KABALE UNIVERSITY

FACULTY OF COMPUTING, LIBRARY AND INFORMATION SCIENCE

TITLE: ADOPTION OF ICT IN TEACHING AND LEARNING IN SECONDARY SCHOOLS IN KIGEZI REGION

Thematic Area 1: Enhance Research and Innovation in ICT products, Applications, and Services

a) Knowledge-based human capital through ICT integration.

Estimated Budget- Ugx 18,000,000

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Project Report submitted to the Directorate of Research and Publication by Research Team from the Faculty of Computing, Library and Information Science
July 2022

List of Abbreviations

ICT   Information and Communication Technology

AIDS   Awareness Incentives Demand Support

TPACK   Technological Pedagogical and Content Knowledge

MICTIVO   Monitor for ICT Integration in Flemish Education

SPSS   Statistical Package for the Social Sciences

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Executive Summary/Abstract

The need for most secondary schools in Uganda, especially in Kigezi region, to embrace Information and Communication Technology (ICT) has been facing a number of challenges which had not been clearly documented. In order to ensure the efficient integration of ICT in the teaching and learning process in these schools, there is need to understand these challenges and know how best they can be handled. The purpose of this study was to establish whether ICT was being integrated in the teaching and learning process among selected secondary schools in the Kigezi region by assessing the usage of ICTs in the teaching and learning process; establish the ICT infrastructures currently available in the selected schools and how they are being used; and, ascertaining the challenges secondary school teachers face in integrating ICT in the teaching and learning process. The study was guided by MICTIVO model (2009) of ICT integration which captures most of the factors for the Integration of ICT in education by looking at infrastructure and policy, perceptions, competences and integration at micro-level, and not only at ICT integration in curriculum development. The study adopted a cross-sectional descriptive survey design to collect data at one point in time from all the selected secondary schools. The quantitative approach was the main approach while the qualitative was the complementary approach. The target population included students (1943) and teachers (24), from Kigezi Region Districts of Kabale, Rukiga and Rukungiri. The six (6) schools were selected among the top schools from which Kabale University has been admitting the highest number of students for different courses in different academic years. The schools represented schools from both urban and rural settings. From the six schools, a sample of 332 students and 24 teachers were required to participate in the study. Data was collected by means of a questionnaire. Data analysis was conducted using descriptive and inferential statistics with the aid of Statistical Package for Social Sciences (SPSS). The findings from the study indicated that ICT was not being used in the teaching and learning process with average response mode of 1[never used ICT]. Furthermore, it was revealed that most of ICT Infrastructures -- computers, printers, Internet connection among others -- were not available [Average response mode of 1], In terms of ICT skills and competences, it was found out that respondents lacked skills in Organizing computer files in folders and sub-folders; Producing a text and using a word processing Programme, among others, as represented by the average mode of 1 [None]. The model developed revealed that location of the schools and the year of existence were found to be significant, while class and gender were found to be insignificant to ICT adoption in secondary schools. Based on the findings of the study, it is recommended that government and stakeholders should ensure that: schools are provided with the necessary ICT infrastructure; qualified computer teachers are recruited; computer laboratory technicians are rectruited; that there is continuous retooling of both students and staff; and that schools encourage ICT usage at home.

Key words: *ICT, Integration, Teaching, Learning*

1.0 Introduction

Recent trends in educational systems worldwide include the integration of Information and Communication Technology (ICT) in the teaching and learning process (Omwenga, 2007). This is to help students acquire the relevant knowledge and skills needed in the 21st century (Omwenga, 2007; Uzunbolyu & Tuncay, 2010). Uganda developed her initial National ICT Policy in 2003 with the objective of integrating ICT into the educational curricula at all levels. Other literacy programmes were also included to provide equitable access to quality education for all students in Uganda regardless of their academic level (Farrell, 2007).

When the Ministry of ICT was established in Uganda in 2006, a number of policies were developed by the Ministry of Education and Sports to enable teachers acquire the necessary ICT skills (Magambo, 2007; MoES, 2005). One of such policies was the ICT policy on Education for primary and secondary schools which specifically aimed at training teachers in ICT skills (MoES, 2005). The Ministry of Education and Sports in partnership with other government agencies, like the Uganda Communications Commission (UCC), directed a number of efforts and resources towards improving teachers' ICT skills so that they effectively integrate ICT in their teaching and learning process (Magambo, 2007).

Information Communication Technologies (ICTs) could, if adopted and implemented appropriately, support learning and teaching but this is most of the times hindered by the prevailing digital divide between the urban and rural schools in Uganda (Ndaula, Kahuma, Mwebembezi & Masagazi, 2013). This is evident in terms of both physical resources and the capabilities of teachers to effectively utilize the limited available ICT resources especially in the rural schools where a great percentage of the schools in Kigezi region fall.

The digital divide within education systems of developing countries is evidenced in the lack of ICT infrastructure in schools and the insufficient capabilities of teachers to effectively utilize the available limited ICT resources they may have at hand (Uzunbolyu & Tuncay, 2010). Most of the times, schools lack basic educational resources, and justifying expenses on costly, fragile and often short-lived ICT can be problematic (Hite et al., 2010; Keniston, 2002; Ndaula, Kahuma, Mwebembezi & Masagazi, 2013). A successful combination of ICT resource acquisition and the capabilities of teachers to effectively use these resources can provide schools with the required

competence that can greatly benefit both the teachers and learners during the teaching and learning process. As head teachers become more aware of the advantages and strategies of ICT resources, they stand to increase the educational benefits for their students.

The research found out the major challenges hindering secondary school teachers from integrating ICT in the teaching and learning process. It made recommendations on possible measures which Kabale University could take in its teacher training and offering shot courses so that schools could be helped to embrace ICT in the teaching and learning process.

To achieve this, the research was guided by the following key questions:
a) How do teachers and students use ICTs in the teaching and learning process?
b) What ICT infrastructure is available in the schools to support ICT integration in Education?
c) What challenges do teachers and students face that hinder them from embracing ICT in Education?
d) Which model can facilitate ICT adoption in teaching and learning process?

1.1 Statement of the Problem

Despite ICT being taught at most secondary schools in Uganda, the students admitted in universities lack the basic computer skills, e.g Email communication, use of spreadsheets, presentation software, Internet usage, use of Office suites (Landon et al., 2012; Markon, 2013). Nomsa Mndzebele (2013) indicated that barriers to ICT adoption are at two levels -- external and internal. The scholar argues that external barriers include lack of equipment, unreliability of equipment, lack of technical support and other resource-related issues, while internal factors include both school-level factors, such as organizational culture and teacher-level factors.

Whereas the investment in ICT continues to increase in the education sector in Uganda (Ministry of Education and Sports, 2018), anecdotal evidence suggests that basic information communication technologies like computers and projectors are still not being effectively used in education institutions at all levels in the districts of Kigezi region. Most teachers in these institutions do not use the ICTs in the process of curriculum delivery as frequently as policy makers and researchers expect. Research conducted by Farrell (2007) showed that some institutions of higher learning, especially universities like Makerere, Kyambogo, Mbarara,

Uganda Martyrs and Nkozi University have tried to integrate ICT into the teaching and learning process, but they have always faced the problem of high costs of purchasing and maintaining the ICT equipment as their main hindrance. At Kabale University, it has been observed that most of the students admitted at the university from Kigezi region have limited computer skills and knowledge, yet ICT is one of the subjects they learn in secondary schools. What is not clear is why they have limited computer knowledge and skills. In order to prepare students with the skills and knowledge necessary for the information society, ICT should be integrated at all levels and all subject matter curricula in an appropriate way (Suat, 2014). Failure to effectively access and adopt ICTs and knowledge has greatly hindered sustainable progress for individuals and communities as we enter the 21st century (Katundu, 2000). Therefore, the study investigated the Adoption of ICTs in Teaching and Learning in Selected secondary schools in Kigezi Region Districts, Uganda.

1.2 Objective of the study

The main objective of the study was to establish ICT adoption in the teaching and learning process in the selected secondary schools in Kigezi region.

1.2.1 The specific objectives of the study included the following:

i. To assess the usage of ICTs in the teaching and learning process;
ii. To establish the ICT infrastructures currently available in the selected schools and how they are being used;
iii. To ascertain the challenges secondary school teachers face in integrating ICT in the teaching and learning process;
iv. To develop a model for ICT adoption in the teaching and learning process.

1.3 Rationale/Justification

One of the goals of East African Community Vision 2050 is well-educated and healthy human resources where Science, Technology and innovation is the key enabler, which is in line with Uganda Vision 2040 to have access to affordable quality health and education services. Ugandans aspire for a healthy, literate and well-informed society where education curriculum, examination and instruction methods will be revised to suit the proposed changes in the education system as well as being responsive to the market demand. Therefore, this study was intended to help the University achieve its third core mandate of community outreach by encouraging the integration of ICTs in teaching and learning. This will help to create a technology-driven education system.

Findings from this research can be used to enable Kabale University take the lead in solving the problems hindering the integration of ICT in the teaching and learning process in secondary schools in Kigezi region. This would facilitate the integration of ICT in the teaching and learning process by both teachers and students in these schools.

