# IMPROVING STUDENTS' PERFORMANCE IN MICROSOFT EXCEL 2007 BY USING MULTIMEDIA TUTORIALS WITH QUIZZES

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## Abstract

The use of demonstration during practical lessons for learners to observe without practice is very common in most Ghanaian schools. This does not enhance understanding. Demonstration without hands-on practical does not enhance learners' understanding of Microsoft Excel. The main purpose of this study is to help students in level 200 in Bagabaga College of Education use Microsoft Excel 2007 to do calculations as prescribed in the syllabus. The Microsoft Excel 2007 is an improved version of the 2003 version with the ribbon feature. This makes it suitable for adoption to teach what the syllabus requires. Sixty (60) students out of the total population of 555 students were taken as sample to carry out the investigation in the form of experiment against the rest of the population. Instruments used are: test and observation. These were used at the pre-intervention and post-intervention stages of the research. Multimedia tutorials were developed as an intervention to help improve the students' performance. A post-intervention information revealed that students' performance improved significantly. Camtasia Studio 7 was used in developing the tutorial with natural Ghanaian narrations by the tutor. The findings of the research revealed practical lessons that are taught by mere demonstrations without students' practice do not enhance students' understanding of the subject-matter. Demonstration coupled with students practical are vital to student understanding of classroom lessons.

**Introduction**

The Ghana Education Service in collaboration with the Curriculum Research and Development Division has structured the syllabus of the colleges of education to effectively train teachers to impart knowledge on pupils at the basic school level. Apart from imparting knowledge on the students, the curriculum will also help the teacher trainee to be more efficient in carrying out other duties as a teacher. Microsoft Excel 2003 or 2007 has been included in the syllabus to enable teachers learn how to calculate by using formulae and functions in dealing with tasks such as continuous assessment, ranking of students after assessing them and sorting of data. These specific tasks were seen as difficult tasks for the students in Bagabaga College of education since they could not identify commands under a tab.

The importance of Microsoft Excel is well noticed in the Ghana Education Service. Almost all templates for data collection are designed using Microsoft Excel and the importance has been noticed by various stakeholders of education. This therefore makes stakeholders place so much emphasis on Excel training to help improve the efficiency of teachers in the service.

In 2015, the government of Ghana through the ministry of education in collaboration with the Ghana Education Service contracted the Rlg Institute of Technology to assist Government in boosting ICT education. Government at the time made a major boost to Information Communication Technology (ICT) as an integral part of the Ghanaian education system.

The Ministry of Education entered into an agreement with Rlg Institute of Technology to train, develop and improve the ICT knowledge and skills of basic school teachers across the country. The program was under the Government's Basic School Computerization Project. The goal of the ICT training program was to introduce ICT in the basic schools throughout the country to enable basic school pupils

acquire the requisite skills in ICT usage and also enhance effective teaching and learning. Over thirty-one thousand (31,000) teachers were trained in this batch after a major training was done in the year 2013 (Mensou,2015)

Students in Bagabaga College of Education who are teacher-trainees have difficulties in identifying the various commands that are under a particular tab in Microsoft Excel 2007. This is due to lack of practice after class and inadequate time allocated for practical lessons in schools. This problem makes students unable to understand what they learn and incapable of revisiting those topics on their own for better understanding. This research is therefore undertaken to help identify and solve the problems students face in identifying the commands under tabs in Microsoft Excel for creating and editing workbooks. It will also help students to learn on their own without the guidance of the teacher.

Multimedia tutorials were chosen to help solve the problem of students' forgetfulness, their inability to use the commands to create and edit workbooks and the lack of practice after class.

The purpose of this study was to find out the causes, effects and the approaches to solve the problem of students in Bagabaga College of Education inability to identify various commands in Microsoft Excel 2007.

