# THE IMPACT OF USING INFORMATION TECHNOLOGY IN TEACHING AND LEARNING OF MATHEMATICS IN SECONDARY SCHOOLS OF VURRA COUNTY, ARUA DISTRICT

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# DECLARATION

I Ayo Odongo Geoffrey declare that this is my original work and that it has never been presented to any University for award of a degree.

Sign: ....................................

Date: ....01$^{st}$/09/2010........

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# APPROVAL

I certify that Mr. Ayo Odongo Geoffrey carried out this research under my supervision.

**SUPERVISOR:**      Rev: Apandi Stanley Reuben

Sign: ...................................................................

Date: ...........03. 09. 2010..................

# DEDICATION

This work is dedicated to my parents Mr. Odongo Atanasio, Mrs. Ajok Bibiana, my dear wife Christine Ayo Odongo and children Odongo Gloria, Odongo Rita, Odongo Rebecca and Odongo Timothy.

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# ABSTRACT

The problem in this research aroused due to poor performance of mathematics in secondary schools in Vurra County, Arua District. The purpose of this study is therefore to assess the importance of IT in teaching and learning of mathematics in secondary schools.

The investigation was conducted in the three secondary schools in Vurra County, Arua District. The researcher used about fifty (50) respondents of who were head teachers, teachers and learners who were closely linked with the use of IT. Interviews were set to teachers and learners while questionnaires were administered to teachers and head teachers to collect purposely data, or the use of information technology in teaching mathematics.

The result of the study indicates that some teachers did not use IT in teaching and learning mathematics. This could cause poor performance. There was also need for the Administration to provide information technology materials as many schools could not access the IT materials. The study also found out that the use of IT was not supervised by the administrators. This caused low attitudes of teachers in using information technology for teaching mathematics leading to poor results.

The implication of the study therefore is that poor attitude towards the use of IT, lack of knowledge of information technology and inaccessibility of teachers to IT materials caused poor performance in mathematics although other factors such as lack of teachers' knowledge of IT, no proper classroom situation could have caused poor results in mathematics.

# CHAPTER ONE

## INTRODUCTION

1.0 Mathematics teaching requires instructional materials and use of information technology. IT is a crucial aspect of teaching and learning process, if not effectively used learning goals and objectives will not be achieved. In case of schools in Vurra County, evidences show that teachers do not give that emphasis in using IT materials to support teaching and learning of mathematics.

There is therefore need to investigate the effect of the use of information technology on the teaching and learning of mathematics in secondary schools in Vurra County. The research intends to find out the impact of the use of information technology on the performance of students and get possible solution to the negative impacts.

### 1.1 Background

Teaching and learning can effectively be carried out when information technology materials are used. This therefore can improve the performance of learners. The researcher from reports and records has noted that the performance of students in mathematics has been poor in the situation of poor attitude towards the use of IT materials such as computers, projectors, globes, charts and models. The researcher therefore would like to find out in the cause of poor performance was due to failure to use IT. He would like to find out whether schools in Arivu Sub County have acquired IT materials to be used effectively in order to have positive effects on learners results, from the background the researcher found it necessary to study the effects of the use of information technology in teaching and learning of mathematics in secondary schools in Vurra County, Arua District.

Modern teaching requires that the process of teaching is not only a matter of presenting and receiving of knowledge but also a process of the two personalities. It is also affected by physical, economic and social environment. The classroom should therefore act as an aid to teaching and direct use of IT materials (Farrant, 1981).

## 1.2 Statement of the problem

For many years, the performance of students in mathematics at ordinary level in Vurra County, Arua District remained poor despite the availability and use of information technology. This study therefore finds out if the use of IT in teaching and learning of mathematics has got any impact on the performance of students in secondary schools in Vurra County, Arua District.

## 1.3 Purpose of the study

The purpose of the study is to assess the importance of IT in teaching and learning of mathematics in secondary schools

## 1.4 Objectives of the study

i. To find out the available IT materials in secondary schools in Vurra County, Arua district.

ii. To find out whether teachers are making use of IT materials in teaching and learning of mathematics in secondary schools.

iii. To find out if the IT materials available are enough for effective teaching and learning of mathematics.

iv. To find out the effects of the use of IT and challenges in teaching and learning of mathematics in Secondary Schools on the performance of learners.

## 1.5 Scope of the study

The study covered three secondary schools in Vurra County, Arua District. These were Arivu secondary school, Ocoko secondary school and Vurra secondary school.

