

**THE EFFECT OF NEW INFORMATION AND  
COMMUNICATION TECHNOLOGY ON PERFORMANCE OF  
LEARNERS: THE CASE OF MOI TEACHERS TRAINING  
COLLEGE IN BARINGO DISTRICT, KENYA.**

**BY**

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**A Research Project Submitted in Partial Fulfilment for the Award of Postgraduate  
Diploma in Education in the Department of Education of the University of Nairobi**

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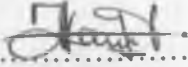


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**Year 2007**

**DECLARATION**

This project is my original work and has not been presented in any other university for diploma examination.



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L40/P/7015/06

This project has been submitted for examination with my approval as the University supervisor.



Date 4/9/2007

MR. OMONDI BOWA

## **DEDICATION**

I dedicate this work to Mr. Mutiga James for the holistic support he has given to me in enabling my study.

## **ACKNOWLEDGEMENT**

I have pleasure to acknowledge Mr. Omondi Bowa for the special guidance, and support he gave me during this project. I also acknowledge the University of Nairobi for giving me this opportunity to study. Last and not least, I acknowledge the Moi teachers training college – Baringo and my family members for providing an enabling environment for me to prepare for this study. May the almighty God bless them all.

## ABSTRACT

Information and Communication Technology (I.C.T) is a new subject in education. It is a service subject as well as academic discipline by itself, which should enable the delivery of education content to learners in a better way than before.

The problem studied was to clearly realise the impact of studying I.C.T in teacher training colleges. Most of the learners may not have realised that their study could be either positively or negatively supported by using I.C.T skills. Most of the learning materials are presented in print or in soft copies in every subject hence making the entire study influenced by I.C.T knowledge. The study shows the performance of learners in the teachers training colleges has been significantly influenced by the introduction of the new Information and Communication Technology in their studies. The area of study was a teachers training college being one of the newly affected institutions in training teachers with I.C.T knowledge before going to teach. Learners of the second year of study are considered in the study. I.C.T is being used to make teachers become proficient users of technology as it gives the components that are vital in the technological world. It has been used as a motivating factor to higher levels of learning as the research reveals. To make a learner feel more wanting to study is better achieved by exposing the learners to the technology studies. The skills always availed in the I.C.T studies are for the future and always keeps one discovering more and more to make even the teacher a learner.

The null hypothesis is that there is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1

teacher training colleges with and without the inclusion of other subjects, while the alternative hypothesis is that there is a significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

The data was collected from the second year students in Moi teachers training college. A sample of 63 learners was taken randomly from the entire population of 362 learners. The analysis is done from the research findings where statistical calculations have been used involving the analysis of variance, the student t-test and the Pearson product moment correlation. In the analysis of variance, the researcher found a score of 49.29 which is significant from the f-distribution score of 3.92. The student's t-test gave a significance of 0.02 while the Pearson product moment correlation, the significance is 0.005441904 in full. This gives significance to the three analyses used.

The researcher recommends that I.C.T be taught to all levels of education to enable learners to have a similar level of entry qualifications in teacher training colleges. Since the study of I.C.T is influencing the performance of other studies positively, it is a good idea to accept it as subject by it self and service subject to use.

## TABLE OF CONTENTS

<b>Content</b>	<b>Page</b>
Title page .....	i
Declaration .....	ii
Dedication .....	iii
Acknowledgement .....	iv
Abstract .....	v
Table of Contents .....	vii
List of Tables .....	x
List of Figures .....	xi
 <b>CHAPTER ONE</b>	
1.0 Introduction .....	12
1.0.1 Management of I.C.T. Integration in the Class .....	13
1.0.2 Issues and Rationale .....	13
1.1 Statement of the Problem .....	15
1.2 Purpose of the Study .....	16
1.3 Objectives of the Study .....	17
1.4 Research Hypothesis .....	18
1.5 Basic Assumptions .....	18
1.6 Significance of the Study .....	18
1.7 Delimitation of the Study .....	19
1.8 Limitations of the Study .....	19

1.9	Definitions of Significant Terms in the Study .....	19
1.10	Abbreviations .....	19

## **CHAPTER TWO**

2.0	Discussions from others .....	22
2.1	Becoming Proficient Users of Technology .....	27
2.2	Motivating Students to Higher Levels of Achievement .....	28
2.3	Preparing Students with 21 <sup>st</sup> Century Skills .....	30

## **CHAPTER THREE**

3.1	Introduction .....	32
3.2	Research Scope and Design .....	32
3.3	Target Population .....	32
3.4	Data Collection .....	33
3.5	Sampling and Sample Size .....	33
3.6	Research Instruments .....	33
3.6.1	Checklist .....	34
3.7	Data Analysis .....	34

## **CHAPTER FOUR**

4.1	Results and Analysis.....	35
4.2	Analysis of Variance.....	47
4.3	Pearson Product Moment Correlation.....	48



4.4	Discussions.....	49
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## CHAPTER FIVE

5.1	Summary.....	52
5.2	Recommendations.....	53
5.3	Suggestions for further research .....	54
5.4	Conclusions.....	55

<b>REFERENCES</b> .....	56
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## APPENDICES

i).	Questionnaire .....	58
ii).	Checklists .....	62
iii).	Table 15: The Results on Respondents Scores in the examinations.....	63
iv).	Table 19: Pearson Product Moment Correlation (r) Scores Table.....	66