The research seeks to find answers to the following questions:
1.  To what extent will the combination of demonstration and students practice in every practical lesson help student to identify commands in Microsoft Excel 2007?
2.  What is the effect of quizzes after every lesson on students' recollection on Microsoft Excel 2007 commands?
3.  What is the effect of developed multimedia tutorials on students' own learning pace in the absence of a teacher?

This research work is very relevant in addressing problems students face in remembering commands in Microsoft Excel 2007. The study

will also add up to relevant literature to assist stakeholders in Ghana during the implementation of ICT in education policies. Again, it will help stakeholders in knowing the importance attached to the provision of computers to the teacher-trainees in school to aid in the teaching and learning of ICT. The study will also help the learner to know the importance attached to "learning by doing" and the need to always go through practical sessions during classroom lessons. The multimedia tutorial product will be a source of reference for the teacher in the classroom to prepare adequately before going to teach.

The study examines the problems associated with abstract learning, inadequate practical lessons and the effect of inadequate computers in the laboratory for learning.

**Literature Review**

**Multimedia**

The use of computers and multimedia systems has become very popular recently. Multimedia system is considered a computer-based communication system as defined by Burleson et al (2001) that includes the use of text, audio, video, graphics and computer animations. The use of multimedia software is becoming very important in the learning process. Instructional software can be found for different levels of knowledge and a wide range of subjects. Therefore, the integration of classroom lectures and multimedia tutorials provides not only the theoretical foundations but also the visual component for the ICT problems that help students to grasp the concepts and enhance their practical skills.

**Tutorial**

A tutorial is a technique of imparting knowledge and may be used as a part of a learning process. It is a more interactive and specific than a book or a lecture Malik (2012). Tutorial seeks to teach by example and supply the information to complete a certain task.

A tutorial can be in many forms, this ranges from instructions to complete a task to an interactive problem-solving session, sometimes with quizzes (usually in academia).

## Multimedia Tutorials

Lawrence (2008) is of the view that Multimedia is the use of text, graphics, animation, pictures, video, and sound to present information. Since these media can now be integrated using a computer, there has been a virtual explosion of computer-based multimedia instructional applications. These applications run the gamut from serious computer-based tutorials for adults to the new category of "edutainment" products for children.

According to Malik (2012), Multimedia is being used increasingly to provide computer-based instruction. One reason for this trend may be the assumption that multimedia information helps people learn. Redundant multimedia does not always enhance effective learning compared to "monomedia." Specific situations in which multimedia information may help people to learn include; when the media encourage dual coding of information, when the media support one another and when the media are presented to learners at their level of understanding. There is empirical support for concluding that specific multimedia can be used to help people learn specific kinds of information.

## Advantages of Multimedia Based Tutorials

The advantages of multimedia tutorials over static non-interactive tutorials cannot be over emphasized. The traditional system of tutorials that has to do with the use of written guidelines or procedures to help learners go through a task without going through interactions and demonstrations lacks the practical task that learners go through to acquire knowledge. Andresen (2013). Advantages of multimedia tutorials over the traditional tutorial system are:
1. the answering of questions after a test to find out one's level of understanding (quizzes);

2. the use of demonstrations and practical view also enhance learning in multimedia tutorials as compared to the traditional system of tutorials;
3. the combinations of text, voice, video and other forms of media arouses the interest of learners and keep them learning as it motivates them.
4. the grouping of task to various stages which can be selected for learning gives the learner the chance to start learning at a suitable stage;
5. learners can learn at their own pace and also control the rate of leaning. (Andresen, 2013).

## Microsoft Excel 2007

Samuel (2010) refers to Microsoft Excel as an electronic spreadsheet program that runs on windows computers and can be used to organize, manipulate and analyse data. Excel is often used in the workplace to track statistics, create statistical reports, financial modelling, scientific engineering, and making charts and graphics. However, it can also be useful at home to create budgets or even make a list of family members' birthdays. Excel is a versatile and powerful program with a lot to offer.