This area was selected because mathematics was one of the subjects with low level of performance in the schools.

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In relation to content, the research concentrated on the variables that were related to the use of information technology in teaching and learning of mathematics. Themes were developed to guide the study.

Related to the respondents, the researcher concentrated on teachers of mathematics in the selected schools. Head teachers of the schools and other key teachers were used to provide useful information. Students were also randomly selected for interview. Related to time, the study was to take three months to provide the final report.

## 1.6 Significance of the study

It was anticipated that the study findings would be used by various groups of people in various ways.

They brought about awareness to the teachers of mathematics by the use of IT materials was important. This is hoped to help to improve teaching and learning of mathematics.

The study would also act as guide tool for supervisors like Head teachers. This would help them to identify the possible ways of improving teaching.

The study would also be of great importance to further research in relation to the topic. This will provide literature in further studies in relation to IT materials.

## 1.7 Definition of operational terms

- Audio visual aids are aids to learning and teaching to communicate the ear or eye.
- Media: media are any means by which message can be passed between human beings.
- Transparency: is used to mean any positive designed to be viewed by placing right behind it.
- Educational technology: is the process of teaching by use of machines and equipment. But is used loosely to mean any teaching conducted with support of teaching technical aids.

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- Software: is a term used for teaching / learning materials such as records, tapes, slides and films.
- Hardware: these are equipments such as record players, records, projectors with which software is used.
- Utilization: making use of something, in this case teaching aids.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0 General introduction

During the process of carrying out the study, the research should not only rely on this knowledge but also some other outstanding scholars and educationalists who emphasized what the researcher forwards is relevant to the problem.

## 2.1 Available information technology materials in schools

Most IT projects work in cycles. First the needs of the computer user must be analyzed. This task is often performed by a professional System analyst who will also who will ask the users exactly what they would like the system to do and then draw up plans on how can be implemented on a real computer based system.

The programmer will take the specifications from the systems analyst and then convert the board brush strokes into actual computer programs. Ideally at this point there should be testing and input from the users so that what is produced by the programmers is actually what they asked for.

Finally there is the implementation process during which all users are introduced to the new systems which of ten involves an element of training.

Computers in Education

Computer based Training (IBT) offers a low cost solution for training needs where you need to train a large amount of people on a single subject, these programs are normally supplied on CD-ROM and combine text , graphics and sound packages range· from general encyclopedias right through learning a foreign language.

Email the phase Emil refers to Electronic mail which operates in the same way as traditional mail system but has the advantage that mail is sent and received instantly (on a world wide basis ) most Email packages are very easy to learn and used properly can greatly enhance productivity.

A presentation program such as Microsoft Power point allows you to produce professional looking presentation, which can e printed out directly onto slides for the use of an overhead on computer screens

A graphics program (such as Corel Graphics is used to produce adverts, posters, and promotional materials by organizations.

Translation programs allow you to electronically convert text from one language to another. While these programs are far from perfect, their use is becoming increasingly common and they are getting better as each new version comes out.

Mathematical calculations; Computer is ideally suited to performing mathematical calculations. Before computers were widely available accountants used to work on manual papers based spreadsheets, within as spreadsheet, a common task would be adding up a column of figures, and then taking the total, which is added to other columns of figures. If you change one number within a column that is being summed there can be a knock- on effect on many other calculations within the spreadsheet. Re-calculating a spreadsheet could take hours (or days), on computers this recalculation can take seconds.

For many years, science fictions has portrayed images of a thinking sentient anhydride. In reality this is a long way from the present capabilities and when it comes to anything requiring creative thought, a human wins every time while computer in their present form would gain little from studying philosophy for instance they can memorize the facts , but cannot make the creative leaps, that humans can. On a more mundane level, when it comes to even a simple task such as cleaning your home, a human can deal with mess , chit and items (such as chairs) that have changed their positions recently. Even this simple task is beyond a small computer.

Computers are very bad at recognizing and interpreting shapes. They can take photographs and record images on video, but they have no understanding of the meaning of shapes, and will be easily confused where presented with two overlapping shapes. The human process of patterns recognition, as recent research had demonstrated, is vast more

complicated than we used to think. For this reason it is humans not computers that will examine tissue smears for signs of abnormality within the hospitals.

Computers in daily life; Computers are used in everyday life e.g. in supermarkets or libraries, at the doctor's surgery the use of smart cards etc.