## LIST OF TABLES

Table 1: Residents Home Backgrounds.....	35
Table 2: Gender for the Respondents.....	36
Table 3: I.C.T Knowledge from High School Before Joining College.....	36
Table 4: Knowledge from Elsewhere Before Joining College.....	37
Table 5: Secondary Levels Attended by the Respondents.....	38
Table 6: Respondents starting I.C.T Studies in College.....	38
Table 7: Respondents Who Studied Other Courses Related To I.C.T.....	39
Table 8: Time Spent in Theoretical I.C.T Studies.....	40
Table 9: Time Spent on Practical Studies of I.C.T.....	40
Table 10: Feelings on Time Spent on Theoretical Studies of I.C.T if it is enough..	41
Table 11: Views on Time Spent on Theoretical Studies of I.C.T.....	42
Table 12: Feelings on Time Spent on Practical Studies of I.C.T if it is enough....	42
Table 13: Views on Time Spent on Practical Studies of I.C.T.....	43
Table 14: Views on the Overall Study of I.C.T in Teacher Training Colleges.....	44
Table 15: The Results on Respondents Scores in the examinations.....	63
Table 16: Those who had not studied I.C.T before joining college .....	46
Table 17: Those who had studied I.C.T before joining college.....	46
Table 18: ANOVA Table.....	48
Table 19: Pearson Product Moment Correlation (r) Scores Table.....	66

## LIST OF FIGURES

Figure 1: The Results on Respondents Scores in the examinations.....45

## **CHAPTER ONE:**

### **INTRODUCTION**

#### **1.0 Background Information**

Information and Communication Technology is the most new subject in Teacher Training Colleges in Kenya today. Though I.C.T has been used in one way or another in the system of education, it is only in 2004 when the Ministry of Education introduced a syllabus for the I.C.T subject in teacher training colleges for certificate course.

Education, I.C.T being part of education has a wide connotation. Education is a process, which enables an individual to adjust himself to the environment. It is a process of self-realization; it curbs the animal instincts in man and shows him the way to realize his latent powers (Aggarwal, 1991). Hence I.C.T will be a key to education acquisition.

If a school develops an I.C.T plan at an early stage in its I.C.T development, it often focuses on providing students with computers skills in isolation from integrating I.C.T into the school curriculum. Moreover, the I.C.T plan tends to be separated from the whole school plan, as one ore more enthusiastic teachers may develop it in isolation from their colleges. Such an approach, particularly in the early adoption of I.C.T, is quite common. Instead, schools are urged to start from curriculum perspective, and to ask how the available technology will enhance the teaching and learning environment for both teachers and students. (Gikonyo & Kinyanjui, 2005).

### **1.0.1 Management of I.C.T. Integration in the Classroom.**

Like other parts of the curriculum, the I.C.T work must be structured and planned. This should be done in conjunction with school policy, skill level of the teacher, the availability of suitable software and taking cognisance of pupil computer ratio. Most of the educational instructions in Kenya have not infused I.C.T integration in their curriculum delivery. The computer then is not only what the child learn about, it is what they learn through and perhaps with, even though part of the process may depend on computer usage.(Obara & Okinda, 2005)

A survey in United States of America indicates that since 1994, the National Centre for Education Statistics (NCES) has documented the large increase in access to computers and Internet in the nation's public elementary and secondary schools (U.S. Department of Education, 2000). These increments have lead to a need to understand the extent and types of computers and the Internet, as well as teachers' perceptions of their own preparedness to use these tools in their classes. To address these critical information needs, NCES commissioned a survey using the Fast Response Survey system (FRSS) that was conducted in the spring of 1999. The survey found that 99% of full-time regular public school teachers reported they had access to computers or Internet somewhere in their schools.

## **1.0.2 Issues and Rationale**

Teachers and facilitators in both formal and non-formal education settings are trying to ensure the effective use of I.C.T contrary to many teachers' fears; they are not an endangered species. Teachers and instructors are not at risk of being replaced by computers, but with the advent of I.C.T and the development of a knowledge-based society, their needs to be redefined. (Weeks, 1994)

Teachers are no longer dispensers of knowledge but rather proactive facilitators who promote collaborative knowledge building and guide students to learn in a variety of environments, to navigate within and process a multitude of information resources, and to use these resources in solving problems and making decisions on their own. (Weeks, 1994)

Many countries in the region have realized this need for redefining teachers' roles and have responded by launching professional development programmes to train teachers in the use of computers. However, most of these training activities are crash programmes, which focus on computer literacy per se and not to enable teachers to actually integrate I.C.Ts in day-to-day classroom instruction. Learning to use an effective tool to improve teaching and learning is currently not currently well affected. (Weeks, 1994)

Teachers need training not only in computer literacy but also in the application of various kinds of educational software in teaching and learning. Furthermore, they need to learn how to integrate I.C.Ts into their classroom activities and school structure. (Weeks, 1994)

The quality of teachers is known in virtually all countries to be a key predictor of student learning. Therefore, teacher training is crucial. I.C.T can become a tool that on the one hand facilitates teacher training and on the other hand helps them to take full advantage of the potential of technology to enhance student learning. (Weeks, 1994)

Especially in poor countries, many teachers lack adequate training for the job they are doing. Thus, teacher training provides a relevant locus for I.C.T. This is not only because it is not difficult, even in poor countries to bring most or all teachers to I.C.T, rather than having to take I.C.T out to all the teachers. (Weeks, 1994)

#### **1.1 Statement of the Problem**

The introduction of I.C.T in schools and colleges has been greatly welcomed by majority in readiness to use and become experts on it. Some have even made it to be a major subject of concern in their institutions. But though this is happening other institutions have not fully accepted it in the fear of the consequences of the technology in either job security or at times the cost among other reasons. In all, the learners should be introduced and get information on the uses of the I.C.T subject.

I.C.T has a big role in making education equal to all regardless of sex, age, ethnicity, race, or performance of the rest of the education subjects. It is the realization of the I.C.T subject that may open for the better education day by day.

As every level of education is growing day by day, I.C.T shall be incorporated in all those levels regardless of age or location of the institution. Hence, we shall have I.C.T in all levels from the university down to what we call Information and Technology (I.T.) and kids. This is simply the study of computers and use of computers to teach and learn in all the levels from the university to the early childhood classes.