Microsoft Excel 2007 version is an improved version of the Microsoft Excel 2003. The 2003 version which is made up of file, menu bar, tool bars, etc. has been replaced by ribbon and tabs with commands grouped for easy identification. This makes the 2007 version easy to use as compared to the 2003 version.

Harvey (2009) examined the Microsoft Excel application. He said it has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns to organize data manipulations like arithmetic operations. It has a set of supplied functions to answer statistical, engineering and financial needs. Also, it can display data as line graphs, histograms and charts, and with limited three-dimensional graphical display. It allows sectioning of

data to view its dependencies on various factors for different perspectives (using pivot tables and the scenario manager). It also has a variety of interactive features allowing user interfaces that can completely hide the spreadsheet from the user, so the spreadsheet presents itself as an application, or decision support system (DSS), via a custom-designed user interface.

**Features of Microsoft Excel 2007**

Havey (2009) perceives the Microsoft office 2007 program as an improved version of the 2003 version. The components of the 2003 version as well as the interface are not completely different. However, some components have been replaced by an improved form of those components. The ribbon system has replaced the menu system in earlier Microsoft versions such as the 2003. The ribbon contains tabs which also contains groups or chunks of commands. The grouping of commands to groups or chunks helps in identifying commands that are related in solving a problem. The organized groups of commands under a tab also help in easy location of commands.

Another feature of the program is the office button. This feature contains options to adjust and make changes to the interface. Some commands and tabs may be shown on the interface or hidden by using the office button. The Excel option button which is located at the bottom part of the menu when one clicks on the office button activates a dialogue box that gives one the chance to control almost all the other features of the program. This is an improvement of the Microsoft Excel 2003 commands under the file menu.

Also, a quick access tool bar is added as a component of the interface. It keeps track of frequently used commands and also helps in saving the time spent in moving far in searching for those commands to use them. This feature is very important in the interface as it has the option of adding more commands to it and also choosing the position of it in relation to the ribbon either below or above it.

These are major components of the Microsoft Excel 2007 that make it different from that of the Microsoft Excel 2003 interface. Other components however remain the same as in Excel 2003. The detailed nature of some of the components however cannot be over emphasized. Torben (2009) figure 1 is a screen shot of the ribbon as a major feature.
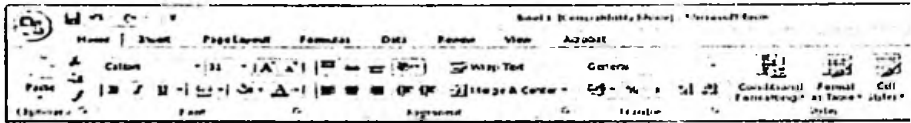


Figure 1: Ribbon of Microsoft Excel 2007

**Importance of Microsoft Excel 2007**

Torben (2009) observed that just like other software or programs of Microsoft, the importance of the Excel 2007 is highly recognized. As an improvement of the Excel 2003 version, Microsoft Excel 2007 has so many importance just like the 2003 version and even beyond. Some of the importance of Excel 2007 version are:

1. as a spread sheet application, it helps in doing complex and simple calculations;
2. it also helps in data analysis and logically organizing the data to more accurate and reliable results;
3. the program also helps in setting up constraints and measures to control data inputs and also prevents others who are not permitted to edit the document from doing so;
4. the program also contains programmable features that can help software developers to improve on the program to get a more desirable application;
5. also, the program accepts import of documents from other applications and also supports the export of information to other applications.

**Camtasia Studio 7**

Scott (2011) explained Camtasia Studio 7 as a software for creating and editing video, sound, graphics, text and other multimedia

elements. It was developed by Techsmith Company Limited. This multimedia company is the global leaders for screen recording and screen capturing software. Camtasia Studio 7 really has two main functions: video editing, and screen casting (recording your computer screen). It is this combination of tools that makes the software an ideal solution for video creating and editing for the novice and expert. **Scott** **(2011).**

Unlike Final Cut Pro or Adobe Premiere Pro which are specifically used by professionals, camtasia is easy to use and can be used by an average person.  Camtasia Studio 7 offers a powerful yet simple option for video creation and editing. Figure 2 shows the interface of Camtasia Studio 7



Figure 2: Interface of Camtasia Studio 7.