Smart identity cards; These cards have recently been introduced in many countries and are called smart cards because they contain a memory chip within them and . They can be credited with an amount of virtual money which can then be spent by the card being read by special machines when you purchase goods or services and this amount is then debit ed from the card . When all the money on the card is spent, you need to get more virtual money credited to the card.

Libraries use computers to log books in and out. many libraries now use bar codes to identify individual books, when someone wishes to borrow a book the librarian scans the bar code , this tells the computer system all about the book (title, author, etc.) removing the need for this information to be keyed in . The computer system can also automatically generate reminder letters to members with overdue books.

## 2.2 Use of information technology resources in teaching and learning

Barton and Gimonon (1994) observed the teaching and learning technologies in interpreting curriculum. Barton observed that curriculum is perceived inappropriate, outdated and adequately supported by teaching facilities. Even schools information technologies are running down because of poor facilities and lack of maintenance. However, Barton did not take into consideration whether teachers are using IT to effect teaching / learning in secondary schools. Barton also ignored to look at the challenges from using IT to effect teaching and learning in secondary schools. It is therefore upon such background that this study will examine the impact of the use of information technology on the teaching and learning of mathematics.

Mafabi (1993) posts most schools in ill equipped with school information technology. Poor information technology in facilitating learning process in secondary schools has

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immense tendency to reduce the children's performance and teaching training process. He advocated that well developed technologies would lead to proper functioning of schools. It improves the efficiency of staff and students' goals and objectives.

Nonetheless, Mafabi did not look into the impact of the use of IT on teaching and learning. Hence, this study will minimize the impact of the use of IT on teaching and learning of mathematics in secondary schools in Vurra County, Arua District.

According to Agwal (1981), use of Audio visual aids such as charts records, charts develop motivation and makes learning more interesting and effective. The instructional help to make ideas and concepts very clear. These raise learning from mere verbalism to understanding. Therefore teaching facilities make learning interesting and lively. They also increase the attitude of using IT in teaching and learning of mathematics. However, unless Audio – visual aids are made and used effectively, they may play negative role in uplifting standard of students. Thus, there is need to study the role of information technology facilities in teaching and learning process of mathematics in secondary schools.

## 2.3 The main categories of teaching and learning technological resources in secondary schools.

Elliot (1999) explains that non projected aids are those that require no projection equipment. They form one of the categories of technologies. Examples of these are charts, chalkboards, flame boards, magnetic boards and photographs to mention but a few. These types of learning aids are the most important in schools because they are clear to be used in both rural and urban schools. They also do not need special talents to use them. They also do not need electricity for their operation.

On the other hand, projected aids are teaching technologies that can be projected on the screen with electrical power. These include; films, transparencies, videos and tapes or software. The hardware are projectors, computers, and video systems. These categories of

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aids are expensive for most schools in Uganda to buy. It is always better to choose the category you can afford to design, produce and use.

## 2.4 Factors limiting teachers from using information technology in teaching and learning.

The acquisition, use and maintenance of teaching / learning facilities by school teachers is sometimes controlled by some factors. The high initial cost of Audio – visual equipments and difficulties in finding suppliers and after sales services together with problems of supplying schools in rural areas with electricity has limited the introduction of information technology in many schools in Uganda. The complexity of some IT equipments tends to threaten some teachers with no practical training. This leads to under use of equipments supplied to schools. An inefficient number of manufacturing equipments pay enough attention to some of the difficult climatic conditions in which their equipments have to be used. Evaluation of Audio – visual aids is not yet fully organised in Uganda. There is therefore need for teachers to form groups for effective evaluation of these materials.

## 2.5 Construction and maintenance of teaching models
**2.5.1** A great deal of teaching models can be obtained from what most households throw away such as scraps, cloth, tins, papers, iron sheets, cardboards, cartons and plastic containers. Farrant (1960) observed that making one's own models is not hard. It is getting good ideas for making and knowing how to make the best model out of them which is the difficult part. The students will usually share in its part with enthusiasm and it is right that they should become in most cases more learning in constructing models than using it.

## 2.5.2 Maintaining teaching aids
There is almost no limit with force which tries to destroy teaching aids, dust, damp, wind, rain, termites, borers, moths, mice, not to mention the heavy hand of use. Teaching aids must be protected including the electrically operated ones. These are particularly susceptible to dust ad damp.

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Damp encourages the growth of mildews on papers and cloth and fungus on films and lenses of cameras and projectors. Fungus is the most serious because it can completely ruin expensive equipments. Dump also affects insulation of the windings in the transformers and electric motors.