International research shows that the schools often greet the arrival of computers with a mixture of trepidation and enthusiasm as they get to grips with the exiting task of mastering new technologies. Initially, schools tend to focus on acquiring additional hardware and software, perhaps without much thought as to how these resources can be used effectively in a learning context. Having had these new resources for some time, schools then start to explore how they can support teaching and learning within the school. (Gikonyo, B. & Kinyanjui, J., 2005)

The problem of clearly realising the impact of studying I.C.T in teacher training colleges is the main aim of this research. Most of the learners may not have realised that their study could be either positively or negatively supported by using I.C.T skills. Most of the learning materials are presented in print or in soft copies in every subject hence making the entire study influenced by I.C.T knowledge. Has a learner, one may be instructed to use the I.C.T materials either to give out work in print, without realising that this learner may not or may have the knowledge of printing work.



## **1.2 Purpose of the Study**

The study will enable better understanding of the I.C.T subject in support of the education system at all levels. It is through this research that facts can be established in backing the purpose of considering I.C.T subject for all without discrimination. The research helps in persuasion of seeing the need for the government to support all learning institutions in the use of Internet facilities in the studies.

This study shows clearly how the performance of learners is influenced by I.C.T studies in all the studied subjects. The study compares the performance of the other subjects with and without the inclusion of I.C.T.

## **1.3 Objectives of the Study**

This research helps in realising on the learner's performance while in training with the consideration in scores of I.C.T with and without other subjects being considered. The specific objects of this research were:

- a) To show if the performance of learners in the teachers training colleges is significantly influenced by the introduction of the new Information and Communication Technology in there studies.
- b) To show if the prior studies of Information and Communication Technology is affecting the performance of learners in the teachers training colleges.

#### **1.4 Research Hypothesis**

The null alternative hypotheses of this research were as follows:

H<sub>0</sub>: There is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

H<sub>1</sub>: There is a significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

#### **1.5 Basic Assumptions**

The researcher assumes that all candidates in the group of study had the same learning environments. The researcher also assumes that every learner had equal knowledge on the I.C.T subject when starting the course.

#### **1.6 Significance of the Study**

This study assists the teachers and instructors in giving more support to the I.C.T subject to equip the learners (teachers to be) with a better service delivery subject to aid in teaching. This study shall assist in making the training colleges for P1 teachers to support

### **1.7 Delimitation of the Study**

The researcher is an instructor of I.C.T in Moi Teachers Training College – Baringo; hence the data collection was done with minimal errors difficulties. There is assurance of getting the correct records to give the true findings of this research. The study shall only consider the overall performance in the mock examinations for second year of study. Only candidates of Moi Teachers Training College shall be considered in the study. Only those students in the second year of academic year 2006-2007 of the institution mentioned above shall be considered.

### **1.8 Limitations of the Study**

The research was carried in Moi Teachers Training College out of the 30 teachers Training Colleges in the country. The Researcher could not afford to carry out a Research to the other Colleges at the same time due to the financial constrains. Otherwise due to the limited time a researcher could only consider one college.

### **1.9 Definition of Significant Terms**

**Information** – Knowledge or facts. This comprises the analysed data collected to give some meaningful ideas hence referred as the information.

**Communication** – Make known or share information, thoughts or feelings. It is the passing of information from one individual to another or from the sender to the recipient with both parties understanding the meaning of the information to qualify the communication process hence communication shall have taken place.

**Technology** – Application of practical or mechanical sciences. This is the scientific means of handling things with some skill or value of high handling of the processes of operation to show the technology in use, like using a computer to type a letter and not using free hands hence technology is realised.

**Test** – A planned process of measuring a sample of behaviour. Students are given test to measure their achievement in each time of study or a given period of time.

**Hardware** – The physical/touchable components of a computer necessary to make the computer functional. They can include the keyboard, C.P.U, monitor, printer, etc.

**Software** – These are sets of instructions designed to perform a particular task. Without the computer software the computer cannot work because it depends entirely on software instructions.

**Monitor** – It can be a cathode ray tube for most of the desktop microcomputers or a liquid crystal display (LCD) for most of the laptops and notebook computers. The common types of monitors are video graphics array (VGA) and the super Video graphics array (SVGA).

## **1.10 Abbreviations**

**I.C.T** – Information and Communication Technology

**P1** – Title given to certificate trained teacher

**A.C.O.T** – Apple Classrooms of Tomorrow

**eMINTS** – Enhancing Missouri’s Instructional Network Technology Strategies Programme.

**T.T.C** – Teacher Training College

**K.T.T.C** – Kenya Technical Training College

**C.P.U** – Central Processing Unit

**S.V.G.A** – Super Video Graphics Array

**V.G.A** – Video Graphics Array

**L.C.D** – Liquid Crystal Display

**W.W.W** – World Wide Web

**SD** – Standard Deviation

**SE** – Standard Error

## CHAPTER TWO:

### LITERATURE REVIEW

#### 2.0 Discussions from Others

The fundamental skills of reading, writing, arithmetic remains the cornerstones of schooling and student learning. Studies have shown that students with routine access to technology learn these basic skills faster and better when they have a chance to practice them using technology. One of the reasons cited for this improvement is that students are engaged by the technology. As a result, they spend more time learning and practicing the basic tasks than students who approach the same tasks in a traditional paper-pencil manner. Students are more motivated to learn when technology is part of their daily school experience. (David, et al., 1997).

To communicate is to make known or share information, thought or feelings. Information is known or facts. Technology is the application of practical or mechanical sciences to industry or commerce. Scientific methods are used in a particular field. Information technology is the use of computers and electronic technology to store and communicate information. Educate is to teach or provide school for. (Collins, 1998). Education would be more meaningful if I.C.T was to be used in all parts of the curriculum development.