Source: www.camtasia.com online help version 7

**Classroom Lecture versus Multimedia Instruction**

Multimedia tutorials have shown to be a very effective learning tool Poli et al. (2003). It can have all the necessary tools for an effective learning experience. Text, audio, visual effects, videos, pictures and graphics animation can be easily integrated in a single program making the tutorial not only user friendly but also a pleasant experience. Computer-related tutorials can be used as a supplemental learning tool for the traditional classroom teaching or they can be used as a single teaching tool for on-line courses or even for in-house courses. In both cases its effectiveness has been proved as concluded Merino and Abel (2003).

The use of visual aids in the learning process has been recognized by many educators and researchers as can be seen in Juarez-Espinosa et al. (2000), Lowrie (2002), Les and Les (2003) among others. The use of labs for many ICT courses is a form to expose the students to practical tuition and also help students to solve problems in real word situations. The well-known expression "graphics speak louder than words" is applicable in learning ICT. However, the use of computer laboratory for ICT is not only expensive but sometimes almost impossible to accomplish in some schools.

The use of computers and multimedia systems has become very popular recently. Multimedia system is considered a computer-based communication system as defined by Burleson, et al (2001) that includes the use of text, audio, video, graphics and computer animations. The use of multimedia software is becoming very important in the learning process. Instructional software can be found for different levels of knowledge and a wide range of subjects. Therefore, the integration of classroom lectures and multimedia tutorials provides not only the theoretical foundations but also the visual component for the ICT problems that help the students to grasp the concepts and enhance their retentive memory.

Interactivity matters in student learning and evaluation of lessons are also very important to assess the level of progress of the learners. It is therefore prudent for the problem to be tackled by using a more detailed and careful approach to help in getting a lasting solution to the problem.

It can be clearly seen from the above that, all the various aspects talk about tutorials as an alternative to classroom learning. However, they all fail to include quizzes and clear voice narrations with demonstrations to help the learner understand the concept. This study is therefore in to the details of multimedia tutorial development to develop interactive multimedia tutorials with clear and natural voice narration to help the learners understand the concept. It also includes

quizzes at the end of each lesson to test the level of understanding of the learner.

## Methodology

The research design, populations, sample, sampling techniques, research instruments and data collection and data analysis for the research are discussed in this section. The main purpose of this study was to train and quiz students to help them understand and do practical data manipulation in Microsoft Excel 2007.

## Research Design

This research was carried out in Bagabaga College of Education. The problem was identified and solved in the school for a period of four months.

## Population

The targeted group in this research was the level 200 students of Bagabaga College of Education made up of five hundred and fifty-five (555) teacher-trainees. The population is made up of sixty-nine (69) students in the Science option, three hundred and fifty-five (355) in general diploma option, sixty-nine (69) in technical option and sixty-five (65) students in the French option. The sample was derived from the entire population.

## Sample

The sample of the research was made up of sixty (60) students from the population. This was a group given the tutorial to practice and their pre-intervention performance was compared to that of the post-intervention performance. Sampling was based on the entire population and measures were taken to give equal chance to members of the population to be captured.

## Sampling Techniques

The sampling techniques that were used in the sampling was stratified sampling and random sampling.

## Strata

The various courses (Technical class, Science class, French class and General Diploma) were the groupings for the various students. Measures were taken to give equal chance to members of each of these groups.

## Random Sampling

From the stratum, 10 members each were randomly selected in the Technical, Science and French classes. 30 members were selected from the general diploma class since they had a larger number.

## Research Instruments

Observation and test are the instruments used in this research. Details of how each of these instruments were used is as follows.

