support personnel.

Carter (2008) found that the lack of computers in the classroom and lack of time to learn how to incorporate the computer into the curriculum as the two most common barriers faced by

schools. Carter argues that many teachers do not incorporate ICT into key aspects of their work because for them, digital technology requires too much time and effort, supplies too many distractions, and produces minimal value for the investment. Geoghehan as cited in Baldwin (2005) sees non-adoption as a matter of social and psychological factors that hinders the use of technology and believes it is not an aversion to technology itself that hinders adoption. It is considered the avoidance to risk a low tolerance for discontinuous change, and insufficient administrative support. The adoption of ICT-based innovation is a function of available resources, accepted value the person places on the innovation, and communication with other adopters.

Reiser and Salisbury (2009) identify a number of barriers to ICT integration. Firstly, they cite access to hardware and software as well as funding as one of the major constraints to technology integration. Secondly, they argue that time for planning; personal exploration, online access, and skill development are a limiting factor. Thirdly, technical, and administrative support and resources hinder proper integration. Closely related to this is training and expertise which affects the users of technology in education. Many other studies have pointed to the practical constraints operating within the working contexts in which teachers currently find themselves. Innovation and adaptation are costly in terms of time; developing effective pedagogy around ICT involves significant input in terms of planning, preparation, and follow-up of lessons (Cox et al., 2003). Other contextual factors which can act as barriers include lack of confidence, experience, training, access to reliable technology resources (Hennessy et al., 2005). Some writers distinguish between ‘school level’ and ‘teacher level’ barriers, with ‘teacher level’ factors such as pedagogical beliefs, technical skill and confidence viewed as particularly influential (Mumtaz, 2000).

2.2 Empirical Literature

The research conducted by the International Association for the Evaluation (IEA) of educational achievement on the influence of ICT in education in more than twenty-six nations found that the infusion of ICT in education increases educational performance and teacher performance (UNESCO, 2008). Another study conducted by Dexter (2001) in EE. Regarding teachers' perception of the impact of the integration of ICT in education, he found that most educators considered ICT as an added value in their teaching. Mewcha and Ayele (2015) conducted a study to investigate teachers' perception of the integration of ICT in the teaching-learning process. The research questions sought to measure teachers' use of software, as well as other educational tools and materials, professional development preferences in gathering information and support, factors that encourage the use of technology, teachers' perceptions of self-efficacy and the barriers they face during the use of technology in the teaching-learning process. A population of 72 teachers at Adwa College participated in this survey. The result on the use of hardware and software shows that the majority of teachers in the university cannot use hardware in the learning process of teaching due mainly to the scarcity of resources. Teachers who cannot use ICT as an educational tool are 55.6 percent higher than those who can use them. This indicates that the majority of teachers in the university are not integrating ICT in the course they teach. Regarding the information and support services, there is no equal support service from the technical support units. Adwa College is found poor by most teachers in the preparation of ICT training. The average of the factors that promote the technology oscillated between 2.72 and 2.99, which indicates that it is important to

promote technology to apply ICT in the teaching-learning process. In addition, the average perception of teachers on the use of ICT ranged between 4.28 and 4.79, showing that the teachers at Adwa College have a strong positive perception to use ICT in the teaching-learning process. The Pearson correlation (r = 0.412) shows that there is a significant relationship between the perception of teachers towards the integration of ICT in the teaching-learning process and the factors that encourage the use of ICT. The results of the correlation of the relationship between teachers' perception of the use of ICT to increase the quality of the courses they teach and their productivity due to the use of ICT are also considered significant (r = 0.615).

Another study conducted by Mbugua (2015) examined the integration of ICT in teaching in public secondary schools in Nakuru County, Kenya. The study used a research design survey. A total of 486 public high school teachers (81 principals and 405 classroom teachers) participated in the study. They were selected at random. Three instruments were used to collect the data, namely the teacher questionnaire (QT), the director interview schedule (PIS) and the school observation calendar (OS). The study found that ICT facilities were not adequate and that teachers had only basic skills or none at all. Financial constraints and lack of facilities and equipment preserve some of the challenges teachers face in the integration of ICT in education. There is a significant positive relationship between the integration of ICT and the academic performance of students at levels of alpha significance of 0.05.