According to Debono (1969), technology has so speeded things that ideas may have to be changed with a generation, instead of between the generations. Yet our culture and education have always been concerned with establishing ideas not with changing them.

Education technology has two meanings of them the term “Educational Technology” as Technology-I and Educational Technology-II (Narayan, 1990)

Educational Technology-I refers to the application of principles of engineering or technology to instrumentation useful to teaching practice. In 1960 Finn and others used education technology in this sense which is the hardware approach emphasizing the need for developing audio-visual aids for teaching. The teaching machine is the only mechanical aid e.g. slide projector, film projector etc. (Narayan, 1990).

Educational Technology-II refers to the application of scientific principals to instruction; this is the kind of meaning Skinner, Gagne, Pask gave to educational technology. For them, instruction is a presentation problem. The Educational Technology-II emphasis objectives and performance in the sense that the teacher himself brings previously specified behaviours up to a specified level. These behaviours are concrete, observable and measurable. They consist of acquisition of knowledge, skills attitudes and the like as desired by the teacher. This conception of Education Technology is essentially problem-oriented. (Narayan, 1990).

The findings of a research study conducted by Rockman et al. (2000) supports technology's positive effect on writing skills. Researchers found that students who use laptops regularly at school and at home are better writers, outperforming their peers in all four scored areas of writing assessment – content, organisation, language/voice/style, and mechanics. When asked what impact using laptops had on their writing, students reported

that computers allowed them to do more extensive editing, which led to better writing. (Rockman, et al, 2000).

Research has also shown that the benefits of technology go well beyond the classroom. A study conducted by the U.S. department of education revealed that when schools provide students with home computers and modems so that they could connect to the schools networks. This made the students to increase the amount of time spent on educational activities outside school. Furthermore, students with home computers spent less time watching television, hence enhancing their problem solving and critical skills, improved their writing and mathematics skills, and showed greater computer literacy. (U.S. Department of Education, 1996).

Technology deployed in education can help remove inequalities between the schools of the inner city and the suburbs, between cities and rural districts. Technology can become the force that equalizes the educational opportunities of all children regardless of location and social and economic circumstances.

Education technology has the potential to provide equal learning opportunities in several ways. Grabe and Grabe (1996) notes that technology in the form of telecommunications allows access to people (through on-line discussion groups, interactive conferences, and interactive tutorials), and access to files through on-line databases, library holdings on a local or campus wide network, and text and graphic files on the internet).



Jan Weeks, a librarian at North Knox high school in Bicknell Indiana, explains how the use of Internet helps students learn communication and research skills and allows them to connect with sources of information across the globe. Applications of technology can provide quick access to information that otherwise might not be available, like distance learning whether conveyed by satellite or Internet. Also can deliver instruction and access to expertise on various subjects that may not have been available to some schools. As Terrett (1993) points out, “the use of technology, even though viewed by some as expensive and unnecessary, creates a cost-efficient mechanism that gives students access to materials and resources that were previously unavailable”(p.30). Such access to resources, especially the wealth of information available through the Internet’s World Wide Web (www), provides foundation for school-based and work-based learning. (Weeks, 1994).

Without equitable access to high – technology, the gap between the technology “have” and the “have nots” will widen, further exacerbating the already troubling display in the quantity and quality of educational resources that are available to different populations because of location or socio-economic conditions. (Weeks, 1994)

Barbara Singleton, director of technology and curriculum at North Knox high school in Bicknell, Indiana, discusses the information gap results when students do not have the opportunities to access the Internet and use other education technologies. According to Means and Oslon (1995), access to educational technology at school can give students from low-income homes, where there is little or no access to technology, “a needed edge

to compete with children coming from more affluent homes, where technology is commonplace” (p.103). Guaranteeing access for all classrooms to affordable education technology in order to achieve curricular goals makes it possible to address the inequalities that exist among schools and districts in the availability of instructional resources. (Singleton, 1994).

Yet, the mere presence of education technology in schools is not guarantee that it is providing academic benefits to students. Many at-risk students attend schools where available technologies are not being used to enhance student productivity, support collaboration, or engage students in authentic learning experiences. DeVillar & Falties (1991) point out that when computers are present in schools serving at-risk students, they usually are used for drill-and-practice programmes on basic skills rather than as tools to support students in designing their own projects. Ensuring equitable means that all students; regardless of class, race, culture, gender, socio-economic status, or physical limitations; have equal opportunities to participate in meaningful and authentic applications of educational technology. To realize the benefits of education technology, the following notes were made by Kozma and Croninger (1992), “teachers, school administrators, and policymakers must ensure that all students have access to these technologies, that the technologies are used effectively, and other aspects of schooling also promote high levels of student learning” (p.440). (Singleton, 1994).

## **2.1 Becoming Proficient Users of Technology**

Studies show that once students become familiar with technology, they quickly develop proficiency in its use. This opens an exciting new world of learning possibilities for them, and their potential for achievement skyrockets. Students gain skills and become familiar with new technologies that will help prepare them for future success in an increasingly technological world. Even the most basic tools can help young learners become more productive. Researchers involved in the Apple Classrooms of Tomorrow (ACOT) project revealed that third-Grade students found it easier to write with keyboard than with a pencil or a pen. Because writing was easier, they wrote more. By writing more, they learned to write better. (David, C. et al, 1997).

Web browsers make it easy for students to find in-depth information on just about any subject, while basic software tools such as databases, spreadsheets, and concept maps help them to organise and evaluate the data they find online. As a result, students express their ideas more clearly and creatively, using a variety of communications media including words, images, audio, and video. Technology also helps students create work that looks more professional. So when it's time to hand in or publish their work, students take pride in sharing it with their peers, parents, and teachers. (David, C. et al, 1997).

