

**ICT TEACHING AND LEARNING OF BIOLOGY IN SECONDARY SCHOOLS IN KISORO
DISTRICT: A CASE STUDY OF MUTORERE SECONDARY**

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ABSTRACT

The major objective of this study lied in finding out whether there was a relationship between ICT teaching and learning of biology at Mutorere secondary school in Kisoro district. Other objectives included; to find out the level of ICT teaching at Mutorere secondary school in Kisoro district, to find out the extent of learning biology at Mutorere secondary school in Kisoro district. A simple random chance sampling strategy was utilized to produce a sample size of eighty participants from the intended sample of 100 people who participated using Solvin's formula for the study, which used a mixture of a descriptive and empirical method of inquiry. The investigator discovered that there is an extremely positive correlation among ICT Teaching and Learning of Biology at $r = 0.704$, and since the sig. value (.000) was much less than 0.01, which is the highest possible level of importance required declaring an important connection between ICT Instruction and Understanding of Biology, this suggests that when the level of ICT Being a teacher is high, the different levels of comprehension of biology is high, whereas when the level of ICT Instruction is low, the level of learning biology is low. This is because integration of ICT Teaching in learning biology involves use of projectors, videos, slides and power point presentations which motivates students and gives deep-insight into the subject content, hence making learning easy.

Key words: ict teaching and learning

Background of the study

In our world today, when information is growing so quickly that it is required by modern devices, teaching has quickly grown into one of the most difficult careers. In a short period of time, ICT has emerged as one of the fundamental pillars of a modern civilization. Understanding ICT and comprehending its fundamental principles are now widely seen as being essential components of education (UNESCO, 2002b). To emphasize the significance of ICT in fostering growth and development in the economy, the authorities of Uganda have, since 2006, formed a full-fledged ICT Ministry. Parents and the corporate sector, in addition to educational divisions, are two sources of increasing interest in and push for the use of technology in schooling. The World Wide Web is one of the most important aspects of the technology or digital era that is very relevant to schooling. Technically and operationally, the Internet is described by Hargittai (1999) as a global network of interconnected devices and people.

The administration is aware that ICT can significantly contribute to the modernization and internationalization of the economy that are key components of stimulating national growth. The government launched a number of efforts to encourage the creation and implementation of ICT in acknowledgment of the necessity of ICT for the purposes of development. A set of regulations that allowed for the establishment of rivalries and the granting of permits of several operators liberalized the wireless communications sector in 1996 (National ICT Policy Framework, 2003). Over the past ten years, Uganda's ICT business has grown quickly as a result of the democratization of ICT usage, application, and purchase.

A secondary school ICT curriculum has been authorized by the Ministry of Education and Sports. These schools are getting equipment through a number of initiatives, like School Net and Connectivity Projects. However, very few secondary educational institutions offer ICT training, and almost never have the kind of infrastructure that would allow for a significant amount of practical instruction (National ICT Policy

Framework, 2003).

Statement of the problem

The problem lied in finding out whether there was a relationship between ICT teaching and learning of biology in Mutorere secondary school, Kisoro district.

Specific Objectives

- 1. To find out the level of ICT teaching at Mutorere secondary school in Kisoro district.*
- 2. To find out the extent of learning biology at Mutorere secondary school in Kisoro district.*
- 3. To find out the relationship between ICT teaching and learning of biology at Mutorere secondary school in Kisoro district.*

Research questions

- 1. What is the level of ICT teaching at Mutorere secondary school in Kisoro district?*
- 2. What is the extent of learning biology at Mutorere secondary school in Kisoro district?*
- 3. What is the relationship between ICT teaching and learning of biology at Mutorere secondary school in Kisoro district?*

Methodology

Research design

Using a cross-sectional research design, the study was conducted. Because it is the design that works best for research aiming at determining the commonality of a phenomena, circumstance, or challenge, cross-sectional study designs are used. In this study, it refers to determining if ICT has an impact on biology instruction and instruction in secondary schools in the Kisoro District and obtaining a comprehensive picture of the situation at the time of the study (Kothari, 2004).

Study population

Using Solvin's technique for calculating sample size, a sample size (n) of 80 responders was selected from the study group consisting of 100 individuals who participated.

Students, instructors, parents, the head teacher of Mutorere Secondary School, and the district education officer of the Kisoro district comprised the study's target group.

Sampling techniques

The method of sampling is the process of selecting a subset of a population to test a population-wide hypothesis (Jowin, 2003). The methods utilized to choose study participants were simple random selection and selective sampling.

Sample size

A sample is a small subset of the total population (George & Mallery, 2003).

The study sample comprised of 80 respondents out of 100 of the total population where 20 respondents were parents, 42 respondents were students, 16 respondents were teachers, Head teacher and a district Education officer of Kisoro district.