The easiest and least expensive to seal equipments from the air when not used is to keep it in polythene bags or tins. A strip of the cello tape around the lid of the tin, around the opening of the bag will ensure an air tight seal. Termites bore which damage cloth, paper, and wood can best be dealt with chemical killers sprayed on visual aids for protections. Most damage comes from normal tear and wear. The best protection is to mount pictures, charts, maps on strong backing materials. Cloth is the most durable but card and even brown papers are obtained by binding the edges with strips of sticks or plastics and re-enforcing the cover where the pictures are pinned when on display.

## 2.5.3 Research questions

i. What are the IT materials in Secondary schools in Vurra County, Arua District?

ii. What shows that teachers are making use of IT materials in teaching and learning mathematics in Secondary schools

iii. Are the IT facilities available enough for teaching and learning mathematics?

iv. What are the effects and challenges of the use of IT materials in teaching and learning mathematics?

# CHAPTER THREE

# METHODOLOGY

## 3.0 Introduction

This research adapted both quantitative and qualitative methods based on secondary and primary data. This chapter presents a detailed methodology adopted by the research from data collection to interpretation and presentation.

## 3.1 Research design

Both quantitative and qualitative methods were focused on people's attitudes and knowledge in using IT in teaching and learning mathematics. The quantitative methods were used to establish member's numbers in using IT in teaching of mathematics.

## 3.2 Area and population

The study was conducted in Vurra County, Arua District, and the selected secondary schools of Arivu secondary school, Ocoko modern secondary school, and Vurra secondary school.

Vurra County is inhabited by Lugbara tribe. It has a rich environment in terms of physical and human feature. However, these have not been effectively utilized for teaching mathematics. Refer to the area of study on the map.

## 3.3 Sample selection and procedure

A total of sample of 50 respondents was used in the study, this constituted 30 teachers, 5 Head teachers and 15 students were purposely selected.

## 3.4 Data collection

During the data collection, the researcher used basically questionnaires, interview guides and documents review.

   (a) Questionnaires: These were a set of questions which were both closed and open ended. These were administered to Head teachers and a few teachers. These were

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used because of Head teachers' and teachers' issues to analyze and reason out the topic on study.

(b) Interview guide: These were a set of guiding questions that were used to carry out interviews. These were administered to a few teachers and students. This was because they were important respondents for study.

(c) Documents review: Documents were reviewed throughout the study. These provided important information for the study; for example schemes of work, lesson plans and lesson notes were reviewed.

## 3.5 Data processing

Editing was carried out before and after data collection. Before data collection, sample questions were set and administered on colleagues. The researcher checked uniformly, legibility, and consistency. The information from the same code was categorically assembled and analyzed for report writing.

## 3.6 Limitations of the study and delimitation

During the study, the researcher met a number of stumbling blocks which had wanted to affect the research process; although some mechanism was used to curb these limitations.

i. In the first place, respondents wanted to conceal information. However, the researcher identified himself as a student and assured them of confidentiality of the information.

ii. There were also financial constraints because the researcher was on private sponsorship. The researcher tried to minimize the case by carrying the study on the nearby schools.

## 3.7 Procedure

The researcher obtained permission from Kampala International University, Department of IODL This was later presented to dignified authorities like Head teachers who assisted the researcher.

# CHAPTER FOUR

## PRESENTATION, INTERPRETATION AND DIISCUSSION OF FINDINGS

### 4.0 Introduction

In this chapter, findings of the study were presented, interpreted and discussed. An examination of the data collection was used to establish the extend of the use of information technology in teaching and learning of mathematics in secondary schools in Vurra County, Arua District. The study covered total 50 (fifty) respondents that constituted 5 Head teachers, 30 teachers and 15 students. The researcher used the number of each respondents and their percentage for interpretation of data collected.

### 4.1 Background characteristics of respondents

### 4.1.1 Sex characteristics

The researcher found out that, of the five head teachers, 4 (60%) were males, 1 (40%) was female, of the 30 teachers, 20 (80%) were males while 10 (20%) were females, in finding important respondents of the 15 students 10 (90%) were males while 5 (10 %) were females.