In classroom, many teachers are turning to digital media to strengthen students' basic skills. Using video technology, it brings class material to life in a way that stimulates young minds and facilitates learning. By incorporating pictures, sound, and animation, multimedia significantly enhances students' ability to recall basic facts, as well as

improving their understanding of complex systems. (U.S. Department of Education, 1996). One reason for this improvement may be that digital media tools can be used to address each student's individual learning style, thereby empowering all students to achieve their potential.

Gaining technology proficiency helps students learn more effectively, and it also improves their desire to learn. One study shows that students who have access to laptop computers explore topics on their own and work longer on school projects. In an interesting side note, the same study revealed that students with regular access to laptops are more confident in their computer skills. That confidence often translates into better performance in the classroom. (Rockman, et al, 2000).

## **2.2 Motivating Students to Higher Levels of Achievement**

One of the important contributions technology makes in the classroom is how it affects students' attitudes toward learning. Students have shown that when technology is a routine part of their school experience, students' attendance improves and dropout rates decline. When ACOT students were compared with their non-ACOT peers in the same high school, absenteeism was about half in the ACOT classes compared to the rest of the school. (David, C. et al, 1997). Over the five years of study, there were no dropouts in the ACOT programme, while thirty percent (30%) of the student body dropped out from the programme. This result is of crucial importance.

Research shows that more students finish high school and many more consider attending college when they routinely learn and study with technology. Fewer than half of the students in the ACOT study came into the programme with any interest in pursuing college. Overall, in the school where the study took place, only fifteen percent (15%) of the graduating students went on to college. Not only did hundred percent (100%) of the students in the ACOT classroom graduate, but more than ninety percent (90%) went on to college. (David, C. et al, 1997).

Studies show that students who graduate in student-centred learning programmes score consistently higher in every subject area on standardised tests. (eMINTS, 2002, Endeavour Group, 1999). Teachers with routine access to computers tend to employ teaching practices that put students at the centre of learning. They focus their lessons on discussion rather than lecture, encouraging student-led inquiry and emphasizing thinking skills. (Rockman, et al, 2000). In this way, technology offers greater opportunities for learner control and greater connections between class work and the real world. (Lenaya, et al, 2000).

Technology encourages students to take charge of their education. In classrooms where technology is part of the curriculum, students are more likely to initiate learning-based activities, sometimes even directing them. (Lenaya, et al, 2000). In addition to exploring topics more often on their own, students who regularly use laptops assume a greater variety of roles in the learning process, helping to teach other students and even their teachers. (Rockman, et al, 2000).

Perhaps most important, students need to discover the joy of learning. If students are to function effectively in this ever-changing world, they must continue to learn every day of their lives. Technology can help instil in students an eagerness to learn that will follow them throughout life and better enable them to reach their goals.

In general, students respond positively when given the chance to actively participate in the process via technology. They come to class eager to learn and take more pride in their work. (Rockman, et al, 2000). By giving students greater control of their education and increasing their motivation to explore and discover, technology plays a major role in instilling in students a love of learning that will help them to reach new heights of achievement not only in school, but also throughout their lives.

### **2.3 Preparing Students with 21<sup>st</sup> Century Skills**

As the world becomes more complex, the skills that students need to acquire and master are quickly changing. The rise of the global economy, an increasingly multicultural society, and rapid changes in technology requires students to learn and apply new skills in their academic and career endeavours. Students need to learn to communicate more effectively, both through speech and written word. They need to learn how to work with others to find new and better ways to solve problems and meet the challenges of everyday life. They need to develop skills they can use in college or the workforce.

The ACOT studies have revealed that in classrooms where technology is used, students interact more with their peers and teachers than in traditional classrooms. Students change the manner in which they organise and accomplish their work, choosing to work collaboratively to solve complex problems. (David, C. et al, 1997). They routinely employ inquiry, collaboration, technology, and problem-solving skills uncommon to graduates of traditional high programmes. Collaboration becomes a learning tool, a means to an end, not just a chance for students to socialise. (Lenaya, et al, 2000). A research study on learning with laptops showed that the use of laptops encouraged even greater collaboration among students. During the study, on average, students with laptops worked in groups several times a week, compared with a few times a month before the laptops were introduced in their classrooms. (Rockman, et al, 2000).

Technology provides powerful tools for organising and analysing information and modelling concepts and underlying structures. Students who have the opportunity to use these tools gain a deeper understanding of complex topics and concepts and are more likely to be able to recall information later in life and use it to solve problems in non-schools situations. (Lenaya, et al, 2000).

The discussions have shown that whenever I.C.T is used in the instruction, the performance in I.C.T with and without the inclusion of other subjects is improved. It can be seen as an example in the ACOT studies by David, et al (1997). From the research carried out, the impact in performance in all other subjects is greatly improved when I.C.T is included just like other researchers have shown in their research findings.

## **CHAPTER THREE:**

### **METHODOLOGY**

#### **3.1 Introduction**

A sample of learners shall be picked in the second year of candidates in the Moi Teachers Training College. There is a better expectation of the population level of the subject understanding because even those who may have joined the college without having any clue of the subject have now known what it is. It is the expectation of the research that the learners in level ground to give the true information especially after getting the studies for second year of their study. The mock examination results shall be used in the study for the students, which are done only one term to end the course period. This makes the learners to have a good experience of the subject and the learning procedure to be better for the research contributions. The views for learners are expected to be true and all stand an equal consideration the year of study.

#### **3.2 Research Scope and Design**

The researcher will work on the suggested year of study, which is second year. The mock examinations results shall be used which are usually administered in the fifth term study as the second last term for the course. All the students in the year shall be given an equal opportunity of participation in the research data collection.

#### **3.3 Target Population**

The second year students of the academic year 2006-2007 are the target population. They are three hundred and sixty two (362) candidates. This includes both men and women.