Sampling techniques

James M.J. (2008) claims that sampling methodology refers to the name or alternative designation of the particular method used to choose the entities for the sample.

To enable her to get more trustworthy data from the field, the investigator used both probability and non-probability sampling strategies, as described below:

uncomplicated random sampling

This method was employed by the investigator, who assigned a number to each member of the population of interest before selecting which members to include using

a table of random numbers. This method was utilized by the researcher to select an 80-person sample from a total sample size of 100 for the study.

Purposive sampling

Each of the units in the sample, including LC1, were chosen using a deliberate sampling procedure.

Headmaster and the chairperson. This method is founded on the study's goal and the distinctive features of a population. This method was employed by the investigator because it is extremely helpful in circumstances when you must quickly achieve a specified sample and where sampling for symmetry is not the major issue.

Only those people who are pertinent to the research design are chosen through purposeful sampling, which is less expensive, more easily available, and more comfortable. In addition, there is no way to guarantee that the sample is actually accurately representing the population, therefore the investigator's ability to evaluate the population's constituent parts is given additional weight.

Data collection methods and instruments

This study shall use primary data to determine the relationship between variables. Primary data collection methods are mixed and they include: questionnaires and observation as discussed below:

Data analysis

The statistical package for social science (SPSS) tool was used by the investigator to compute proportions, rate, and tabulate responses, as well as to employ both quantitative and qualitative types of data. To find and correct mistakes made by participants, data was modified. The answers provided to the questions were then coded into several categories. The data were analyzed using descriptive statistics like frequency distribution and proportions. The answers were all grouped according to

their theme categories and the information they contained were evaluated for quantitative information using content analysis techniques. Presentation materials included tables, charts, and figures. Software from the Statistical Package for Social Sciences (SPSS) was employed to assist in data analysis.

RESULTS

Response rate

Questionnaire return rate

All 80 questionnaires were given out, 40 were returned, thus representing 50% response. The study was considered good because according to Peil (1995), questionnaire return rate above 50% is considered good for a study.

Personal information of respondents

Information regarding to the personal background of the respondents included their age, gender, marital status, education level and working experience of the respondents.

Age of the respondents

Information regarding the age of the respondents was added to questionnaires during the piloting process. The following information regarding the ages of the respondents was analyzed and presented in form of grouped data as shown in the table 1.

Table 1: Age of the respondents

Class (Age)	Class mark (x)	frequency (f)	Fx	Percentage (%)
10-15 years	12.5	5	62.5	12.5
15-20years	17.5	20	350	50.0
20-25 years	22.5	8	180	20.0
25-30years	27.5	7	192.5	17.5
TOTAL		$\Sigma f=40$	$\Sigma fx=785$	100

Source: Primary data (2022)

From the table 1, the researcher found out that majority 5 students at Mutorere Secondary school with 12.5% of the respondents were aged between 10-15 years, 8 respondents with 20% were aged between 20-25 years and 7 respondents with 17.5% were aged between 25-30years.

Respondents

Gender	Frequency (No. of Respondents)	Percentage (%)
Males	18	45
Females	22	55
TOTAL	40	100

Table 2: Gender of respondents

From table 2, it was found out that, majority of the respondents were females with

55% compared to males with 45%. This meant that most of the students at Mutorere secondary school are females hence their dominance in the study relative to their male counterparts. The simple random sampling technique offered each member of the population an equal and non-zero chance of participation in the study.

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Marital status of the respondents

Table 3 Marital status of the respondents

<i>Marital status</i>	<i>Number of respondents (f)</i>	<i>Percentage (%)</i>
<i>Single</i>	25	62.5
<i>Married</i>	10	25.0
<i>Divorced/ Separated</i>	3	7.5
<i>Widow/ Widower</i>	2	5.0
<i>Total</i>	<i>40</i>	<i>100.0</i>

***Source: primary data
(2022)***

From table 3, the researcher found out that majority of the respondents were single with 62.5% of the total targeted population, 10 respondents with 25% were married, 3 respondents with 7.5% were divorced and only 2 respondents in this study were widows with 5%.

Educational level of the respondents

Information regarding the academic background of respondents in Kisoro district was obtained and tabulated as shown in table 4

Table 4: Educational background of the

respondents

Educational level	Number of Respondents	Percentage (%)
UCE	15	37.5
UACE	8	20.0
Certificate	6	15.0
Diploma	7	17.5
Degree	4	10.0
TOTAL	40	100.0

Source: *Primary data*
(2022)

According to table 4, an analysis of the questionnaires and interviews revealed that the majority of the respondents—15 participants with a median UCE completion rate of 37.5%, 8 respondents with a median UACE completion rate of 20%, six participants with a median certificate completion rate of 15%, seven individuals with a median diploma completion rate of 17.5%, and four participants with a median undergraduate degree completion rate of 10%—had accomplished lower secondary education. The majority of those who participated in this survey (37.5%) fell within the range of Ordinary level of education, according to analysis of the aforementioned data.