## Observation Guide

This was another instrument that was used to gather data in other to find out the nature of the problem and the strategies to solve the problem. Under this, the respondents were observed in the research to find out the behavioral pattern they may possess that is likely to be affecting them in the problem. The result of the observation was use for interpretation to find out if the problem actually exists. It was also used at the post-intervention stage to find out if the problem has been solved.

## Test

A test was conducted to gather information about the performance of the students on the topic. This was used at both the pre-intervention

and the post-intervention stage to gather data for interpretation to the problem. It was made up of twenty (20) questions and each question was assigned five (5) marks. This instrument was very reliable as the true reflection of students' performance was recorded at each level.

## Intervention, Design and Implementation

This aspect talks about how preparations were made to tackle the problem and the various measures that were taken at each stage to ensure that the problem was addressed with ease. The Pre-Intervention, Intervention Design, Implementation of Intervention, Post-intervention and Discussion of the Study, Presentation of Findings and Results were the aspects the researcher looked at.

## Pre- Intervention

Before solving the actual problem identified, the researcher used some measures to find out if the approach to the problem was the best strategy to adopt. The students' inability to identify various commands under the tabs in Microsoft Office Excel 2007 was a problem that should carefully be looked at to get a better approach to help the students do away with those challenges. The students were carefully observed during this stage. Some of the factors that were identified are:
1.    Students do not go through lessons practically, hence they are passive listeners during lessons;
2.    Students do not get the chance to practice what they learn after class because they do not have computers in their various halls of residence in the school;
3.    There are no questions for students to answer to test their ability to perform certain task;
4.    The number of students using the computer laboratory as well as the number of computers in the laboratory also affect the learning of the topic;
5.    Students cannot get the guidance of the teacher to go through learning after classes; this affects their understanding.

Based on these responses, the researcher settled on using Camtasia Studio 7 to develop multimedia tutorials to help the students understand and identify the various commands under the tabs in Microsoft office 2007. This approach reduced the challenges that the students were facing in the topic.

## Intervention

After the main problems were identified and the approach to solving them had been chosen, the researcher moved in to gather information on the approach chosen. Camtasia Studio 7 was the software used to develop the multimedia tutorials and quizzes. The software was selected among many because of the convenience and the interactivity features that make it possible for students to go through all steps practically. The availability of quizzing in the software was another factor that stimulated the researcher to use the software for the development of the product.

The multimedia tutorial was developed by using the Camtasia Studio 7 software. Each component on the interface of Microsoft Excel 2007 was looked at and linked to the features of Excel 2003 to review student's relevant previous knowledge in Excel versions. After discussing the various features on the interface, the main problem of the work (the various commands in each group under the tabs) was looked at in detail. Voice narration accompanied by the movement of the mouse pointer to go through practical work with vivid explanation of the procedure and the terminologies involved in each stage was the strategy adopted. The recording of the screen was captivating enough to help students go through the tutorials with ease. After going through the various tabs with the groups or chunks under them, the researcher set questions from the topic to test students' level of understanding of the tutorials. Both multiple choice and short answers objective quizzing were used in the tutorials to help students do self-test to find out their level of understanding of the topic. After answering each question in the test, a feedback is given to the

students. This is to help students know as to whether their responses are correct or wrong. At each of the stages of the tutorials, students are also motivated to keep learning. Chance is also given to students to select the stage they want to learn without going through unwanted stages.

## Implementation of Intervention

The product was launched with the students to take them through how to use it. Each student was asked to give out any portable storage medium to copy the tutorials as a personal copy. The tutorials were also loaded on the school computers, giving the students the chance to learn on their own anytime they have access to the computer laboratory without a teacher. The students were encouraged to keep watching the video as it will make them understand the concept well. The product can be played on any device that supports MP4 or MPEG, so those with smart phones can use it. Also, those with computers in their various homes will have more advantage as they can answer the questions through the quizzes for feedback to measure their level of understanding.