The second year students were used as they had been in college for at least one year of study hence giving them enough knowledge to answer the questionnaires with the true understanding of the subject. A sample is taken from the nine classes of the second years comprising the group studied.

### **3.4 Data Collection and Analysis**

A checklist was designed by the researcher to help in data collection. A questionnaire was used in assisting the researcher to get the rest of the information from the students for the research that may be of much help in making conclusions. When analysing the data collected, the researcher used both quantitative and descriptive statistical analysis.

### **3.5 Sampling and Sample Size**

Stratified method of sampling was applied to separate the nine classes of the second year group. In each group, random sampling was applied. A sample of sixty-three (63) students was taken from the population. This is to comprise approximately seventeen percent (17%) of the population. Because of the stratification of the classes, each class contribute seven (7) students to the sample size randomly.

### **3.6 Research Instruments**

The researcher developed a checklist to be used in the extracting of information from the records of examination done by the students. A questionnaire shall also be used in the collection of the rest of the information from the student.

### **3.6.1 Checklist**

The checklist was applied to all the sampled students records of examination. The information shall be used to calculate the relationship of the schools in I.C.T only against the overall performance of the candidates in the examination. Checklist items are a matter of “fact” not of “judgement”. They are important tools in gathering facts for educational surveys, instructional procedures game facilities etc. (Kkoul, 1993).

### **3.7 Data Analysis**

The statistical package for social sciences (SPSS) will be used to analyse the data collected where necessary and appropriate. SPSS is the most commonly used set of computer programme in educational research. It is comprehensive, integrated collection of computer programmes for managing, analysing and displaying data (Gall & Borg, 1996). Tables, means, frequencies and percentages were used to summarize the data by the researcher. In areas where comparison and more of display of the findings is needed, the researcher used graphical illustrations for easy and faster understating of the results by all.

The analysis of variance (ANOVA), the student’s t-test and the Pearson product analysis have been used. These analyses assisted in the determination of the significance of the findings. Otherwise without them the hypothesis can not be justified.

## CHAPTER FOUR:

### ANALYSIS, RESULTS & DISCUSSIONS

#### 4.1 Results and Analysis

The questionnaires were randomly given to the nine classes within Moi Teachers College – Baringo second years. The random sampling numbers were applied on each class separately. Sixty-three (63) questionnaires were dispersed, but only fifty-eight (58) questionnaires were received back. Eight (8) questionnaires were not returned. Out of the fifty-eight respondents; the following are the findings of the research as the raw data for use in analysis.

The respondents said their homes were located as shown in the table below:

**Table 1: Residents Home Backgrounds**

Home place	Number of respondents	Percentage	Mean
Market place	04	6.90	0.07
Municipality	09	15.52	0.16
Just rural	45	77.69	0.78
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

In table 1 above, it true that most learners in the P1 teacher training colleges come from the rural areas. From the data in the table, only about twenty two percent (22%) of the total population comes from those places that can be termed as urban. Due to this, it is clear that unless these learners had joined schools, which could give the opportunity to interact with the I.C.T facilities, otherwise it could be difficult for them to find these

facilities in their rural homes. This is evident because approximately seventy eight percent (78%) comes from the rural areas.

The respondents have the following as their gender ratio. In some classes there were more women than men or more men than women responding but by coincident the ratio was equal after compiling the total respondents.

**Table 2: Gender for the Respondents**

<b>Gender</b>	<b>Number of respondents</b>	<b>Percentage</b>
<b>Men</b>	<b>29</b>	<b>50.00</b>
<b>Women</b>	<b>29</b>	<b>50.00</b>
<b>Total</b>	<b>58</b>	<b>100.00</b>

In table 2 above, the sampled respondents came to equal in gender for both men and women. This was just a coincidence from the returned questionnaires, of which may be could have been different if all the questionnaires were returned.

Those students who had studied I.C.T in there high schools before coming to college were as follows:

**Table 3: I.C.T Knowledge from High School before Joining College**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
<b>Yes</b>	<b>10</b>	<b>17.24</b>	<b>0.17</b>
<b>No</b>	<b>48</b>	<b>82.76</b>	<b>0.83</b>
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

In table 3, most of the learners did not study I.C.T in high school. This is shown by the data represented in the table because only seventeen percent (17%) had studied I.C.T in their high schools. This could be supported by the fact that in table one most of the learners agreed to have come from rural homes where the I.C.T facilities are not common.

Those students who had studied I.C.T studies elsewhere after high school were as follows:

**Table 4: Knowledge from Elsewhere before Joining College**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
<b>Yes</b>	<b>13</b>	<b>22.41</b>	<b>0.22</b>
<b>No</b>	<b>45</b>	<b>77.59</b>	<b>0.78</b>
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

About twenty two percent (22%) of the learners agree that they studied I.C.T elsewhere after high school. This is seen in table 4 where data reflects this information. Given the fact that most of the learners come from rural areas, it could be very difficult for them to find I.C.T facilities within their home areas.

According to the levels of various secondary schools that we have, the respondents categorized their high schools of attendance as the following:

**Table 5: Secondary Levels Attended by the Respondents**

<b>School</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
National	0	0.00	0.00
Provincial	32	55.17	0.55
District	21	36.21	0.36
Private	5	8.62	0.09
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

From the data given in table 5, most of the learners studied in provincial schools followed by the district secondary schools. There were very little those who studied in private making only nine percent (9%) of the respondents. There was no respondent who came from a national high school; of which most of those who get this opportunity of attending high national schools also get the opportunity to study I.C.T as their school are better equipped with facilities for I.C.T. Though we see that approximately fifty five percent (55%) studied in provincial secondary schools, most of these schools do not have the I.C.T facilities.