This information was presented in the table 1 below

**Table 1:** Distribution of respondents by sex

| Respondents category | Males | | Females | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| Head teachers | 4 | 80 | 1 | 20 |
| Teachers | 20 | 80 | 10 | 20 |
| Students | 10 | 90 | 5 | 10 |
| **Total** | **34** | | **16** | |

Source: Primary data

**4.1.2 Table 2:** Showing age characteristics

| Age Group | Head teachers | | Teachers | | Students | |
|---|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | Frequency | % |
| 06 – 10 | | | - | | 7 | 14 |
| 11 – 15 | | | - | | 6 | 12 |
| 16 – 20 | | | - | | 2 | 4 |
| 21 – 25 | | | 1 | 2 | | |
| 26 – 30 | | | 7 | 14 | | |
| 31 – 35 | | | 8 | 16 | | |
| 36 – 40 | 1 | 2 | 5 | 10 | | |
| 41 – 45 | 3 | 6 | 6 | 12 | | |
| 46 – 50 | - | - | 2 | 4 | | |
| 56 | 1 | 2 | 1 | 2 | | |
| Total | 5 | 10 | 30 | 60 | 15 | 30 |

**Source:** Primary data

From the above interpretation, it shows that Head teachers were 5 (10%) of the total sample population and were between 36 – 57 years of age. Teachers were between 21 – 57 years of age while students used were below 21 years of age and constituted 15 (30%) of the sample population. The researcher used this age characteristics for varying his method of data collection.

4.2 The IT used in teaching and learning mathematics was identified by the respondents are projectors, computers, charts slides, maps, radio cassettes. These became important issues in the analysis of the use of IT in secondary schools. However, the researcher found out that not all respondents were aware of the availability of IT materials in their schools. The following responses were identified.

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**Table 3:** Shows respondents knowledge on the available IT in their schools

| Response | Frequency | Percentage % |
|----------|-----------|--------------|
| Highly know | 30 | 60 |
| Know | 12 | 24 |
| Don't know | 4 | 8 |
| Not concerned | 4 | 8 |
| Total | 50 | 100 |

From the above interpretation, 30 (60%) highly know about the availability of IT in their schools. These were mainly head teachers and teachers, 12 (24%) know the available IT materials used to teach mathematics in their schools, 4 (8%) showed no knowledge of available IT in their schools and 4 (8%) showed no concern to the availability of IT materials in their schools. The researcher therefore noted that not all teachers of mathematics were aware of the IT materials in their schools.

### 4.3.1 The extend of the use of IT

The study findings tried to establish the extent of the use of IT in teaching and learning of mathematics and various respondents were used.

These responses were recorded below:

**Table 4:** The extend of the use of IT

| Response | Frequency | Percentage % |
|----------|-----------|--------------|
| Highly used | 38 | 76 |
| Used | 9 | 18 |
| Not used | 1 | 2 |
| Irrelevant | 2 | 4 |
| Total | 50 | 100 |

Of the 50 respondents, 38 (76) noted IT is highly used in teaching of mathematics, 9 (18%) noted that information technology is used in teaching mathematics and 1 (2%) noted that IT is not used in teaching mathematics while 2 (4%) noted that IT is irrelevant in teaching mathematics. The above interpretation shows that not all teachers use IT in teaching mathematics. This may have negative effects on students' performance as IT used aids in appreciating the changing environment.

### 4.3.2 The availability of and accessibility of IT materials

The availability and accessibility of IT materials were also related to the teaching of mathematics. The researcher investigated on the availability of IT materials for teaching mathematics to the teachers. The responses were as follows:

**Table 5**: Showing the availability of IT materials to the teachers

| Response | Frequency | Percentage % |
|---|---|---|
| Readily available | 25 | 50 |
| Available | 12 | 24 |
| Scarce | 8 | 16 |
| Not available | 5 | 10 |
| **Total** | **50** | **100** |

Source: Primary data

The table indicates 25 (50%) respondents noted that IT materials were readily available. 12 (24%) noted that IT materials were available. 8 (16%) noted that IT materials were scarce in their schools while 5(10%) noted that IT Materials were not available. The implication of the above analysis was that information technology is essential in all subjects. However, a critical analysis shows that most respondents were quick to say that IT materials were not readily available to the teachers and those available were not enough. This could have effects on the teaching and learning of mathematics.

### 4.3.3 The teachers, attitude towards the use of IT in teaching mathematics

The researcher found out that teachers had different attitudes towards utilization of IT materials in teaching mathematics. The researcher used different respondents to determine the level of the use of IT. The responses were the following:

**Table 6:** Shows teachers, attitudes towards the use of IT in teaching mathematics

| Responses | Frequency | Percentage % |
|-----------|-----------|--------------|
| Very high | 18 | 36 |
| High | 20 | 40 |
| Low | 10 | 20 |
| Very low | 2 | 4 |
| **Total** | **50** | **100** |

**Source:** Primary data

From the above table, 18 (36%) noted that teachers' attitude towards the use of IT for teaching mathematics was very high. This involved use of available materials in improving on the circumstances of shortage of materials. 20 (40%) of the respondents noted that the attitude of use of information technology was high making 76% of the population under study.