Findings of this study will also be important to school administrators, and other stakeholders in the education sector in Kigezi region to ascertain how prepared their secondary schools are in terms of an enabling environment to support the adoption and integration of ICT in the teaching and learning process.

The findings may further be used to highlight the capacity building gaps that are important in formulating the suitable framework to empower teachers and students to effectively integrate ICT in the secondary school curriculum and how these gaps can be filled.

2.0 Literature Review

In the past years, different researchers have investigated on various ICT implementations across a number of sectors among which include the education sector both in Uganda and internationally. For instance, Salih (2004) researched about the factors affecting the application of ICT in distance education in Turkey, whereas Bagchi and Godwin (2007) carried out research on the factors that drive the adoption of ICT in Africa and in the Organization of Economic Cooperation and Development (OECD) group of nations. Katushabe and Kisambira (2002) focused on ICT-based educational content at Kyambogo University and its affiliated National Teachers Colleges; whereas Odongo (2007) took a study on ICT integration and its influence on the teaching process in selected secondary schools in central Uganda. Ariho and Twinomujuni (2011) undertook a study to ascertain problems in ICT implementation in selected institutions of higher learning in Kigezi Region districts. None of the above studies tackled the challenges faced by teachers in secondary schools in integrating ICT in education, yet secondary level is a critical level in the education process where this should be emphasized and thoroughly integrated in the teaching process.

A study conducted by Mugisha (2007) put emphasis on the problems hindering ICT implementation in the curriculum of Primary Teachers' College in Kabale District. The study mainly considered tutors' attitude towards the usage of ICTs in teaching and the availability of ICT infrastructure. Whereas the research looked at problems related to ICT implementation in education, the intended population consisted of only tutors in the said college, hence leaving a gap which this study intended to close by considering secondary schools. In another research, Munyantware (2006) conducted a study on the problems hindering teachers' adoption of ICT in secondary schools in the western district of Kisoro. In this study, the researcher found out that teachers' technological skills were very essential to enable successful ICT implementation in the teaching and learning process. However, there was still a gap in the study since it targeted only science and mathematics teachers in secondary schools, leaving out teachers of other subjects. The study also did not assess the extent to which other factors like availability of ICT infrastructure in the school can also impact ICT integration in education. This study sought to explore in depth the impact all the other underlying challenges can impact the process of ICT integration in education.

2.1 ICT Integration models

Quite a number of models have been employed by various researchers to assess ICT integration in Education. This study reviewed a number of them including AIDS Model, TPACK Model and MICTIVO as discussed below.

2.1.1 AIDS Model

The AIDS model, according to Asabere, Togo and Acakpovi (2017), is an ICT integration model which aims at increasing the usage of ICT in the teaching and learning process. The model comprises mainly four (4) components, that is: Awareness, Incentives, Demand and Support Services (AIDS), as shown in Figure 1. The first stage of Awareness suggests that in a way of improving ICT usage, teachers and learners should first be made aware of its importance. Once the advantages are known, Incentives should be provided to both teachers and students as a way of encouraging them to use ICT. This motivation leads to amplified Demand in the usage of ICT in teaching, learning and research. The increased demand will eventually lead to a need for Support Services to help teachers and learners to use ICT better. By the end of the four stages, the model suggests that there will be increased usage of ICT in education. However, the model becomes hard to implement since it suggests that for it to work effectively there must be the right ICT infrastructure, yet from most of the previous research, the availability of ICT infrastructure is one of the major factors hindering ICT integration in various institutions.
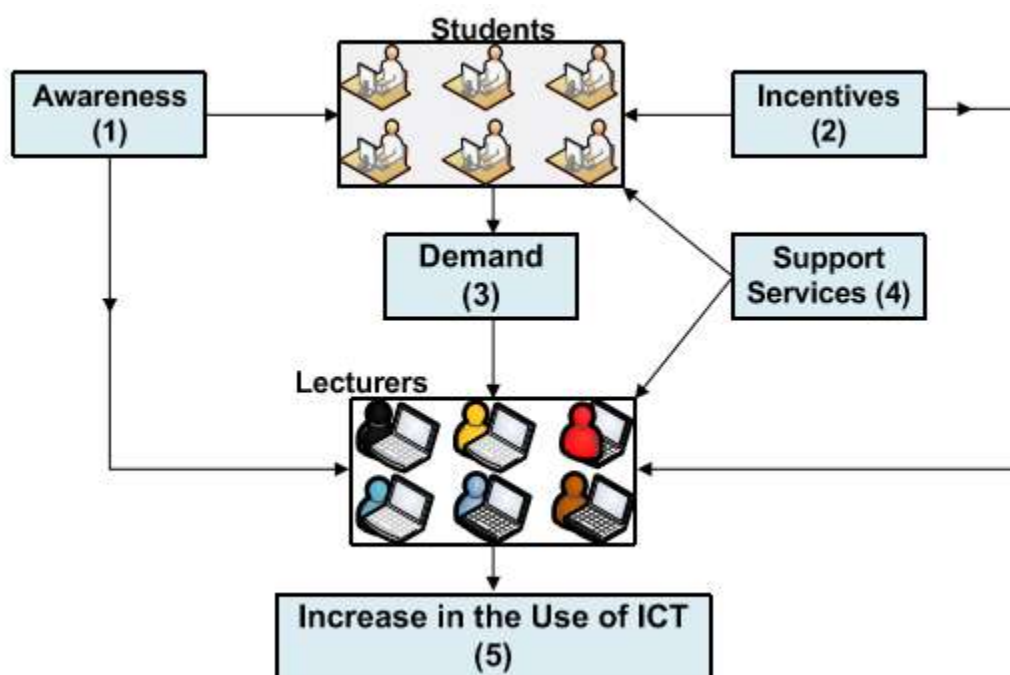
Figure 1: AIDS model adopted from Asabere et al. (2017)

2.1.2 TPACK Model

Another model is the TPACK (Technological Pedagogical Content Knowledge) Model for Technology Integration developed by Mishra and Koehler (2008). This model is aimed at thinking about all the knowledge teachers' need to acquire in order to effectively use technology during curriculum delivery (Mishra & Koehler, 2008). The diagram below summarizes the TPACK model.
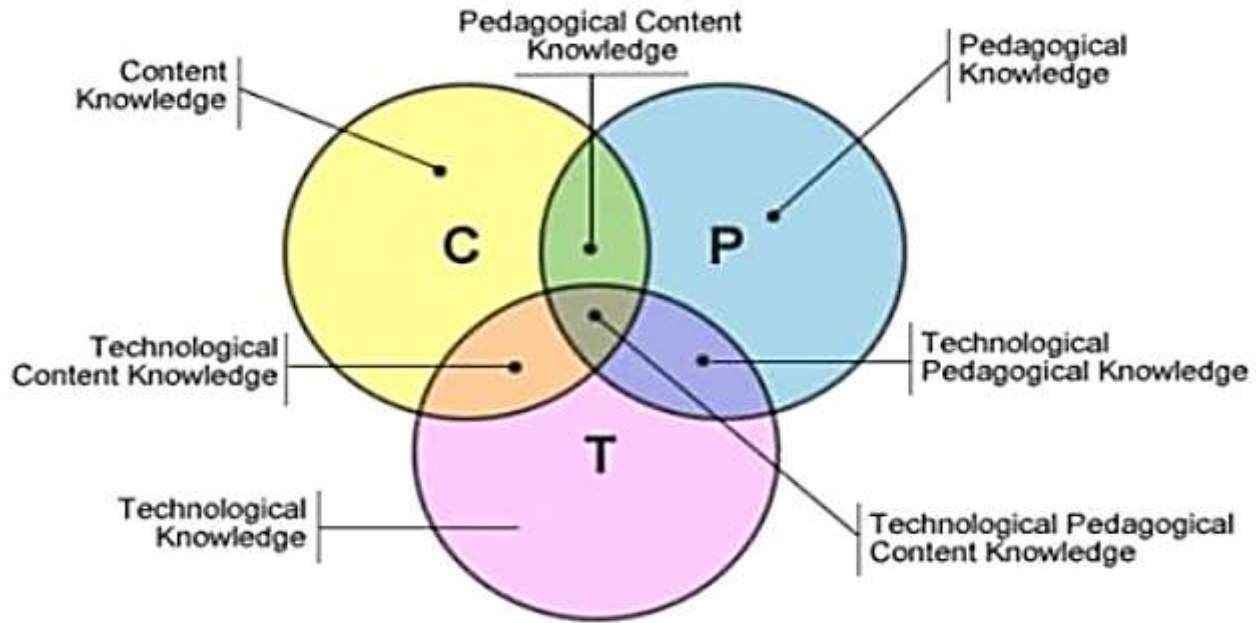
This model is mainly intended to establish how teachers can effectively develop and apply the technological, pedagogical, and content knowledge (TPACK) in the teaching process. It mainly focuses on designing and evaluating teachers' knowledge on how effectively they can use technology to effect students' learning in various areas of study. Therefore, the TPACK model is very useful in helping teachers acquire the knowledge they need in order to integrate ICT in the teaching and learning process.