Those who started the study of I.C.T for the first time here in college were as follows:

**Table 6: Respondents starting I.C.T Studies in College**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
Yes	46	79.31	0.79
No	12	20.69	0.21
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

In table 6, we can see that most of the learners have come to study I.C.T for the first time in the college. This makes them to need more time to understand and make it look familiar for them to score like others who may have studied it before. Noting only approximately twenty one percent (21%) of the respondents have agreed not to have started the study of I.C.T here in college, then we should accept that the learners are new to this study.

The respondents who had done other courses that could have something related to I.C.T like typing or secretarial studies before joining the college were as follows:

**Table 7: Respondents Who Studied Other Courses Related To I.C.T**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>
Yes	4	6.90
No	54	93.10
<b>Total</b>	<b>58</b>	<b>100.00</b>

Most of the learners had not done any other study that could have made them realise the relevance of I.C.T as shown in table 7 above. Studies like typing and secretarial may end up using computers together with the typewriters, hence making the learners realise the need to study I.C.T. subject. Only seven percent (7%) of the respondents accepted having done any of the related studies to I.C.T. This gives the degree of ignorance with the learners in this field of I.C.T.

According to the time spent in theoretical I.C.T studies by the respondents, they had the following to say:

**Table 8: Time Spent in Theoretical I.C.T Studies**

<b>Time</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
2 hours and below	42	72.41	0.72
2 - 4 hours	13	22.41	0.22
4 - 8 hours	3	5.17	0.05
Above 8 hours	0	0.00	0.00
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

Most of the learners spend two (2) hours and below in a week to study I.C.T in the theoretical aspects. Noting that these learners are new to this subject of study, one may not accept that majority (72%) should give as few hours as that to the study. Only five percent (5%) have given up to eight (8) hours of study to the subject.

According to the respondents, the time spent by respondents on Practical or applied I.C.T studies are as follows:

**Table 9: Time Spent on Practical Studies of I.C.T**

<b>Time</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
2 hours and below	38	65.52	0.66
2 - 4 hours	17	29.31	0.29
4 - 8 hours	3	5.17	0.05
Above 8 hours	0	0.00	0.00
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>



On practical aspects of I.C.T as seen in table 9, sixty six percent (66%) agree to spend only two (2) hours and below on the practice. Though the number of those who spend two (2) to four (4) hours on practical is approximately twenty nine percent (29%) and higher than those who spend the same amount of time in theory studies which is approximately twenty two percent (22%) as seen in table 8; it is evident that this time may be little considering it is the whole week and a new subject to majority.

The feelings of the respondents on the time they spend on theoretical I.C.T according to their satisfaction is as follows:

**Table 10: Feelings on Time Spent on Theoretical Studies of I.C.T if it is enough**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
No	54	93.10	0.93
Yes	4	6.90	0.07
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

According to table 10, most of the respondents agreed that the time was not enough. For those whose response was no, they had the following to say as seen in table 11.

For those who felt that they were not satisfied on the time they spend on theoretical I.C.T according to their own feelings (that is those who said no), had the following reasons to give:

**Table 11: Views on Time Spent on Theoretical Studies of I.C.T**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
Little time due to other subjects	52	89.66	0.90
No interests	1	1.72	0.02
Any other reason	5	8.62	0.09
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

It is commonly agreed that the reason why little time is spent on theoretical studies of I.C.T. is that there are many other subjects that are to be studied, as table 11 gives approximately ninety percent (90%) of the respondents accepting this. There is approximately two percent (2) of the learners who give their view as having no interest to the study. This may be from the fact that most of the learners come from rural areas as seen in table 1 hence have little or not exposure to the benefits of the I.C.T studies in their living.

The feelings of the respondents on the time they spend on practical or applied I.C.T according to their satisfaction is as follows:

**Table 12: Feelings on Time Spent on Practical Studies of I.C.T if it is enough.**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
No	56	96.55	0.97
Yes	2	3.45	0.03
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

Majority of the learners (97%) had a feeling that the time spent on Practical I.C.T was not enough. For those whom had this opinion had the following to give as the reasons as seen in table 13.

For those who felt that they were not satisfied on the time they spend on practical or applied I.C.T according to their own feelings (that is those who said no), had the following reasons to give:

**Table 13: Views on Time Spent on Practical Studies of I.C.T**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
Little time due to other subjects	35	60.34	0.60
No interests	0	0.00	0.00
Few computers to share	14	24.14	0.24
Limited access to the computer laboratory	6	10.34	0.10
Any other reason	3	5.17	0.05
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

Table 13 gives views on the reasons why the respondents are not satisfied with the time they spend on practical I.C.T as to little time due to other subjects, few computers, limited access to the computer laboratories among other as approximately, 60%, 24%, 10%, and 5% respectively. This gives mixed views but in all we can agree that the reasons are mainly time sharing because of the other subjects demand.

The following are the views of the respondents on the study of I.C.T in teacher training colleges:

**Table 14: Views on the Overall Study of I.C.T in Teacher Training Colleges**

<b>Response</b>	<b>Number of respondents</b>	<b>Percentage</b>	<b>Mean</b>
Very necessary	49	84.48	0.84
Necessary	9	15.52	0.16
Not necessary	0	0.00	0.00
<b>Total</b>	<b>58</b>	<b>100.00</b>	<b>1.00</b>

In table 14, all the respondents agree that it is of importance for all the teachers being trained to study I.C.T in their training. This gives better hope in the new subject, as resistance expected must be minimal. Out of this, it is expected that every learners always puts a lot of effort to discover and learn more on the subject though other factors may be there to limit them.

The respondent's examination results in I.C.T, other common subjects, and both I.C.T and other common subjects combined as in the last terms mock examinations is as shown in the table in appendix III:

In table 15 in appendix III, the performance of the learners in I.C.T alone, other subjects average, and the two combined (70.9, 61.6, and 66.3) respectively in mean as shown. Most of the students would score better in I.C.T alone than other subjects combined. This may be brought by the fact that the subject being new, most of the learners are keener on it and the interest they have in the subject. It could be a good image to the learners to use the subject to study as one of the service subject in training.