However, there was a section of population that noted low attitude in the use of IT materials. This was 12 (24%) of the responses. This was due lack of knowledge of IT materials, lack of available materials and lack of supervision.

The relationship between the use of IT and performance of students. The study findings tried to establish the performance of students when IT was used and when IT was not used. The researcher found out that the respondents had the following responses when IT was used.

**Table 7:** Responses on the performance of students when IT was used

| Responses | Frequency | Percentage % |
|-----------|-----------|--------------|
| Highly related | 26 | 52 |
| Related | 16 | 32 |
| Unrelated | 5 | 10 |
| Highly unrelated | 3 | 6 |
| **Total** | **50** | **100** |

**Source:** Primary data

From the analysis, respondents noted that the performance of students in mathematics is highly related to the use of information technology. 26 (52%) of the respondents noted that performance of students is highly related to the use of IT. Another category 16 (32%) of the 50 respondents noted that performance were also related to the use of information technology. However, only 5 (10%) noted that performance of students in mathematics was not related to the use of information technology. This coincides with Nyerere (1970) who noted that the use of instructional materials facilitates the acquisition of skills by appreciating the learnt ideas. From this study therefore, it can be interpreted that when IT is not used, it can have negative impact on the learners' performance.

## 4.4 Comparison of the use of information technology in mathematics and other subjects

The researcher also tried to establish the extent of the use of information technology by comparing mathematics with other subjects taught in secondary schools. The researcher found out that information technology is needed in other subjects as well as mathematics teaching. This was aimed at establishing relativity of the use of information technology in teaching mathematics.

**Table 8:** Relative use of information technology materials in teaching mathematics and other subjects

| Subjects | Yes | | No | | No | | Not concerned | |
|---|---|---|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | Frequency | % | Frequency | % |
| English | 48 | 96 | 2 | 4 | 2 | 4 | - | - |
| Mathematics | 38 | 76 | 10 | 20 | 10 | 20 | 2 | 4 |
| History | 40 | 80 | 6 | 12 | 6 | 12 | 4 | 8 |
| Biology | 43 | 86 | 4 | 8 | 4 | 8 | 3 | 6 |

**Source:** Primary data

From the tables above, 48 (96%) respondents noted that English can be taught without IT. Whereas 27 (4%) noted that it is not necessary. In relation to other subjects 38 (76%) noted that IT is needed to teach mathematics as well as other subjects. While 10 (20%) noted that there is no need for use of IT in teaching and learning of other subjects and 2 (4%) did not recommend. In history, 40 (80%) noted that IT is not necessary in teaching History and 4 (8%) said it is not necessary for teaching History. While for Biology 43 (86%) noted that IT is not necessary while 3(6%) were not concerned. The implication of the above analysis was that information technology is essential in all subjects. However, deeper analysis showed that more respondents who said IT were not necessary showed lack of knowledge of information technology. However, a critical analysis of the above information showed that mathematics teaching greatly involves the use of IT. Most respondents were however quick to say that IT materials were not readily available and those available were not enough. This was one of the factors that caused poor performance in mathematics in secondary schools, although other factors might have had a part to play in poor performance.

## 4.5 Challenges met by teachers in using IT in teaching mathematics

The researcher went ahead to find out the challenges met by teachers in utilization of information technology. The respondents identified several factors affecting use of IT in teaching and learning mathematics. In the first place, the respondents noted the some IT

materials were not available for example computers and projectors are not available in some schools.

In another aspect, the available IT materials in some schools were not enough for large classes. These factors have resulted into low use of IT in teaching mathematics.

The above factors could not have affected the use of IT much, teachers knowledge to apply information technology also have affected use of IT in teaching mathematics. Some teachers fail to suit teaching aids in their teaching methods. This results into low use of IT materials. In relation to why IT is not highly used, the respondents identified lack of supervision by Administrators as a reason for IT being not highly utilized.

The respondents also noted that seniority results into low use of IT materials. They noted that some senior teachers claim mastering of knowledge of mathematics. They also claim that teachers who use teaching aid lack subject matter. However, this happens with a few teachers who claim to be seniors.