The study concluded that the integration of ICT is quite important in the current dispensation. Luhombo (2015) conducted a study on the factors of teachers that influence the integration of information communication technology in the teaching of English in public secondary schools in the sub-county of Mumias, Kenya. The study aimed to address the following objectives: To examine the extent to which the demographic data of teachers influenced the integration of ICT in the teaching of English, in order to determine the extent to which teachers' attitudes influenced the integration of ICT, for to determine the extent to which teachers 'training influenced the integration of ICTs and evaluated the extent to which the workload of teachers' classes influenced the integration of ICT in the teaching of English in public secondary schools. The study adopted a descriptive survey design that uses both quantitative and qualitative approaches. The target population for this study was 3320 participants, with principals, English teachers, and students. A sample size of 1660 participants was used for the study, composed of 20 directors, 80 English teachers and 1560 students. The data for this study was collected using two types of instruments, namely questionnaires for English teachers and students and interview schedules for directors. The analysis of the data was done by descriptive statistics, as frequencies and percentages were used to analyze the quantitative data.

From the study it was established that the teaching demography (age, gender, academic qualifications, and years of experience) are not the only factors that determine the use of ICT. In addition, it was established that most English teachers, principals and even students have a positive attitude towards the use of ICT. It was established that most teachers did not receive adequate training in ICT. It was also established that many teachers had many lessons to teach in a week, so they did not have enough time to prepare for the ICT-related lessons.

Kamarulzaman (2017) conducted a study to investigate the level of integration of ICT in teaching and learning in private preschool in Malaysia. A total of 61 teachers from 10 private preschools in the Mualim district in the state of Perak Malaysia were randomly selected in this survey investigation. The questionnaire was used to collect quantitative data and the data was analyzed using SPSS version 20.0.The findings of the study revealed that most teachers were well informed about the educational application of ICT. However, the findings revealed that the level of ICT integration of teachers is still at the low level. This is based on the results of a study in which most teachers are normal users and that the application of ICT was used for their own work instead of using it in their teaching and learning in the classroom. In addition, the findings indicated that teachers' awareness of the importance of ICT in teaching and learning is not encouraging and this problem is related to the training provided, the equipment and the time constraints that hinder the integration of ICT.

2.4 Theoretical Framework

Diffusion of innovation theory (IDT)

Diffusion innovation theory was proposed by Roger (2007), who suggested that diffusion is the process by which an innovation is communicated through certain channel overtime among the members of the social systems. Hence, innovation diffusion is a process that takes time to occur. It provides a context in which one looks at uptake and effects of ICT in a given period. It is general model which helps in understanding more about the diffusion process. It enables to understand the process of change and how to affect change. It guides on strategies on creating intent to change and turning an intention into action. According to this theory, the knowledge and skills about ICT is important hence teachers need the adoption of technology in their teaching and learning processes for value addition.2.4.2 Theory of reasoned action (TRA)

The theory of reasoned action (TRA) was initiated by both Fishbein and Ajzen (1980). According to them intention to carry out a given behavioral task is determined by both the attitude and the norm. The theory highlights on attitudinal behavior relating to accepting, using, and adopting of a given technology in an organization. The theory holds on the idea that a person’s voluntary behavior is determined by one’s attitude towards that behavior and how one thinks other people near him would view the behavior if he acted/performed the behavior. According to Oliviera (2006), the people decide to perform a given behavior even though they differ in view with it but its effects, since they want to please the society/people. This theory is applicable to this study in that teachers’ attitudes are very important in adoption of ICT in teaching and learning process. It is promised that teachers with positive attitudes towards ICT are likely to embrace adoption of ICT in teaching and learning process.