This study did not adopt this integration model since it mainly focused on the teachers leaving out the learners.

2.1.3 MICTIVO model

This model was developed by the Flanders (the Dutch-speaking part of Belgium). The MICTIVO (Monitor ICT-Integratie in het Vlaamse Onderwijs) integration model comprises four main components, that is: infrastructure and policy, perceptions, competences and integration at micro-level. The model is conceived as a recurrent monitor model with emphasis on space for additional ICT-related indicators to be able to measure the latest innovations (e.g.,social media usage).

In the MICTIVO model, ICT integration can be viewed in three different ways as stated below:

a) Policy oriented: When assessing the efficiency of the available ICT policy in order to determine the culture and content of available ICT policies (Plante & Beace, 2004).

b) Technologically oriented: This view focuses on assessing the impact and uses of specific technologies (Harrison, Lunzer, Tymms, Fitz-Gibbon &Restorick, 2004).

c) Educationally oriented: The educationally oriented view assesses the extent to which ICT integration impacts methodical and content-related adaptations in education (Smeets, 2005).
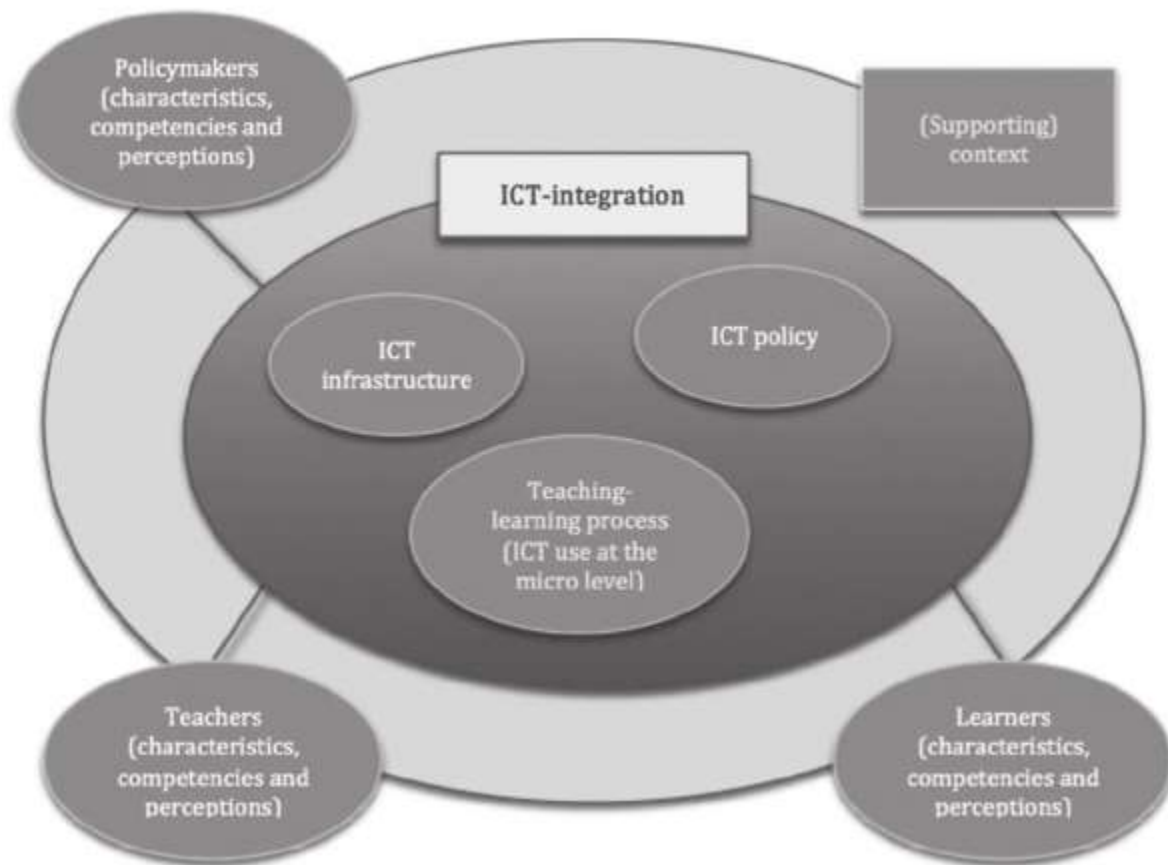
Figure 2: MICTIVO--model (Evers, Sinnaeve, Clarebout van Braak, & Elen, 2009)

Basing on the various literature reviewed, it was found out that most of the studies conducted have concluded that the available ICT infrastructure, availability of technical and administrative support are the outstanding factors that influence the way teachers use of ICT in the teaching and learning process. ICT infrastructure measures the perceived availability and suitability of the ICT tools such as hardware, software and peripheral equipment available in the school (Vanderlinde and van Braak, 2010). According to Shiue (2007), teachers in the school will always perceive greater desire to embrace the use of technology in education when they find it easier access to the necessary hardware and software resources. In a study conducted by Cowie and Jones (2015), it was reported that with the provision of ICT infrastructure, teachers were able to easily and effectively use the school network, internet and other accessories. Therefore, teachers are more likely to use technology in curriculum delivery when ICT infrastructure is provided and easier to access. However, there might be other underlying factors that the proposed study sought to identify.

Provision of technological support poses an impact on teachers' use of ICT (Moses et al., 2008), as well as their integration of ICT into the teaching-learning process (Dexter, Seashore, & Anderson, 2003). It is therefore essential to always provide the necessary guidance, support and services as constituents of the ICT applications (Haslaman, Mumcu, & Usluel, 2008). During the integration of the ICT in education, technical support is so much needed for technology use throughout curriculum delivery since the lack of it may cause difficulties and result in diminished support for the curriculum (Resta, 2002). Research studies have shown that providing technical support has a great impact in enhancing the use of laptop among educators (Dexter et al., 2003; Resta, 2002). Technical support is therefore much required in schools to facilitate the teachers to use ICT effectively in their teaching process.

Baylor and Ritchie (2012) stated that administration support is key in influencing the way teachers use technology. It appeared that the administrators, who support the actual use of technology in culture rather than in words, play a big role in making teachers accept the use of technology. It is upon this that Baylor and Ritchie (2012) concluded that if administrators were to encourage the technology culture, they should figuratively ''roll up their sleeves and join in''

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instead of sitting by the side (p. 412). It is therefore important to note that the successful integration of ICT in the teaching and learning process is largely dependent on the support teachers get from the school administrators (Samuel & Bakar, 2016). Based on the literature review, administrative support can therefore influence the success of integrating ICT into the teaching-learning process among the school teachers (Ali et al., 2009; Baylor & Ritchie, 2012; Samuel & Bakar, 2016). Therefore, administrative support is crucial in the integration of ICT in a school environment.

This study therefore, was guided by MICTIVO model of ICT integration since it captures most of the factors for the Integration of ICT in education looking at infrastructure and policy, perceptions, competences and integration at micro-level not only looking at ICT integration in curriculum development. The MICTIVO model has space for additional ICT-related indicators to be able to measure the latest innovations (e.g. Social media usage) which are currently used by teachers in teaching and learning. The model this study proposed takes into consideration some of these latest innovations that can support the integration of ICT in the teaching and learning process in secondary schools.

3.0 Methodology

3.1 Study Design

The study adopted a cross-sectional descriptive survey design to collect data at one point in time from all the selected secondary schools. The quantitative approach was the main approach while the qualitative was the complementary approach. This research design was used to identify the challenges hindering ICT integration in the teaching and learning process in secondary schools in Kigezi sub region.

3.2 Study Area and Scope

Geographical scope of the study included Kabale, Rukiga and Rukungiri districts. According to the National Census of 2014 and Uganda Bureau of Statistics (UBOS) of 2016, Kabale, Rukiga and Rukungiri districts have populations of 534,160; 104,700 and 330,700 respectively. The districts were specifically selected because most of the students at Kabale University come from these districts.

3.3 Population and Sample size

The target population included students (1943), Teachers (24), Administrators (12) and Inspector of Schools (3) selected from Kigezi Region districts of Kabale, Rukiga and Rukungiri. The six (6) schools were seected from among the top schools from which Kabale University admitted highest number of students for the different courses in different academic years. The schools represented both urban and rural setting by selecting one from town and another from rural setting in each district and a total population of 1943 was considered as shown in Table 1 below.

The sample size was determined using Yamane's formulae (1967).

$$n = \frac{N}{1+N(e^2)}$$

Where; N is the population of study; n is the sample size and e is precision level.

To ensure proper representation of the samples, randomization and stratification approaches were used. Stratification uses knowledge of the population to increase the representatives of a sample of a given population size or to get an equivalent amount of information for a small sample (Margaret, 1995). From the six (6) schools, a sample of 332 students were required to participate in the study as shown in the Table 1.