Lastly, respondents noted that the nature of classes in which teachers teach also affects the utilization of information technology. Some classes exceed maximum number of 50 students per class, which is recommended. This however requires a lot of time especially where illustrations, teaching and feeling are involved. This could however be solved by reducing teacher student ratio by splitting large classes to accepted number.

# CHAPTER FIVE

# DISCUSSION, SUMMARY, CONCLUSION AND RECOMMENDATION

## 5.0 Discussion

In this chapter, the researcher presents summary of the study findings and concludes from the findings. The researcher also gives recommendation for policy makers for further research. This study is set out to examine the impact of the use of information technology in teaching mathematics in secondary schools in Vurra County, Arua District. The study was carried out on 50 respondents from whom information was obtained. From the field, important dedications were identified. The study on the impact of the use information technology on teaching and learning of mathematics found out that many schools did not have access to IT materials and this had much impact on teaching of mathematics. However, from deeper analytical point of view in some schools, IT materials are available and yet performance in mathematics had continually dropped. Therefore, other factors could have affected mathematics teaching.

Another finding was that teachers had poor attitudes towards the use of IT which could have had negative impact on teaching and learning of mathematics in secondary schools. Some teachers boast of mastering of subject matter as they assumed seniority. However, this alone could not have impacted on teaching and learning of mathematics.

The finding of the research was that mathematics teachers have no skills and knowledge of IT materials and therefore have failed to fit some of the IT materials available in their lesson plans. Thus, there is need to supervise and encourage teachers by offering refresher courses in skills of using IT materials.

## 5.1 Summary

The study on the impact of the use of information technology on the teaching and learning has been summarized. As the main information technology materials were found out to computers, projectors, charts, wall maps, radios, videos to mention but a few, in

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most schools a few teachers have the knowledge and make use of the available IT materials. And therefore, this made low utilization of IT in teaching and learning of mathematics. This had however negative effects on the performance of students in these secondary schools.

In the case of availability of IT materials and accessibility, in some schools, a few IT materials were available. However, most respondents quickly found out that the information technology equipments were not readily available. This made the utilization of IT in teaching of mathematics difficult, resulting into ineffective teaching and poor performance. Apart from unavailable IT facilities, teachers of mathematics have low attitude towards the use of IT, claiming seniority in mastering subject matter. Although a few of mathematics teachers used IT materials, the variation in the use of IT had impact on teaching and learning mathematics in secondary schools.

The teachers of mathematics however were noted to have faced challenges in the use of IT in teaching mathematics. The IT materials were not available and those available were not enough for effective teaching. In other development, some teachers did not know where to access IT facilities and lacked the knowledge of application of IT materials to suit their lessons. Information technology also suffers negligence by senior teachers who claim to have mastered their subject matter, thus creating low attitude of the use of IT in teaching mathematics. This has caused poor performance in mathematics by secondary school students.

There had also been the challenge created by abnormal teacher – student ratio especially for large classes. It had been difficult to involve all the students in using IT because in some cases the number of IT materials could not match with the number of students especially when feeling and touching are involved.

## 5.2 Conclusion
The researcher found out from the study findings that there were various forms of information technology which include computers, projectors, radios, videos, charts,

maps, globes among others. The researcher found out that awareness of teachers about IT was high. However, what was noted was that some teachers did not use IT for teaching mathematics in secondary schools in Vurra County, Arua District. There was therefore need for Administrators and Educators to monitor teachers and coordinate the use of IT in teaching mathematics in order to tape the positive effects of the use of IT in teaching and learning mathematics.

## 5.3 Recommendations

The following recommendations were made by the researcher to help policy makers as well as for further studies.

## 5.3.1

i. The Ministry of Education and Sports should try to avail IT materials to schools. This is because the researcher noted that IT materials in secondary schools were not adequate; the provision of these materials would increase the use of IT and performance of learners in mathematics.

ii. The researcher observed that the school administrators especially Head teachers should supervise the use of IT. This was because it was found out that lack of supervision was one of the reasons for not using IT in teaching mathematics. The researcher recommended for further refresher courses on the utilization of IT especially for senior teachers. This was because senior teachers always take action of seniority to justify their failure to utilize instructional materials.

## 5.3.2 For further research

The researcher noted that the following areas were vital for researchers in the field of utilization of IT materials in teaching mathematics.

i. Further research should concentrate on the challenges faced by teachers in using IT materials. This would improve the use of IT in teaching mathematics.

ii. Further study should involve a wider area. This would widen the study findings and get wider scope of the problem.