2.5 Conceptual Framework

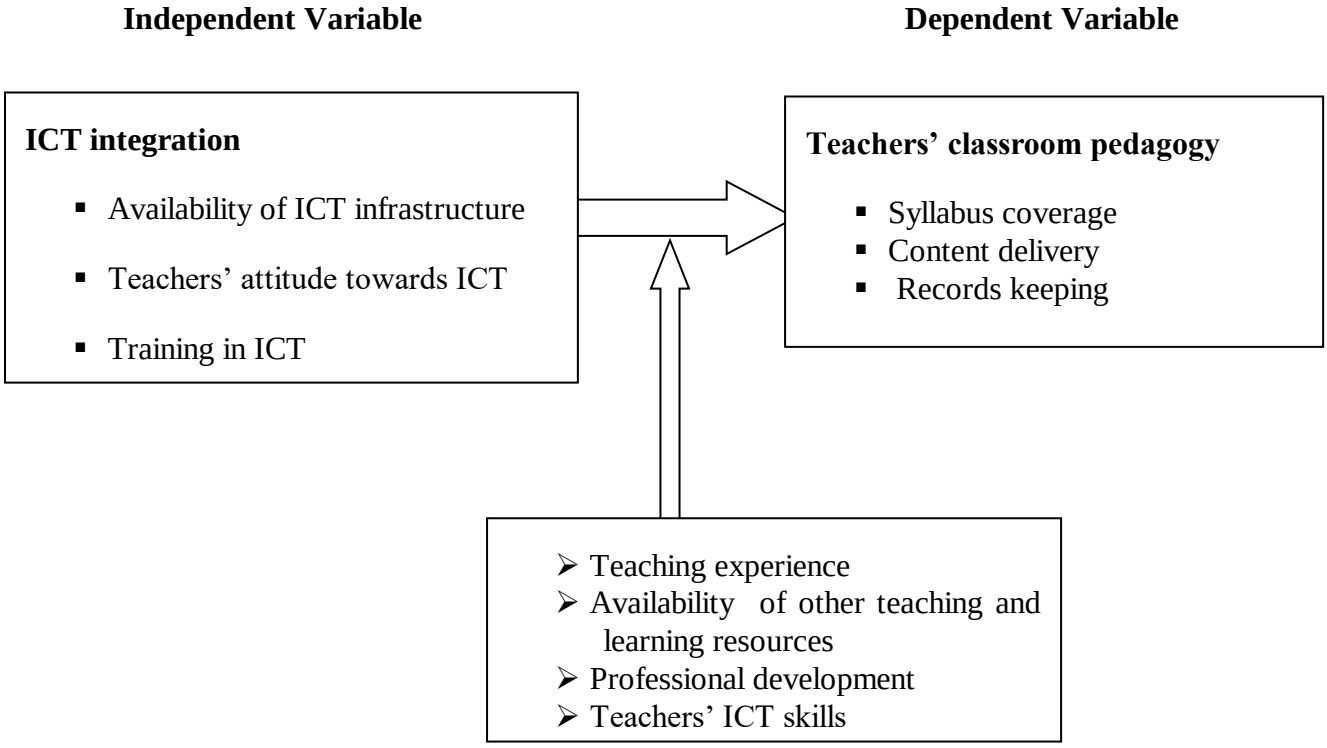

Figure1: Conceptual Framework

3.0 Research Methodology

The study used both quantitative and qualitative approaches to triangulate and broaden the understanding of the influence of ICT integration in education and teacher classroom pedagogy. Quantitative approach was used for gathering, analyzing, interpreting, and presenting numerical data.

4.0 Findings and Discussions

4.1 ICT integration in teaching and learning process in sampled schools

The first objective of this study was to assess the level of ICT integration in teaching and learning process in selected schools in Nyanza District.

Table 1: Perception of respondents on ICT integration in selected school

Items	Mean	Std. Deviation
Computer laboratory in our school is well equipped with laptops and desktops	2.41	1.25
Both teachers and students use computer and internet in our school	3.62	.90
Students visit computer laboratory for all subjects not only for ICT session	2.56	1.19
Training programs are provided for teachers to increase their awareness about the value of ICT learning	2.48	1.17
Teachers in our school are supported to attend workshops or training programs in order to use ICT integration effectively	2.42	.99
Teachers have freedom and responsibility for use of ICT tools in order to make learning better	3.80	.78
The school give flexibility for teachers to adopt ICT integration in the classroom	3.91	.84
I teach my students to consider the implication and opportunities of computer use	4.02	.57
I use computer as a tool to teach new subjects' knowledge	3.70	.97
I encourage students in class to search for relevant information on the internet	4.25	.43
I ask my students to undertake tasks or follow up classwork at home on computer	3.66	.79
The school encourage autonomy and team work to enhance ICT use among the teaching staff	3.86	.89
Average	**3.42**	**0.89**

As indicated by the study finding, teachers try the best to integrate ICT in teaching and learning process as shown by the mean of 3.42 in Table 1 which expressed as high mean. The study also found that both teachers and students use ICT tools and equipment during teaching and learning process. Teachers encourage students to search relevant information on the internet and encourage them to do classroom assignment using ICT tools and equipment. Moreover, the study found that the integration of ICT in teaching and learning process is being hindered by several factors such as limited ICT tools and equipment; negative attitudes of some teachers towards ICT use; limited in service training on ICT use among teachers and among others.