Table 1: Population and sample sizes for the respective districts

Table 1: Population and sample sizes

No	School Name	Status	District	Student Population			Total Population	Students Sample			Total Students Sample
				S2	S3	S4		S2	S3	S4	
1	St. Mary's College Rushoroza	Urban	Kabale	230	147	181	**558**	39	25	31	**95**
2	Kahondo Secondary School	Rural	Kabale	37	37	43	**117**	6	6	7	**20**
3	Queen of Apostles Academy Solidale	Urban	Rukiga	35	38	28	**101**	6	6	5	**17**
4	Kamwezi High School town	Rural	Rukiga	185	162	137	**484**	32	28	23	**83**
5	Kyamakanda Secondary School	Urban	Rukungiri	120	153	186	**459**	21	26	32	**78**
6	Bwambara Secondary School	Rural	Rukungiri	121	113	89	**323**	14	13	11	**38**
				728	650	664	**1943**	118	105	109	**332**

3.4 Sampling Methods

Kothari (2007) defines sampling as the selection of some part of an aggregate or totality on the basis of which a judgement or inference about the aggregate or totality is made. Both random (cluster and stratification) and non-random (purposive) sampling techniques were employed in the study.

3.4.1 Quantitative Sampling Technique

Cluster sampling was used where the respondents were clustered basing on the three districts. Thereafter, stratified sampling was employed in recruiting participants in the study. The population was stratified by school (rural and urban), status of school (grade 1, and seed school) and by class (senior 2, 3 and 4), and gender (male and female) in the 3 districts. We used a table of random digits to select a total of 332 students in the six (6) selected schools. Proportionate sampling was used to determine the specific number of respondents that was selected in each school per class. This ensured that the sample selected is commensurate with the school enrolment in each school.

3.4.2Qualitative Sampling Technique

Purposive sampling was used to select a total of 6 head teachers, 6 (each school had one IT technician) IT technicians, 18 IT teachers and 3 Inspector of Schools in the three districts. Inspector of Schools were selected because they oversaw inspection of Education services at District level. Head teachers were selected because they were managers of schools hence key decision makers on ICT usage in the schools. Teachers of IT and IT technicians were directly involved in the processes of teaching and learning in the schools. Hence, they would provide valuable information on the challenges associated with ICT adoption in the schools.

3.5Data Collection Instruments

Both quantitative and qualitative data collection instruments were used in the study. They included:

3.5.1 Quantitative data collection instruments

A questionnaire was used to collect data among students on ICT usage, Infrastructure, Teacher characteristics, knowledge, competences and perceptions, learners' characteristics and competences.

3.5.2 Qualitative data collection instruments

An interview guide was used to guide the researchers in conducting face-to-face interviews with key informants. It included questions related to respondents' attitudes to ICT usage, knowledge, skills and challenges affecting ICT adoption in the schools.

Observation checklist was also used to observe existing ICT infrastructure in the schools and challenges related to ICT adoption.

3.6 Data Collection Methods

The study employed both quantitative and qualitative data collection methods to enhance cross validation of data collected.

Quantitative data collection methods

Questionnaire was used to collect quantitative data related to respondents' demographic characteristics, type of ICT infrastructure in the schools, computer skills and programmes taught at the school and respondents' competences. This method enabled the researchers to collect quantitative information from a large population in a short period of time. The questionnaires were administered by trained research assistants.

3.6.1 Qualitative Data Collection Methods

Face-to-face In- depth interviews

Face-to-face in-depth interviews were used to collect descriptive qualitative data from Head teachers, Inspector of Schools, IT technicians and ICT teachersin the selected schools on type of ICT infrastructure in the schools, the Policies in Schools and administration, their attitudes on ICT adoption and challenges affecting ICT usage in the schools.

Observation Method

The observation method was used to observe the ICT infrastructure in the selected schools.

3.7: Data Analysis and Management

Quantitative and qualitative methods of data analysis were used in the study.

3.7.1 Quantitative Data Analysis

A five-point Likert scale was used in assessing the level of knowledge of participants on ICT usage. The standardized information collected from the quantitative data was processed statistically to enable this study to be generalized. The data was entered, cleaned and analysed using the Statistical Package for Social Sciences (SPSS).

For the purpose of this study, the following logistic model was used:

$Y = F (U, I, C)$ model; $\ln Y_i = \beta_o + \beta_1 \ln U_{1i} + \beta_2 \ln I_{2i} + \beta_3 \ln C_{3i} + V_i$

Where;

Y: is the ICT adoption

U: is the ICT usage

I: is the ICT infrastructure

C: is the ICT challenges

V_i = Random error term

3.7.2 Qualitative Data Analysis

Qualitative data on challenges affecting ICT adoption from Head teachers, teachers of IT and IT technicians in the school were audio recorded with consent from respondents, transcribed and responses analysed guided by the research questions. The data was coded through descriptive, concept and pattern coding. Then content and thematic analysis was used to analyse the data and present it according to themes.

3.8 Ethical Issues

It was mandatory for the investigators to adhere to the following ethical issues;

i.   Researchers obtained an introduction letter from the University to the selected secondary schools.
ii. Researcher requested for acceptance letter after submitting the introduction letters.
iii. Consent was sought from the respondents before data collection.
iv. Confidentiality of respondents was given utmost priority.
v.   Intellectual honesty.
vi. The investigators ensured security of data during and after completion of the study.

4.0 RESULTS AND DISCUSSION

Data was collected from the three districts and a total of 332 questionnaires were distributed. A total of 233 questionnaires were returned and relevant to be used for analysis. This represented a return rate of 70.2% which was good enough for analysis.

4.1 Reliability of the Instrument

Reliability is the extent to which an instrument generates consistent results over time (Creswell, 2018). The researcher tested the instrument on 233 students' responses, the results of which was analysed in SPSS Ver. 23. From reliability test, Cronbach alpha values were attained with average reliability test of 0.73 obtained, and considered reliable if their alpha values are 0.7 and above, which has also been used in earlier studies, and recommended (Mugenda & Mugenda, 2013).

The table2 below shows the summary of the reliability test as generated from SPSS.

Table 2: Reliability Tests

No	Question Category	Reliability Test
1	How is ICT taught to classes in your school?	0.70
2	How have you used ICT during your learning?	0.84
3	Infrastructure	0.78
4	ICT Infrastructure Challenges	0.77
5	Students (Characteristics, Competences and Perceptions)	0.58
6	Supporting Context	0.55
7	Skills Evaluation	0.90
	Average	**0.73**

4.2 Demographic Characteristics

District

The study sought responses from secondary school students selected from 6 schools in three districts of Kigezi region.
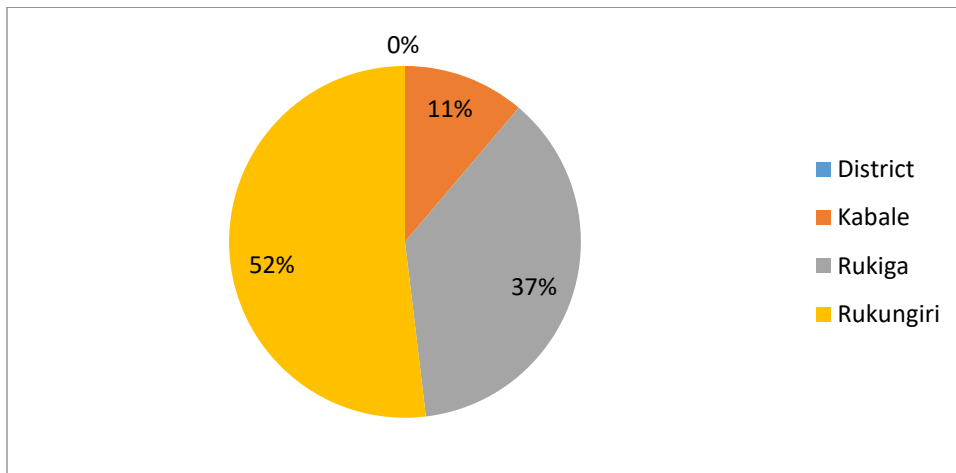
Figure 3 : Districts

From Figure 3 above, the largest number of the responses were collected from Rukungiri District with 52%, followed by Rukiga (37%) and the least responses from Kabale District with 11% of the respondents.