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iii. Further study should also investigate why provision of IT materials by the Ministry of Education and Sports and Policy makers was not adequate. This would enlighten policies in the Ministry of Education and Sports to influence the utilization of IT materials in schools.

# REFERENCES

1. Agwal (1981). Investigating classroom talk. London: Paluser Press.

2. Aron, Y.O. (1995). Introduction to educational technology. Kampala: Kyambogo University. Press

3. Aron, Y.O. (1997). General methods of teaching curriculum studies. Kampala: Makerere University.

4. Barton and Cumore (1994). Teaching and learning in interpreting curriculum. Melbourne: Prentice Hall.

5. Black, P. & William, D. (1998). Assessment and classroom learning. New York. Macmillan.

6. Brophy, J.E. & Good, T.L. (1986). Teacher behaviour and student achievement in and without. M.C. (ED). Handbook of research in teaching. New York: Macmillan.

7. Charbe, S.P. (1997). School organization highlighting the basic principles in consonance with the tents of the true democracy. (Gandhi Nagar).

8. Coe, R. & Fitzgi Bourn, C.T. (1998). School effectiveness, research criticisms and recommendations. Oxford Review of Education.

9. Doyle, W. (1990). Themes in teacher Educational research. In W.R. Houston, Handbook of research on teacher education. New York: Macmillan.

10. Elliot, J. (1996). School effectiveness in research and its critics, alternative vision of schooling. Cambridge Journal of Education. (26) 199-224

11. Enon, J.C. (1998). Educational research statistics and measurements. Kampala: Makerere University. Press

12. Farrant, J.S. (1997). Principles and practices of education. Hon Kong: Check-wash.

13. Kakoofa, T.L. (1997). An introduction to research methodology. The national adult education. Kampala: Makerere University.

14. Mafabi, (1991). The new meaning of education change, London: Cassel.

15. Rich, I. (1993). Stability in teacher expertise. Teaching and teacher education. 9,139-146.

## APPENDIX I
## QUESTIONNAIRE FOR TEACHER / HEAD TEACHERS

Dear Respondents,

I am a student of Kampala International University undertaking course in Bachelor of Education. I am therefore carrying out research on the impact of information technology on teaching / learning of mathematics in secondary schools in Vurra County. So help me and complete this questionnaire and the information given will be treated with full confidentiality.

Tick where applicable

1. What is the name of your school

.........................................................................................................

2. Sex of respondent

   Male                                    Female

3. What is your age? ...................................................................................

4. What subject do you teach? ...................................................................

5. Do you think it is possible to use information technology materials in the subjects You teach?

   Yes                                     No

6. If no, how do you present your lessons?

   .....................................................................................................

   .....................................................................................................

   .....................................................................................................

7. If yes, what are the information technology materials introduced in your school?

   .....................................................................................................

   .....................................................................................................

   .....................................................................................................

8. Are the IT materials in your school enough?

   Yes                              No

9. If no, does it affect teaching and learning of mathematics/

   ...................................................................................................

   ...................................................................................................

   ...................................................................................................

10. How do you rate the knowledge of teachers on the use of information technology?

    They highly know

    Know

    Do not know

    Not concerned

11. Rate the need of using information technology in teaching mathematics.

    Highly

    Needed

    Not needed

    Irrelevant

12. How do you rate the performance of students before information technology was introduced in your school?

    Excellent

    Very Good

    Good

    Poor

    Very Poor

13. What is the attitude of teachers towards the use of IT in teaching mathematics?

    Very high

    High

    Low

    Very low

14. Incases where the attitudes are low, do you think teachers gain to use information technology material?

    ...................................................................................................

..........................................................................................

..........................................................................................

15. What would be your other comments on the use of information technology in
teaching mathematics

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..........................................................................................

## APPENDIX II
## INTERVIEW GUIDE FOR LEARNERS

The researcher will base his interviews on the following themes;

1) Background characteristics (to establish impact with learners).
    (a) Sex
    (b) Age
    1. Class
    2. School

2) Subjects they study.
3) The use of information technology in general.
4) The use of information technology in teaching mathematics.
    (a) Knowledge of use.
    (b) Comparison between subjects.
    (c) Accessibility of information technology.
    (d) Source of information technology facilities.
    (e) Frequency of the use of information technology
    (f) Performance of the learners

5) Attitude of teachers in using information technology materials.
6) Reasons why information technology might not be used.