In all, the five hundred and fifty-five (555) students had access to the multimedia tutorials and used them at their convenient time to enhance more understanding. The researcher took steps in finding out the level of progress of the students by testing them periodically to find out how far they are going with the tutorials. Students who were having problems in understanding some of the aspects in the video were given attention by the researcher to enable them pace well in the tasks.

## Post-Intervention

After the product was delivered to the students and they used it, the researcher took measures to find out if the students actually understand the teachings and can now face the challenges that they were facing with ease. Class test was conducted in all the six classes

to find out students' level of understanding. From the results gathered, it was clear that the students showed knowledge of the topic and were able to perform various tasks in the topic. The interest of the students in the learning of ICT was also aroused as they keep attending ICT classes voluntarily. The data and the results of the above stages are illustrated in the data analysis.

## Data Analysis

The data was organized in tables. The main techniques used in analyzing the data were frequency tables and per centages, since it appears to be more understandable. Also, paired sampled T-test was used to compare the pre-intervention results to the post-intervention results to find out the variation between them. Each of the results was also interpreted in the form of explanation to help in clarifications. This analysis was based on the research questions.

## Presentation of Findings and Results

The findings and results of this research are grouped under the various research questions of the research. For the research question one, data was gathered by using the various instruments that are selected as the research instruments in this research.

## Test Based on Research Question 1, 2 and 3

After the students wrote the test on Microsoft Excel 2007, it was wise going through the scripts of the students to find out the scores and know why they are facing such problems. After going through the scripts of the students, the information below was revealed.

## Table 1: Representation of Pre-Intervention Student's Performance.

| Marks | Mid-Point (X) | Frequency(F) | FX | $Fx^2$ |
|-------|------|------|------|------|
| 0-39 | 19.5 | 7 | 136.5 | 2661.75 |
| 40-49 | 44.5 | 24 | 1068 | 47526 |
| 50-59 | 54.5 | 18 | 981 | 53464.5 |
| 60-69 | 64.5 | 5 | 322.5 | 20801.25 |
| 70-79 | 74.5 | 4 | 298 | 22201 |
| 80-100 | 90 | 2 | 180 | 16200 |
| | | $\sum F=60$ | $\sum FX=2986$ | $\sum FX^2=162854.5$ |

Mean Score $=\sum FX/\sum F=49.76$

Standard deviation $S = \sqrt{(\sum FX^2/\sum F) -(x)^2}$

$= \sqrt{(162854.5/60) -(49.76)^2}$

$= \sqrt{2714.24-2476.06}$

$= \sqrt{238.18}=15.43$

From Table 1, it can be seen that only two (2) representing three per cent (3%) of the students had Excellent. Four (4), representing seven per cent (7%) of the students were very Good, five (5) representing ten per cent (8%) were Good, eighteen (18), representing thirty per cent (30%) of the students were Average, twenty-four (24), representing forty-per cent (40%) of them, were Poor and the remaining seven (7), representing twelve per cent (12%) were those who could not just do the work at all. The findings above were seen at the pre-intervention stage of the research. The information gathered above gave the researcher an insight to the problem and the way forward in handling the problem to get a lasting solution to it. Below are the findings at the post-interventions stage after all measures in addressing the problems were used and the researcher tried to find out as to whether the problem was solved or not. The information is grouped under the various tools just as in the pre-intervention stage.

**Post-Intervention Test.**

When the students' scores in the various test were checked at the post-intervention stage, the following information emerged.