Location

The study was carried out using schools from both the rural and urban settings.
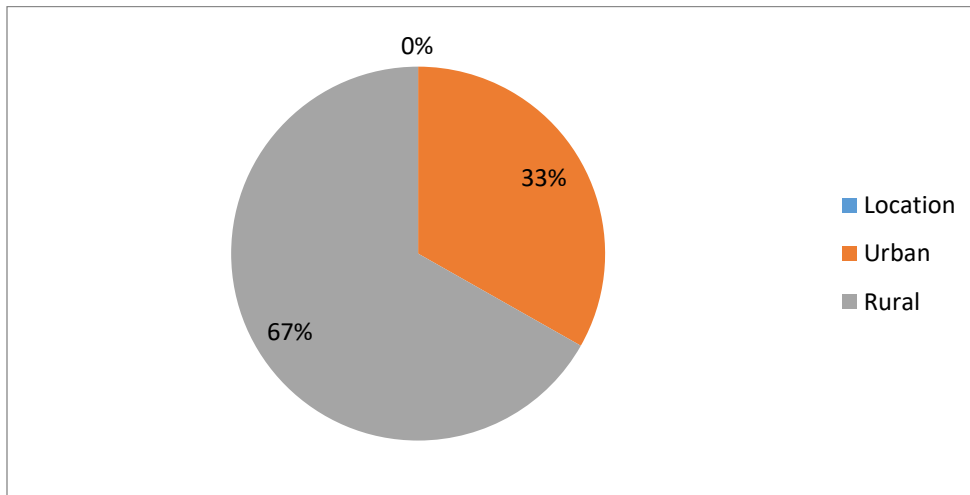
Figure 4: Location

As shown in Figure 4 above, most of the respondents were from Rural schools, contributing 67% of the respondents, and 33% of the respondents were from the Urban schools.

Classes

The study considered students from three classes in the selected schools as shown in Figure 5 below.
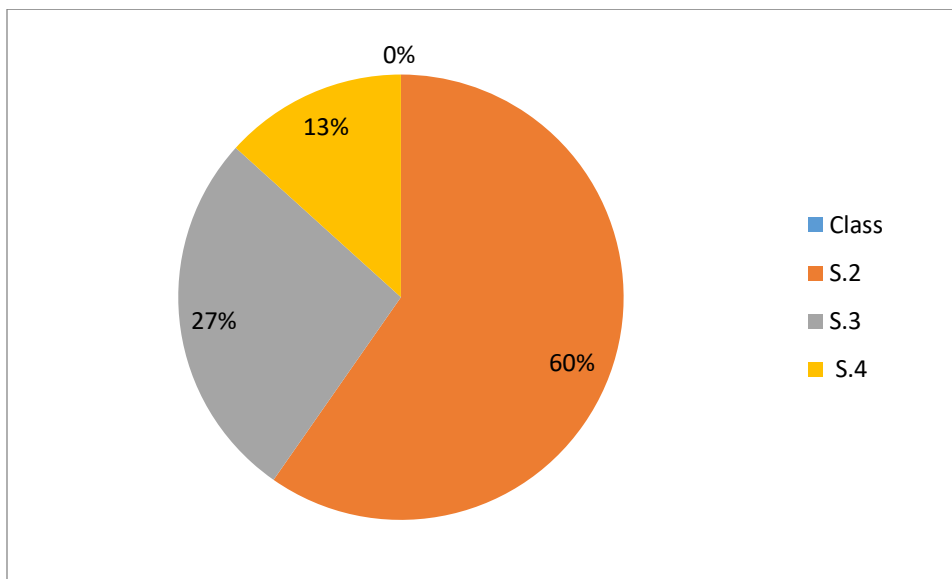
Figure 5: Classes

Figure 5 above shows that most of the respondents were from Senior Two (S.2), constituting 60%, followed by Senior Three (S.3) with 27%, and the least responses were from Senior Four (S.4), constituting 13%.

Gender

The number of respondents in terms of gender is as shown in Figure 6 below.
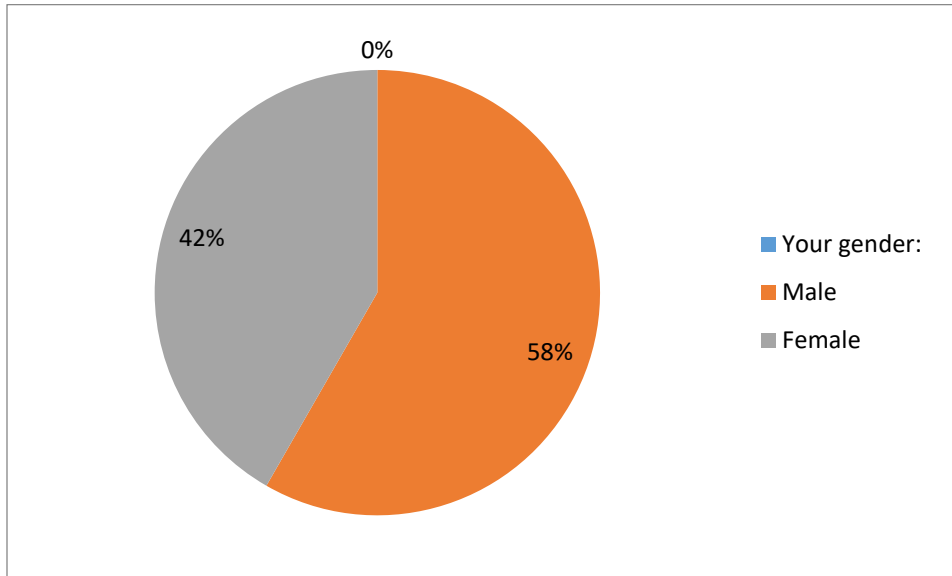
Figure 6: Gender

In terms of Gender, 58% were male and 42% female as shown in Figure 6 above. This has an indirect meaning that in these three districts, boy students in schools are more than girls in schools.

4.3. How is ICT Taught in Classes

Table 3 below shows that ICT was taught as a separate subject with 79.4% of the respondents confirming while 20.6% said ICT was not taught as a separate subject. It could thus be concluded that most schools taught ICT as a separate subject while some did not teach ICT as separate subject.

The respondents also confirmed that ICT was not integrated in several subjects (57.5%) while 42.5% said that ICT was integrated in several subjects. This was because some schools integrated ICT in several subjects while others did not. But the majority did not integrate ICT in several subjects.

It was also reported that 68.5% of the respondents did not accept that ICT was integrated in subject because of curriculum requirements; only 31.5% confirmed that ICT was integrated in subject because of curriculum requirements.

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Respondents did not accept (77.5%) that ICT was integrated in subjects because they asked teachers to do so while 22.5% accepted that ICT was integrated in subjects because they asked teachers to do so

Table 3: How ICT taught is in classes

	How is ICT taught to classes in your school?	Yes (%)	No (%)
1	ICT is taught as a separate subject	79.4	20.6
2	ICT is integrated in several subjects	42.5	57.5
3	ICT is integrated in my subject because of curriculum requirements	31.5	68.5
4	ICT is integrated in my subject because I ask my teacher to do so	22.5	77.5

4.4 Objective 1: Usage of ICT in the Teaching and Learning Process

As shown in Table 4 below, the most appearing response was Never (Mode of 1), with the majority of the respondents reporting they had never used ICT in the teaching and learning process except where sometime (36.8%) students used ICT to work on exercises and other tasks as indicated: Download homework uploaded by teacher on the school website (94.3%); Download/download/browse material from the school's website (85.9%);Create your own digital learning materials (81.6%); Use ICT to provide feedback and/or assess teachers' teaching (77.1%); To answer an online work or assignment (75.1%); Download/download/browse material from a learning platform (71.6%); Evaluate digital learning resources in the subject(s) you learn (70.9%); To make presentation slides (69.4%),Use applications to aid your learning process (64.1%); To monitor and evaluate your progress or performance(61.1%),Look for online professional development opportunities (58.9%); Browse/search the internet to collect information which you can use to understand concepts better (58.4%); To learn in class (47.6%) and Communicate online with your colleagues (47.4%).

Table 4: USAGE OF ICTs IN THE TEACHING AND LEARNING PROCESS

	How have you used ICT during your learning?	Never	Rarely	Sometimes	Often	Mode
1	Download homework uploaded by teacher on the school website	94.3	4.4	0.9	0.4	1
2	Download/download/browse material from the school's website	85.9	5.3	6.2	2.6	1
3	Create your own digital learning materials	81.6	8.8	8.8	9.0	1
4	Use ICT to provide feedback and/or assess teachers' teaching	77.1	15.6	4.8	2.6	1
5	To answer an online work or assignment	75.1	14.0	6.1	4.8	1
6	Download/download/browse material from a learning platform	71.6	9.1	15.9	3.4	1
7	Evaluate digital learning resources in the subject(s) you learn	70.9	18.9	7.9	2.2	1
8	To make presentation slides	69.4	12.1	9.9	8.6	1
9	Use applications to aid your learning process	64.1	14.7	15.2	6.1	1
10	To monitor and evaluate your progress or performance	61.1	11.8	17.0	10.0	1
11	Look for online professional development opportunities	58.9	18.6	16.5	6.1	1
12	Browse/search the internet to collect information which you can use to understand concepts better	58.4	13.9	23.8	3.9	1
13	To learn in class	47.6	12.1	10.0	30.3	1
14	Communicate online with your colleagues	47.4	23.7	17.5	11.4	1
15	Work on exercises and other tasks	36.0	15.4	36.8	11.8	3

In summary, most of the respondents had never used ICT during the teaching and learning process for: Downloading homework uploaded by teacher on the school website; Downloading material from the school's website; Creating their own digital learning materials; Using ICT to provide feedback and/or assess teachers' teaching; Answering online work or assignment; Evaluating digital learning resources in the subject(s) you learn; Making presentation slide;, Using applications to aid their learning/Teaching process; Monitoring and evaluating progress or performance; Looking for online professional development opportunities ,Communicating online with colleagues; and Working on other tasks as reflected in Table 2 above by the average mode

of 1[Never]. These are in line with findings that showed that most teachers in schools did not undergo professional ICT training and therefore did not exhibit the necessary ICT skills (Ndawula, Kahuma and Mwebembezi, 2013).