4.2.2 Teachers' classroom pedagogy in sampled schools

The second objective of this study was to determine the level of teachers' classroom pedagogy in selected schools in Nyanza District. This objective was evaluated under three main indicators namely syllabus coverage, content delivery and record keeping. To respond to this objective , the researcher requested participants to rate the items related to the study variables by ticking either strongly disagree, disagree, undecided, agree and strongly agree and their responses are presented in Table 2; 3 and 4 below.

Table 2: Opinion of respondents on syllabus coverage

Items	Mean	Std. Deviation
I complete my subject syllabus on time because of using ICT tools	3.58	1.20
I prepare my course materials on time due to the use ICT tools	3.75	.94
I make the syllabus more engaging because of ICT integration in education	4.01	.78
With ICT use I easily communicate course goals and content well	3.55	1.00
ICT is an effective tool for teaching	4.31	.70
Average	**3.84**	**.92**

Source: Data from the field (2019)

The Table 2 describes the opinion of respondents on syllabus coverage as a result of integrating ICT in teaching and learning process in sampled schools. As depicted in the Table, majority of teachers confirmed that they complete their subject syllabus on time as a result of using ICT tools and equipment as indicated by a high mean of 3.58 and heterogeneous perception as the standard deviation was 1.20. Findings in Table 4.6 also indicated that teachers prepare their course materials on time due to the use ICT tools as shown by them mean of 3.75 and homogeneous perceptions as the standard deviation was 0.94; teachers make the syllabus more engaging as a result of ICT integration in education as indicated by high mean of 4.01 and homogeneity in responses as the standard deviation was 0.78. Moreover, results in Table 2 indicated that with ICT use teachers easily communicate course goals and content well as shown by high mean of 3.55 and heterogeneous perception as the standard deviation was 1.00.

Finding in the table also indicated that ICT is an effective tool for teaching as confirmed by majority of respondents on the mean of 4.31 and homogeneous perception as the standard deviation was 0.70. Finally, the overall mean of 3.84 in the Table which is expressed as high mean indicates that ICT plays a significant role in syllabus coverage in the process of teaching and learning. By using ICT tools and equipment, teachers easily prepare and complete the subjects' syllabus on time. This results concur with that of interview with head teachers who revealed that ICT integration in education plays a significant role in teaching and learning activities for instance in syllabus completion and assessment of learners.

Table 3: Opinion of respondents on content delivery

Items	Mean	Std. Deviation
The quality of teaching in the classroom has improved due to the use of ICT tools	3.71	.85
Use of ICT has made my subject more enjoyable	4.15	.69
The ability of teachers to deliver meaningful content has increased because of the use of ICT in the classroom	3.82	.77
I have improved my teaching capability due to the ICT integration in education	3.75	.83
I deliver content effectively due to the ICT integration in education	4.07	.63
Average	**3.90**	**.75**

Source: Data from the field (2019)

The Table 3 displays the opinion of respondents on effective content delivery as a result of ICT integration in education. As depicted in the Table, majority of teachers in sampled schools confirmed that the quality of teaching in the classroom has improved due to the use of ICT tools as indicated by high mean of 3.71 and homogeneous perception as the standard deviation was 0.85. Findings in the Table also indicated that a great portion of respondents (teachers) confirmed that the use of ICT has made their subject more enjoyable and the ability to deliver meaningful content has increased because of the use of ICT in the classroom, as shown by high mean of 4.15 and 3.82 respectively and homogeneous perception as the standard deviation was 0. 69 and 0.77, respectively.

Furthermore, results in the Table indicated that majority of respondents (teachers) was in agreement that they have improved their teaching capability due to the ICT integration in education and they deliver content effectively due to the ICT integration in education as shown by high mean of 3.75 and 4.07 respectively and homogeneous perception as the standard deviation was 0.83 and 0.63 respectively. Lastly, the overall mean of 3.90 in the Table which is expressed as high mean indicates that ICT use has helped the teachers to deliver content effectively. From the findings, it is clear that integration of ICT in teaching and learning process plays a crucial role. Through classroom observation, researchers found that only ICT teachers use ICT tools and equipment in teaching and learning process but still also lack knowledge of the practical use of ICT tools through collaborative and constructivist learning practices to involve their students more in the lesson.