**Table 2: Representation of Post-intervention Students Performance.**

| Marks | Mid-Point (X) | Frequency(F) | FX | FX² |
|---|---|---|---|---|
| 0-39 | 19.5 | 0 | 0 | 0 |
| 40-49 | 44.5 | 3 | 133.5 | 5940.75 |
| 50-59 | 54.5 | 3 | 163.5 | 8910.75 |
| 60-69 | 64.5 | 12 | 774 | 51483 |
| 70-79 | 74.5 | 24 | 1788 | 133206 |
| 80-100 | 90 | 18 | 1620 | 145800 |
| | | $\sum F=60$ | $\sum FX=4479$ | $\sum FX^2=345340.5$ |

Mean Score=$\sum FX/\sum F$=74.65

$$\begin{aligned}\text{Standard deviation S} &=\sqrt{(\sum FX^2/\sum F) -(x)^2}\\ &=\sqrt{(345340.5/60) -(74.65)^2}\\ &= \sqrt{5755.67-5572.62}\\ &=\sqrt{183.05}\\ &=13.53\end{aligned}$$

From Table 2, eighteen (18) representing thirty per cent (30%) of the students had Excellent, twenty four (24) representing forty per cent (40%) had Very Good marks, twelve (12) representing twenty per cent (20%) had Good marks, three (3) representing five per cent (5%) had Average and the remaining three (3) representing five per cent (5%) had Poor marks. All students were able to do the work. This indicates that the intervention measures which were taken has helped in improving the performance of the students.

The pre-intervention and the post-intervention data gathered was compared to find out how best the situation has improved in the school. Below is the T-test between the pre-intervention performance of the students and the post-intervention performance of the students.

**Table 3: Paired Sample Statistics for Pre and Post-intervention Test**

|        |                   | Mean  | N  | Standard Deviation |
|--------|-------------------|-------|----|--------------------|
| Pair 1 | Pre-intervention  | 49.76 | 60 | 15.43              |
|        | Post-intervention | 74.65 | 60 | 13.53              |

$CI = (.9500)$

As it can be seen from the Table, a paired sample T-test of the pre-intervention and post-intervention performance of the students in the various test reveals the mean for the pre-intervention performance was 49.76 while that of the post-intervention performance was 74.65 bringing a variance of 24.89. This shows the massive improvement of the performance. Also there was a standard deviation of 15.43 for the pre-intervention against 13.53 for post-intervention which shows a wider variation in the marks at the pre-intervention stage than the pre-intervention stage revealing an improvement in the performance.

**Observation Based on Research Questions 2 and 3**

**Pre-Intervention Observation**

An observation was made before the intervention to find out the competencies executed by the students. At the pre-intervention stage, students were observed during the pre-test. The emphasis was on the efficiency of the students. Speed, accuracy and easy to use were the parameters used in measuring their efficiencies. The speed was on how fast they can quickly carry out a task, the accuracy was on how they are able to avoid the mistakes and the easy to use was on how convenient they found it accomplishing the task that was given to them. For the aspect of efficiency, Table 3 represents the information that was gathered.

**Table 4: Results from Pre-Intervention Observation**

|  | Observations | Findings in percentages |
|---|---|---|
| Students who accurately and easily completed the task within the time given. | 6 | 10 |
| Students who requested for additional time to complete the task | 48 | 80 |
| Students who could not do the task given | 6 | 10 |

From Table 3, it is realized that only six (6) students, representing ten per cent (10%) of the students, were able to accurately and easily finish doing the work within the time allowed. Forty-eight (48) students representing eighty per cent (80%) of them, requested for more time to complete the work; and six (6) students, representing ten per cent (10%) of them, could not just do the work at all.

**Post-Intervention Observation**

When a post-intervention observation was made to find out the improvement in students' performance in solving the problem, it was realized that the students' performance in the topic increased positively. They were able to go through the work with less stress and trauma and all students were able to finish the work as compared to that of the pre-intervention stage. This is because they were able to easily identify the various commands on the ribbon and locate them to execute a task.

## Table 5: Results from Pre-Intervention Observation

| Observations | Number of students | Findings in percentages |
|---|---|---|
| Students who accurately and easily completed the task within the time given | 48 | 80 |
| Students who requested for additional time to complete the task | 12 | 20 |
| Students who could not do the task given | 0 | 0 |

From table 4, forty eight (48) representing eighty per cent (80%) of the students were able to finish the work within the time that was allocated to it, only twelve (12) representing twenty per cent (20%) requested for additional time and all students were able to do the work at the end.