This finding was supported by qualitative finding from one of the staff during interviews.

"I have personally never used ICT to prepare for my class, give exercises to my students, provides feedback to my students, and to make a presentation in class. On rare scenarios; I have used ICT to search the internet for teaching materials and to keep students marks".

4.5 Objective 2: ICT Infrastructures Currently Available

Table 5 below shows that majority of the respondents reported that most of the ICT infrastructure were not available, for example: Mobile phone provided by the school (97.4%); E-reader(a device to read books and newspapers on screen) (93.9%); Interactive whiteboard (93.1%); Digital camera or camcorder(87.9%); Non-internet-connected laptop, tablet PC, netbook or notebook computer (84.8%); Internet-connected laptop, tablet PC, netbook or notebook computer (84.4%); Scanner (79.2%); Desktop computer with internet access (67.0%);Projector (63.4%).

However, regarding computers for students, 44.2% of the respondents reported that they were available but insufficient; Computer laboratory: 28.4% reported that they were very Insufficient; and, Printing/Photocopying Facilities: 29.7% said that they were very Insufficient though available. This means that most of the schools lacked the ICT facilities though some had ICT facilities, e.g. 20.7% reported that they had sufficient Computer laboratory; Projectors (13.4%) and Printing/Photocopying Facilities (13.4%).

Table 5: ICT INFRASTRUCTURES CURRENTLY AVAILABLE

	Infrastructure	Not Available	Very Insufficient	Insufficient	Sufficient	Mode
1	Mobile phone provided by the school	97.4	1.7	0.4	0.4	1
2	E-reader (a device to read books and newspapers on screen)	93.9	1.7	3.5	0.9	1
3	Interactive whiteboard	93.1	3.5	2.6	0.9	1
4	Digital camera or camcorder	87.9	7.3	3.4	1.3	1
5	Non-internet-connected laptop, tablet PC, netbook or notebook computer	84.8	5.7	7.0	2.6	1
6	Internet-connected laptop, tablet PC, netbook or notebook computer	84.4	8.7	3.5	3.5	1
7	Scanner	79.2	6.9	8.7	5.2	1
8	Desktop computer with internet access	67.0	22.2	6.1	4.8	1
9	Projectors	63.4	10.3	12.9	13.4	1
10	Desktop computer without internet access	41.7	28.3	27.8	2.2	1
11	Printing/Photocopying Facilities	29.3	29.7	27.6	13.4	2
12	Computer laboratory	25.4	28.4	25.4	20.7	2
13	Computers for students	22.3	27.5	44.2	6.0	3

In summary, the results showed that most schools, especially in the rural setting, lacked ICT equipment and infrastructure such as: Mobile phone provided by the school; E-reader (a device to read books and newspapers on screen); Interactive whiteboard, Digital camera or camcorder, on-internet-connected laptop, tablet PC, netbook or notebook computer ,Internet-connected laptop, tablet PC, netbook or notebook computer, Scanner, Desktop computer with internet access, Projectors, Desktop computer without internet access; Printing/Photocopying Facilities, Computer laboratory, and Computers for students as evidenced in Table 3 above with average mode of 1 [Not available]. This is in line with the findings that most schools lacked Computers, Printers, Scanners, Photocopy (Ndawula, Kahuma and Mwebembezi, 2013).

However, Schools in Urban setting had some of the equipment and infrastructure but not sufficient. For example, most schools had a few desktop computers with Internet connection.

This finding was supported by qualitative findings from the ICT staff during interviews at an urban school.

"The school management has tried to procure a few computers, a photocopier, printer and scanner. Two computers in the computer laboratory are connected to the Internet."

A teacher from a rural school said:

"Our school does not have a computer laboratory, projectors, scanners, photocopiers and no Internet connection."

4.6 Objective 3: Challenges Faced in Integrating ICT

A. ICT Infrastructure Challenges

Table 6 below shows which infrastructural challenges affected integrating ICT teaching and learning and from the majority of respondents agreed that the entire ICT infrastructure affected them a lot (Mode of 4). For example: Insufficient number of interactive whiteboards (58.8%); Insufficient Internet bandwidth or speed (57.1%); Insufficient number of internet connected computers (55.7%); Insufficient number of laptops/notebooks (50.9%); Insufficient number of computers (50.6%); School computers out-of-date and/or needing repair (47.8%); Lack of stable power connection (41.5%). This means that for the majority of schools, ICT infrastructure was hindering them in integrating ICT in Teaching and Learning.

Table 6: ICT Infrastructure Challenges

	ICT Infrastructure	Not at All	A little	Partially	A lot	Mode
1	Insufficient number of interactive whiteboards	23.2	5.2	12.9	58.8	4
2	Insufficient Internet bandwidth or speed	18.2	8.2	16.5	57.1	4.0
3	Insufficient number of internet connected computers	15.7	12.6	16.1	55.7	4
4	Insufficient number of laptops/notebooks	20.9	11.3	17.0	50.9	4
5	Insufficient number of computers	2.6	26.6	20.2	50.6	4
6	School computers out of date and/or needing repair	16.1	20.0	16.1	47.8	4
	Lack of stable power connection	9.4	26.3	22.8	41.5	4

B. Students' (Characteristics, Competences and Perceptions)

Table 7 below shows that the response mode was 4, meaning that the majority of the responses on Students (Characteristics, Competences and Perceptions) were that they affected them a lot. For example: Lack of adequate content/material for learning (55.2%); Lack of adequate ICT skills (52.8%); Lack of models on how to use ICT for learning (40.5%);Most students not in favour of the use of ICT at school (39.2%), No or unclear benefit to use ICT for learning (37.3%); Lack of interest of students (36.4%). However, 29.3% of the respondents reported that most students not in favour of the use of ICT at school did not affect integration of ICT in Teaching and learning.

Table 7: Students (Characteristics, Competences and Perceptions)

No	Students (Characteristics, Competences and Perceptions)	Not at All	A little	Partially	A lot	Mode
1	Lack of adequate content/material for learning	5.2	20.7	19.0	55.2	4
2	Lack of adequate ICT skills	8.7	18.2	20.3	52.8	4
3	Lack of models on how to use ICT for learning	4.3	32.8	22.4	40.5	4
4	Most students not in favor of the use of ICT at school	21.6	22.8	16.4	39.2	4
5	No or unclear benefit to use ICT for learning	29.3	19.1	14.2	37.3	4
6	Lack of interest of students	30.7	21.1	11.8	36.4	4

C. Supporting Context

Table 8 shows that the mode of the responses was 4, meaning that the majority of the respondents accepted that Insufficient technical support for students and Lack of refresher training in ICT affected them a lot. For example, 51.3% agreed that insufficient technical support for students affected them a lot while 54.1% also agreed that Lack of refresher training in ICT affected them a lot. This means there is need of Continuous refresher trainings in ICT and technical support for students in secondary schools. These are in agreement with the findings of Resta (2002) who noted that during the integration of the ICT in education,, technical support is so much needed for technology use throughout curriculum delivery since the lack of it may cause difficulties and result in diminished support for the curriculum.

Table 8: Supporting Context

No	Supporting Context	Not at All	A little	Partially	A lot	Mode
1	Insufficient technical support for students	14.2	22	12.5	51.3	4
2	Lack of refresher training in ICT	9.2	18.8	17.9	54.1	4

4.7: Skills Evaluation

Table 9 below evaluated the extent to which students were confident in the different skill sets. The results showed that the majority of the respondents did not possess ICT skills with mode response of 1, meaning none of the skills except Producing a text using a word processing Programme where students had little confidence. For example, respondents reported that they possessed none of the following skills: Create and maintain blogs or web sites (68.4%); Download or upload curriculum resources from/to websites or learning platforms for students to use (68.0%); Edit text online containing internet links and images (65.1%); Download and instal software on a computer (57.6%); Create a presentation with video or audio clips (57.3%); Participate in a discussion forum on the internet (56.7%); Create and/or edit a questionnaire online (56.1%); Use a spreadsheet to plot a graph (55.7%); Create a presentation with simple animation functions (55.0%); Capture and edit digital photos, movies or other images (54.1%); Email a file to someone (54.1%); Create a database (52.8%), Use emails to communicate with others (49.4%); Participate in social networks (47.6%);Use a spreadsheet (e.g., Excel) (45.5%); and Organize computer files in folders and subfolders (44.1%).