Table 4: Opinion of Respondents on Record Keeping

Items	Mean	Std. Deviation
I easily update lesson notes on time due to the ICT integration in education	4.27	.67
With ICT preparation of class notes is effectively done by use word processor	3.76	.95
I timely develop scheme of work using computer due to the ICT integration in education	3.92	.77
ICT enhances professional development of teachers	3.90	.88
ICT helps to administer tests on time	3.60	.94
Average	**3.89**	**.89**

As depicted in Table 4, majority of teachers were in agreement that they easily update lesson notes on time due to the ICT integration in education as shown by high mean of 4.27 and homogeneity in perception as the standard deviation was 0.67. Results also revealed that with ICT, preparation of class notes is effectively done by use word processor as indicated by high mean of 3.76 and homogeneous perception as the standard deviation was 0.95.

Furthermore, results found a high mean of 3.92 on item that teachers timely develop scheme of work using computer due to the ICT integration in education and homogeneous perception as the standard deviation was 0.77. Findings in the Table also show that ICT enhances professional development of teachers and helps to administer tests on time as justified by high mean of 3.90 and 3.60 respectively and homogeneous perception as the standard deviation was 0.88 and 0.94 respectively.

Finally, the overall mean of 3.89 in the Table which is expressed as high mean indicates that majority confirmed that ICT use in teaching and learning process plays a significant role in record keeping and assessment.

4.2.2 Relationship between ICT integration in education and Teachers' classroom pedagogy

The third objective of this study was to assess the relationship between ICT integration and teachers' classroom pedagogy in sampled schools in Nyanza District. To establish the nature of relationship between variables, the Pearson correlation coefficient was used and it is based on the following rules: when the Pearson correlation value is positive, it is to say that the relationship is positive, and when it is negative the relationship is said to be negative, and the Pearson correlation is 0, it is said that there is no relationship between variables. The relationship was tested basing on the significance level or p- alpha of 0.01. When the p-value in Table is less than or equal to 0.01 the relationship is said to be statistically significant, and when the p-value or Sig. (2-tailed), is greater than 0.01 the relationship is said to be not statistically significant.

Table 5: Relationship between ICT Integration and Teachers' Classroom Pedagogy

		Teachers' Pedagogy
ICT integration	Pearson Correlation	.803**
	Sig. (2-tailed)	.000

**. Correlation is significant at the 0.01 level (2-tailed).

Source: Primary data

The Table 5 shows the relationship between ICT integration and Teachers' classroom pedagogy. The result in the Table shows that there is a strong positive relationship between ICT integration and Teachers' classroom pedagogy due to the correlation coefficient of 0.803** and that is statistically significant since the p- value of .000 is less than 0.01.

From the statistics in the Table it is clear that ICT integration in teaching and learning process has great impact on teachers' classroom pedagogy. From the findings, the study concludes that effective integration of ICT in education can yield positive results on teachers' classroom pedagogy.

6.0 Conclusions and Recommendations

To the government of Rwanda: Since it was revealed that there was limited ICT tools and equipment as well as limited training in ICT among teachers, the Ministry of Education (MINEDUC) together with Rwanda Education Board (REB), should provide enough ICT tools and equipment in sampled schools and organize regular training on the use of ICT tools and equipment for both teachers and other school personnel.

To the non-governmental organization: Non-government organization working in education sector should invest in ICT field through proving ICT tools and equipment to schools and helping in providing trainings to teachers in ICT related domain. This may help in improving ICT skills about ICT among teachers and improve their classroom pedagogy.

To the school head teachers: school head teachers should encourage/ motivate teachers to attend ICT training to ensure teachers have necessary ICT skills and knowledge. Schools should develop a partnership with private institutions and non-governmental organization so that those institutions and organization can assist schools in getting more ICT tools and equipment and training teachers in ICT domain. A school ICT policy must be in place and a vision statement for ICT integration in all subjects (learning areas). As the study found that some ICT tools and equipment were damaged, schools should contract ICT technicians to aid in maintenance of ICT facilities and assist teachers build confidence in the integration of ICT in teaching.

To the parents: parents should be mobilized about the integration of ICT in education so that they can facilitate their students to get ICT tools. Parents should be mobilized to buy ICT tools for their children, e.g. laptops.

To the teachers: teachers themselves should develop a positive attitude towards ICT use in teaching and learning process. Moreover, knowledgeable teachers can arrange informal ICT mediated work session to assist those who need guidance.

To the students: students should develop the culture of not abusing schools facilities or breaking schools materials and equipment. This should help in maintaining the existing ICT tools and equipment.

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