Working experience of respondents

Information regarding the working experience of respondents in Kisoro district was obtained and tabulated as shown in table 5

Table 5: Working experience of the respondents

<i>Working experience</i>	<i>Number of Respondents</i>	<i>Percentage (%)</i>
<i>Never worked(student)</i>	15	37.5
<i>6 Months - 1 Year</i>	2	5.0
<i>1 - 2 Years</i>	4	10.0
<i>2-9 Years</i>	10	25.0
<i>10 Years and above</i>	9	22.5
<i>Total</i>	40	100

Source: *Primary data
(2022)*

From table 5, it was found out in an analysis of interviews and questionnaire that 15(37.5%) respondents were students, 2(5%) respondents had worked at Mutorere secondary school between 6 Months - 1 Year, 4(10%) respondents had worked at Mutorere secondary school between 1 - 2 Years, 10(25%) respondents had worked at Mutorere secondary school between 2-9 Years and 9(22.5%) had worked at Mutorere secondary school between 10 Years and above

The level of ICT teaching at Mutorere secondary school in Kisoro district

This Section describes the independent variable (ICT teaching). The independent variable was addressed in Section B of the questionnaire for respondents. Information regarding the level of ICT teaching at Mutorere secondary school in Kisoro District was tabulated in table 6 below

Level	Frequency (No. of Respondents)	Percentage (%)
<i>Small</i>	20	50
<i>Medium</i>	15	37.5
<i>Large (high)</i>	5	12.5
<i>Total</i>	40	100

The results showed that there was little ICT instruction. It was determined that the level of ICT instruction at Mutorere Secondary School is low because 50% of the participants in the research agreed that the level of instruction is low, 37.5% agreed that the level of instruction is at an intermediate level, and only 12.5% said the level of instruction is at a high level. When questioned about the ICT software currently in use for the research's aim, participants overwhelmingly stated that they utilize software for word processing, appearance, its release, videoconferencing, Blackboard, Internet, and e-mail programs.

The extent of learning biology at Mutorere secondary school in Kisoro district

This Section describes the dependent variable (Learning biology). The dependent variable was addressed in Section C of the questionnaire for respondents. Information regarding the extent of

learning biology at Mutorere secondary school, Kisoro District was tabulated in table 7 below

Extent	Frequency (No. of Respondents)	Percentage (%)
<i>Small</i>	5	12.5

Medium	15	37.5
High	20	50
Total	40	100

Source: Primary data (2022)

The findings revealed that the extent of learning biology at Mutorere secondary school is high and this was because 20(50%) respondents agreed that the extent at which biology is taught is high,

5(12.5%) respondents agreed that the extent at which biology is taught is small and 15(37.5%)

respondents agreed that the extent at which biology is taught is at medium.

Relationship between ICT Teaching and Learning of Biology

Table 8: Showing Pearson Correlation between ICT Teaching and Learning of Biology

Correlations

		ICT Teaching	Learning of Biology
ICT Teaching	Pearson Correlation	1.00	.704
	Sig. (2-tailed)		.000
	N	40	40
Learning of Biology	Pearson Correlation	.704	1.00
	Sig. (2-tailed)	.000	
	N	40	40

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

Source: SPSS output page

Since the sig. value (.000) was much lower than the threshold of importance (0.01) that must be met to declare an important connection among ICT Teaching and Learning of Biology, Table 8's finding that there is an extremely strong positive correlation between ICT Teaching and Learning of Biology at $r = 0.704$ implies that whenever the level of ICT Teaching is high, the level of comprehension of biology is high, and when the level of ICT Instruction is low, the level of learn This is due to the usage of projectors, movies, slides, and PowerPoint slides used in ICT teaching when learning biology, which inspires students and provides in-depth knowledge of the subject matter, making learning simple.

Conclusion of the findings

The investigator came to the conclusion that there is an extremely positive connection between ICT Teaching and Learning of Biology at $r = 0.704$, and since the sig. value (.000) was significantly less than the threshold level of importance required to declare a significant connection between ICT Teaching and Learning of Biology, this suggests that when the level of ICT Teaching is high, the level of understanding biology is high, and when the level of ICT Teaching is low, the level o

Recommendations of the study

The researcher recommended the government to put up well installed computer laboratories in secondary schools to aid in teaching ICT skills to learners.

The researcher recommended parents to encourage their students to take practical subjects like

ICT and biology in order to cope up with the changing world.

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