Table 9: Skills Evaluation

No	To what extent are you confident in the following? *	None	A little	Somewhat	A lot	Mode
1	Create and maintain blogs or web sites	68.4	11.7	6.5	13.4	1
2	Download or upload curriculum resources from/to websites or learning platforms for students to use	68.0	11.7	5.6	14.7	1
3	Edit text online containing internet links and images	65.1	14.2	4.3	16.4	1
4	Download and instal software on a computer	57.6	15.7	9.2	17.5	1
5	Create a presentation with video or audio clips	57.3	16.4	11.2	15.1	1
6	Participate in a discussion forum on the internet	56.7	18.6	9.5	15.2	1
7	Create and/or edit a questionnaire online	56.1	23.0	6.5	14.3	1
8	Use a spreadsheet to plot a graph	55.7	19.6	7.0	17.8	1
9	Create a presentation with simple animation functions	55.0	13.4	11.3	20.3	1
10	Capture and edit digital photos, movies or other images	54.1	19.7	7.4	18.8	1
11	Email a file to someone	54.1	27.7	6.9	11.3	1
12	Create a database	52.8	21.5	6.4	19.3	1
13	Use emails to communicate with others	49.4	22.7	15.9	12	1
14	Participate in social networks	47.6	29.1	7.9	15.4	1
15	Use a spreadsheet (e.g., Excel)	45.5	26.8	10.0	17.7	1
16	Organize computer files in folders and subfolders	44.1	27.5	7.9	20.5	1
17	Produce a text using a word processing Programme	30.0	32.6	18.5	18.9	2

In summary, the respondents were not confident in: Creating and maintaining blogs or web sites; Downloading or uploading curriculum resources from/to websites or learning platforms for students to use; Editing text online containing internet links and images; Downloading and installing software on a computer; Creating a presentation with video or audio clips; Participating in a discussion forum on the internet; Creating and/or editing a questionnaire online; Using a spreadsheet to plot a graph; Creating a presentation with simple animation functions; Capturing and editing digital photos, movies or other images; Emailing a file to someone; Creating a database; Using emails to communicate with others; Participating in social networks; Using a spreadsheet (e.g., Excel); Organizing computer files in folders and subfolders; Producing a text and using a Word processing Programme as represented by the average mode of

[None].This is in line with the findings of Ihmeideh (2009) and Tapan (2009) who noted that 'Teachers' lack of knowledge and skills' is one of the main hindrances in the use of ICT in education.

This finding was supported by qualitative findings from the ICT staff during interviews:

> *"Most of the teachers lack ICT skills that can enable them effectively integrate usage of ICT in the teaching and learning process for example most of us can not create presentation with simple animation functions, participation in live online discussions, however; a good number of teachers have some skills in using word processors, using emails, using excel and to teach students online if resources are available."*

4.8: Objective 4: Model Development

We proposed two models.

(1) Logistic regression model for the association of Location, Type of School, Year of Existence, Students' Classes and Gender on the adoption of ICT

The first model estimates the association of Location, Type of School, Year of Existence, Students' Classes and Gender on the adoption of ICT among secondary school students in Kigezi region using binary logistic regression model.

Table 10: Logistic regression model for the association of Location,

Variable	Model
Dependent Variable	**ICT Adoption**
Independent Variables	
Location (Urban)	$1.383^{*}(0.001)$
(Rural)	
Class (S2)	2.313(0.753)
(S3)	2.015(0.092)

(S4) (S1)	1.185(0.049)
Year of Existence (Above 15 Years) (Less than 15 Years)	1.185(0.002)
Gender (Male) (Female)	1.008(0.161)
Number of Respondents	233
Pseudo R^2	0.453
Prob $>$ chi^2	0.001

The coefficients before the brackets are the adjusted odds ratio (AOR). AOR >1 means that the event (success) is more likely to occur in the first group. This analysis tested the association of Location, Type of School, Year of Existence, Students' Classes and Gender on ICT adoption among secondary school students in Kigezi region. From the model, the intercept / constant is the expected mean value of ICT adoption when all independent variables are zero. The results in Table 8 indicate that the likelihood of adopting ICT was higher among students in Urban secondary schools (AOR=1.383; p_value=0.001) and the result was significant. Also, students in S2 were more likely to adopt ICT (AOR=2.313, p_value=0.753), followed by students in S3 (2.015, p_value=0.092), followed by students in S4 (AOR=1.185, p_value=0.049), but the result was not significant. Students in secondary schools that were founded and in existence for above fifteen (15) years were more likely to adopt ICT (AOR=1.185, p_value=0.002) compared with those students who attended secondary schools in existence for less than fifteen (15) years, and the result was significant. ICT adoption was approximately equal for both genders. The likelihood ratio (LR) chi-square of 45.3 with a p-value of 0.001 told us that our model fitted significantly. Therefore, location of the schools and the year of existence were found to be significant while class and gender were found to be insignificant to ICT adoption in secondary schools in Kigezi region.

(2) Multiple Regression Model

The second model is a multiple regression model and it is described as follows:

$$Y = \beta_0 + \beta_1 U + \beta_2 I + \beta_3 C + \varepsilon_i$$

Where;

Y: is the ICT adoption

U: is the ICT usage

I: is the ICT infrastructure

C: is the ICT challenges

V_i = Random error term

Table 11: Regression Analysis 2

Variables Regressed	Adjusted R^2	Standard Error	F-value	Sig.	Interpretation	Decision on H_o
ICT Adoption Vs ICT usage, ICT infrastructure, ICT challenges	0.406	0.5819	37.435	0.000	Significant effect	Rejected
Coefficients	**Beta**	**Standard Error**	**t-value**	**Sig.**		
(Constant)	1.928	0.446	4.322	0.000	Significant Effect	Rejected
ICT usage	0.490	0.142	3.449	0.001	Significant Effect	Rejected
ICT infrastructure	-0.250	0.058	-0.420	0.675	No Significant Effect	Not Rejected
ICT challenges	-0.343	0.056	-6.090	0.000	Significant Effect	Rejected

Results in Table 10 indicate the multiple regression analysis carried out to model the ICT Adoption on ICT usage, ICT infrastructure and ICT challenges. The results showed that ICT usage, ICT infrastructure, ICT challenges accounted for a total of 40.6% improvement on ICT adoption in secondary schools in Kigezi region. The results further indicated that both ICT usage

(β= 0.490, Sig=0.001) and ICT challenges by students (β= -0.343, Sig=0.000) were significant while availability of ICT infrastructures had no significant effect (β=-0.250, Sig=0.675). The students' ICT usage had a positive impact on their learning and, therefore, this increased their level of adoption of ICT in the schools. However, availability of ICT infrastructures was negative, implying that there was no adequate provision in these schools; although this inadequate provision was not significant, implying that it did not affect students and did not discourage them from adopting ICT in their learning. This could be due to the students having their own smart phones and laptops at home. Finally, ICT challenges by the students in secondary schools in Kigezi region contributed negatively and it was significant.

The model for estimation was given as:

$$\hat{Y} = 1.928 + 0.490U - 0.25I - 0.343C$$

5.0 Conclusions and Recommendations

The findings from this study formed a report which can help in improving the community engagement services provided by the Faculty of Computing, Library and Information Services, the Department of Information Technology and IT in particular by using their expertise and skills in ICT to help teachers use ICT to foster better education. This can also help the Faculty of Education to start refresher courses, for example, ICT usage in Teacher Training. For successful execution of the recommendation, there is expected to be improved relationship between Kabale University and the neighbouring communities through community outreaches tailored on ICT skills acquisition. The relevance of the University in solving community problems is expected to improve greatly as well since the University can organize community outreaches aimed at acquisition of ICT skills by the Teachers.

5.1: Conclusion

In view of the study findings, the following conclusions were made.

i.   In terms of how ICT is used during Teaching and Learning, most teachers and students cannot download/upload homework; create their own digital learning/teaching materials; use ICT to provide feedback; attempt online work or assignment; evaluate digital learning resources; make presentation slides and communicate online with colleagues.

ii. The ICT Infrastructure, for example computers, computer Laboratory, photocopiers, printers, among others, were not sufficient in most urban schools and were not available in the rural schools.

iii. The following were identified as the major challenges hindering Integration of ICT in Teaching and Learning process: Lack of adequate ICT Infrastructure; Lack of ICT Skills and Competences; and Lack of Technical Support for both students and Teachers.

iv. The model shows that location of the schools and the year of existence were found to be significant while class and gender were found to be insignificant to ICT adoption in

secondary schools in Kigezi region. It was also noted that the students' ICT usage had a positive impact on their learning and, therefore, this would increase their level of adoption of ICT in the schools.