## Research Findings

Comparing the pre- intervention and post-intervention results was necessary. This was done in relation to the various research questions that were used in conducting the research. The following information emerged.

From the research, it is realized that over seventy per cent (70%) of students cannot carryout practical task when lesson delivery is mere demonstration without students practice in practical lessons in ICT. This is as a result of forgetfulness due to lack of practice.

It was realized that eighty per cent (80%) of students who go through self-test (quizzing) to find out their level of understanding helped in improving their learning.

From the research, it was realized that eighty per cent (80%) of students can learn at their own pace in using multimedia tutorials in the absence of the teacher.

Interactive multimedia with options for quizzing to test learner understanding enables different groups of learners to learn and understand at their own pace.

Effective teaching and learning can be enhanced if the teacher trainee is given a personal computer (laptop) to go through the learning process in the college. This will help in easy integration of technology into the curriculum.

## Conclusion

The problem of students finding it difficult to identify the various commands to create edit and save work in Microsoft Office Excel 2007 has been minimized. Students can now confidently carry out tasks and explain to teach Microsoft Excel 2007 without trauma. Practice during and after a lesson is necessary for retentive memory and it will be prudent if stakeholders consider putting technological devices into the hands of the teacher-trainee. The use of multimedia tutorials with quizzes has helped in improving the learners' performance. Leaners can continue revisiting this and learn at their own pace.

# References

Andresen, B., & Brent, K. (2013). Multimedia in Education Curriculum. United Nations Educational, Scientific and Cultural Organization. *2*, 140-147.

Burleson, W., Ganz, A., & Harris, I. (2001). Educational innovations in multimedia systems. *Journal of Education*, *90*(1), 21-31.

Harvey, G. (2009). *Excel 2007 Workbook for Dummies* (2nd ed.). Wiley. Retrieved from https://www.camtasio. com/ online_ help_version _7

Juarez-Espinosa, O., Hendrickson, C., & Garrett, J. (2000). Using visualization for teaching.*Proceedings of SPIE the International Society for Optical Engineering*, *3*, 86-95.

Najjar, L. N. (1996). Multimedia information and learning. Journal of Educational Multimedia and Hypermedia, 5(2), 129-150.

Les, Z., & Les, M. (2003). Shape understanding system: The visual reasoning process. Int. *Journal of Pattern Recognition and Artificial Intelligence*, *17*(4), 663-683.

Lowrie, T. (2002). The influence of visual and spatial reasoning in interpreting simulated 3D worlds. *Int. Journal of Computers for Mathematical Learning*, *7*(3), 301-318.

Malik, S. & Agarwal, A. (2012). Use of multimedia as a new educational technology tool. *International Journal of Information and Education Technology*, *2*, 467-471.

Mensou, K. N. (2015). Rlg Assists Government in boosting ICT education...As Teachers Undergo Training RLG news. Retrieved from www.rlg.com.

Merino, D., & Abel, K. (2003). Evaluating the effectiveness of computer tutorials versus traditional lecturing in accounting topics. *Journal of Engineering Education*, *92*(2), 189-194.

Poli, C., Fisher, D., Pollatsek, A., & Park-Woolf, B. (2003). Design for stamping: Identifying pedagogically effective components in multimedia tutors and the classroom. *Journal of Engineering Education*, *92*(3), 227-237.

Gyamfi, S. A. G., & Frimpong, K. A. N. (2010). *ICT for Tertiary Students – Introductory Concepts, Windows Vista and Microsoft Office 2007 Edition*. Kumasi, Ghana: Ash Metro Press.

Scott, J. (2011). *Camtasia Studio 7 Video Editing & Screen Casting Software Review*. Video marketing insight. Retrieved from http://tubularinsights.

Frandson, T. L. (2009). *Microsoft Office Excel 2007*. Retrieved from www.bookboon.com.