5.2: Recommendations

In view of the study findings, the following recommendations were made.

i. Government and stakeholders should provide ICT Infrastructure to schools.

ii. Recruit qualified computer teachers with the required ICT skills.

iii. Recruit computer laboratory technicians to provide the necessary technical support to teachers.

iv. The University should undertake continuous retooling of both students and staff through community outreaches.

v. Encourage ICT usage at home so that students can replicate its usage at school.

vi. The Faculty of Education should incorporate ICT in the curriculum courses to help teachers acquire the required ICT skills while still at the University

9.0 Staffing

SN	NAME	Qualification	Status	RESPONSIBILITY
1	Dr. Businge Phelix Mbabazi	Ph.D. MSc-IS, BCI, MCSA, CCNA, HCIA, HETC	Principal Investigator	Questionnaire formulation , Data coding and Analysis, report writing
2	Dr. Nafiu Lukman Abiodun	PhD (Statistics); MSc. (Statistics); BSc. Mathematics	Investigator	Questionnaire formulation, Data coding and Analysis
	Supporting Staff Members			
3	Mr. Micheal Tamale	Msc. CS, BSC	Investigator	Questionnaire formulation , Data coding and Analysis
4	Mr. Benjamin Ahimbisibwe	Ph.D. Info. Systems (Student), Msc.Info. Science(MAK), BLIS (MAK), PGDISM(UMI)	Investigator	Pre testing of the Questionnaire and Data collection from the various stake holders

10.0 Budget Proposed for Funding

Table 13: Budget

SN	ACTIVITY	QTIES.	DURATION	UNIT COST	TOTAL COST
1	Research Ethics Approval	1		$300 (UGX 1100,000)	1,100,000
	Transport to Mbarara	1		100000	100,000
	Per diem	2	3	120000	720,000
2	**Writing Materials**				
	Printing paper	10 Reams	-	20, 000	200,000
	Cartridge	5		50,000	250,000
	Writing pads	10	-	2,000	20,000
	Ball point pens	1 packet	-	120,000	120,000
3	**Training of research assistants**				
	Training Research Assistants	1	1 Day	Venue UGX 100,000 a day	100,000
				Transport refund for 2 trainers UGX 30,000 a day	60,000
				Transport refund for 6 trainees UGX 30,000 a day	180,000
				Meals for 8 people UGX 25,000 per person	200,000
4	**Piloting of research instruments/tools**				
	Research Instrument formulation Formulation	4	2	Development of the questionnaire meeting for 2 days UGX 120000 per day	960,000
	Virtual meetings- subscription-	4	1	1 meeting for 4 members each cost of 120000	480,000
	Pre Visit of schools	2	2	3 Investigators visiting the 2 schools for 2 day at 120,000	720,000
5	**Data collection**				
	Data Collection in 6 schools	6	5 days	6 people in school Transport UGX 30,000	900,000
				Per Diem for 3 Research Assistants at 120,000	1,800,000
				Fees for local contact person UGX 50,000 for 1 at each school	250,000

				Per Diem for 3 Investigators	1,800,000
	Communication and Internet	4	5	4 Members facilitated at a rate of 20,000 for 5 days	400,000
6	Covid-19 SoPs for the entire process	1	1	Sanitize and Masks for data collection , analysis and dissemination	480,000
Phase 1 Sub Total					**10,840,000**
7	**Data processing**				
	Data Coding (Pretesting and final data collection)	3	2	Each member facilitated with 120,000	720,000
8	Data analysis(Qualitative)	2 People	5 days	Facilitation of 120,000	1,200,000
9	Data analysis(Quantitative)	2 People	5 days	Facilitation of 120,000	1,200,000
10	**Dissemination**				
	Payment for publication	1	1	1,000,000	1,000,000
	Dissemination meetings	80	1	20,000	1,600,000
11	**Writing, editing and producing final report**				
	Writing, editing and producing final report	4 People	3	Facilitation of 120,000	1,440,000
Phase 2 Sub Total					**7,160,000**
	Total				**18,000,000**

11.0 Work plan

Table 14: Work plan

No	Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	38	39	40
1	Pre Visit of Schools	■	■	■	■	■																																		
2	Research Instruments formulation			■	■	■	■	■																																
3	Training of research assistants								■																															
4	Pre testing of the Instruments									■	■	■	■	■																										
5	Data collection from the various stake holders														■	■	■	■	■																					
6	Data Coding and Entry																			■	■	■	■	■																
7	Data Analysis																								■	■	■	■	■											
8	Final report writing																													■	■	■	■	■	■	■	■	■	■	
9	Report Dissemination Workshop																																							■

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QUESTIONNAIRE FOR STUDENTS

Dear Sir/ Madam,

RE: **A QUESTIONNAIRE ON** ICT ADOPTION

Dear respondent, I am investigating the **Adoption of ICT in Teaching and Learning in Secondary Schools in Kigezi Region**.

Findings from this research will be used to enable Kabale University take lead in solving the problems hindering integration of ICT in the teaching and learning process in secondary schools in Kigezi region hence, facilitate the integration of ICT in the teaching and learning process by both teachers and students in these schools.

I therefore kindly request you to participate in this research by freely and honestly responding to the following questionnaire on the basis of your personal experience. Unless for your personal reasons wish to indicate your names, the questionnaire is anonymous. The questionnaire does not require your names. Your information will be confidential and will be used for academic purposes only.

Please return the questionnaire at your earliest convenience.

Thank you very much for your anticipated participation.

Yours faithfully,

Businge Phelix Mbabazi
0782823607
Email: mphelixx@gmail.com

Tick (√) the appropriate corresponding answer.

1) District   1) Kabale   2) Rukiga   3) Rukungiri

2) Location   1) Urban   2) Rural

3) Type of School   1) Private   2) Public

4) School Existence   1) Below 5 Years   2) 5-10 Years   3) 11-15 Years,   4) Above 15 Years

5) Class   1) S.2   2) S.3   3) S.4

6) Gender: 1) Male   2) Female

	How is ICT taught in your school?	Yes	No			
1	ICT is taught as a separate subject					
2	ICT is integrated in my subject because I ask					

	my teacher to do so					
3	ICT is integrated in my subject because of curriculum requirements					
4	ICT is integrated in several subjects					
No	**How have you used ICT during your learning?**	Never	Rarely	Sometimes	Often	
1	Browse/search the internet to collect information which you can use to understand concepts better					
3	Use applications to aid your learning process					
4	Create your own digital learning materials					
5	Work on exercises and other tasks					
6	Download homework uploaded by teacher on the school website					
7	Use ICT to provide feedback and/or assess teachers' teaching					
8	Evaluate digital learning resources in the subject(s) you learn					
9	Communicate online with your colleagues					
10	Download/download/browse material from the school's website					
11	Download/download/browse material from a learning platform					
14	To monitor and evaluate your progress or performance					
15	To make presentation slides					
16	To answer an online work or assignment					
18	To learn in class					
19	Look for online professional development opportunities					
20	Any other					
A	**Which of the following does your school provide for use to enable you use ICT during learning?**	Not Available	Very Insufficient	Insufficient	Sufficient	
1	Computers for students					
2	Desktop computer without internet access					
3	Desktop computer with internet access					
4	Non-internet-connected laptop, tablet PC, netbook or notebook computer					
5	Internet-connected laptop, tablet PC, netbook or notebook computer					
6	E-reader (a device to read books and newspapers on screen)					
7	Mobile phone provided by the school					
8	Interactive whiteboard					
9	Digital camera or camcorder					

10	Computer laboratory				
11	Printing/Photocopying Facilities				
12	Scanner				
13	Projectors				
14	Any other				
Please rate how the following factors affect the use of ICT during your learning process.					
A	**ICT Infrastructure**	Not at All	A little	Partially	A lot
1	Insufficient number of computers				
2	Insufficient number of internet connected computers				
3	Insufficient Internet bandwidth or speed				
4	Insufficient number of interactive whiteboards				
5	Insufficient number of laptops/notebooks				
6	School computers out of date and/or needing repair				
	Lack of stable power connection				
B	**Students (Characteristics, Competencies and Perceptions)**	Not at All	A little	Partially	A lot
1	Lack of adequate ICT skills				
2	Lack of adequate content/material for learning				
3	Lack of models on how to use ICT for learning				
4	Most students not in favour of the use of ICT at school				
5	Lack of interest of students				
6	No or unclear benefit to use ICT for learning				
C	**Supporting Context**	None	A little	Somewhat	A lot
8	Insufficient technical support for students				
11	Lack of refresher trainings in ICT				
	Skills Evaluation				
	To what extent are you confident in the following aspects of ICT? *	None	A little	Somewhat	A lot
1	Produce a text using a word processing programme				
2	Use emails to communicate with others				
3	Capture and edit digital photos, movies or other images				
4	Edit text online containing internet links and images				
5	Create a database				
6	Create and/or edit a questionnaire online				

7	Email a file to someone					
8	Organize computer files in folders and subfolders					
9	Use a spreadsheet (e.g., Excel)					
10	Use a spreadsheet to plot a graph					
11	Create a presentation with simple animation functions					
12	Create a presentation with video or audio clips					
13	Participate in a discussion forum on the internet					
14	Create and maintain blogs or web sites					
15	Participate in social networks					
16	Download and install software on a computer					
17	Download or upload curriculum resources from/to websites or learning platforms for students to use					
18	Any other					

INTERVIEW GUIDE FOR TEACHERS

1. Do you own any of the following computing devices
2. How is ICT taught to in your school?
3. How have you used ICT during your teaching?
4. Which ICT infrastructure is available for your access when using ICT in your teaching process?
5. **Which challenges hinder your teaching and learning using ICT?**
   a. Infrastructural
   b. Technical
   c. Administrative

6. Which ICT skills do you possess?