Below is a figure to illustrate the performance of the respondents in table 15.

**Figure 1: The Results on Respondents Scores in the examinations**

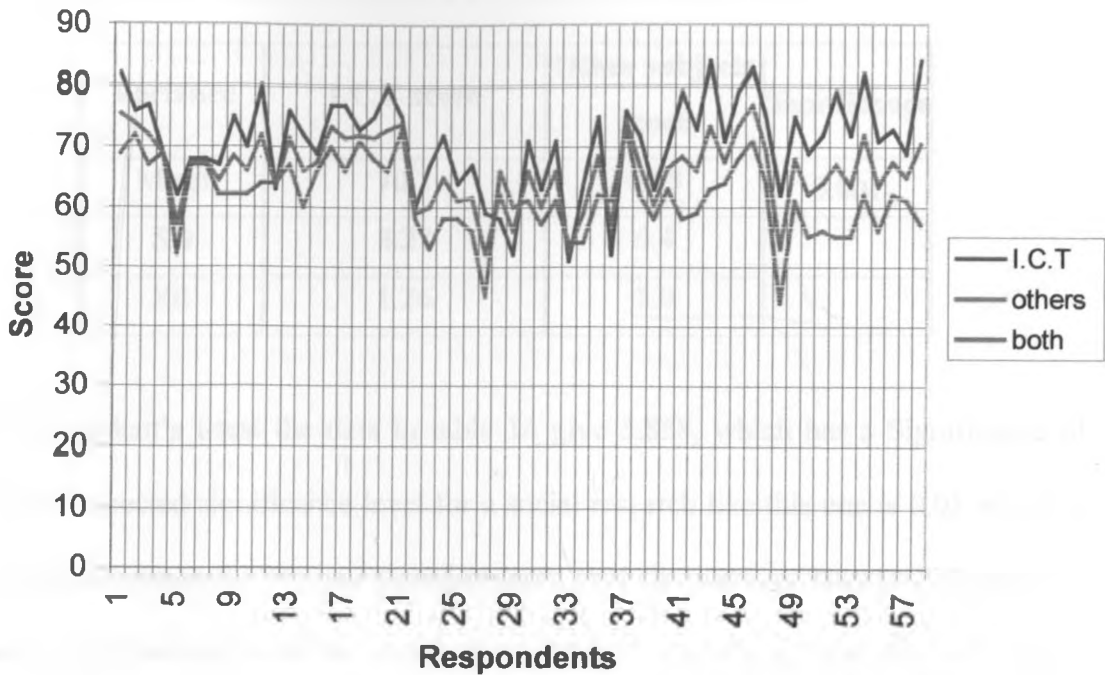


Figure 1 shows that I.C.T could be a motivating subject to the learners as they can perform at least slightly better than the rest of the subjects though almost the same. The Performance of I.C.T as in figure 1 affects the overall performance of the learners; we see that the I.C.T score assisted in making the average score better when included. It means that if I.C.T was not there, the learners could have scored a lower average as shown by the figure when I.C.T is not included.

The variances and means of those who never studied I.C.T before joining college in their performance is as follows in table 16:

**Table 16: Those who had not studied I.C.T before joining college**

<b>Variance</b>	<b>I.C.T score</b>	<b>Other subjects score</b>	<b>Significance</b>
Mean	70.1	60.8	0.001
SD	8.27	6.4	
SE	1.26	1.0	

Using the student's t-test the data in table 16 give 5.858, which has a Significance of 0.001. The expected significance level for a social research like this one is 0.05 which is not a medical research. We can therefore note that the learners have a difference in performance in learning with the introduction of I.C.T even though they had not studies I.C.T before joining college.

The variances and means of those who had studied I.C.T before joining college in their performance is as follows in table 17:

**Table 17: Those who had studied I.C.T before joining college**

<b>Variance</b>	<b>I.C.T score</b>	<b>Other subjects score</b>	<b>Significance</b>
Mean	73.1	64.2	0.001
SD	5.93	5.28	
SE	1.53	1.36	

Using the student's t-test the data in table 17 gives 4.333 reading from the t-table, which has a Significance of 0.001. The expected confidence level for a social research like this

one is 0.05. We can therefore note that the learners have been affected in the performance by the introduction of I.C.T even though the respondents had studied I.C.T before joining college. From what is seen in table 16 and 17, the average performance of the learners has improved which can be an indication that previous studies in I.C.T is good advantage in assisting the general performance of learners.

Using the student's t-test the performance of I.C.T and other subjects for those who had studied I.C.T before joining college and those who had not studied I.C.T before joining college had a significance of 0.02. This evidence that the study of I.C.T has influence in the way students perform in their studies.

#### **4.2 Analysis of Variance**

To calculate a variance in two or more variables an Analysis of Variance (ANOVA) is one of the mostly used methods. We can have ANOVA calculated in one factor, two and so on but for this calculation is one factor ANOVA to test an  $H_0$  hypothesis derived from the research question. The  $H_0$  is that there is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

Using the data in table 15, we can have the analysis to test the hypothesis using a significance level of 0.05 from the F-table. The points to be noted in the calculation are: Grand total (GT) of  $\Sigma X$  is 7685, correction factor (CF) i.e.  $(GT/n)^2$  is 509131.25, corrected sum of squares (CSS) total i.e.  $(\Sigma X^2 - CF)$  is 8173.75, CSS scores i.e.  $((\Sigma X$

I.C.T scores/n) + ( $\Sigma$ X Others scores/n)) –CF) is 2467.46 and the CSS error i.e (CSS total – CSS scores) is 5706.29. This can be further given in a table referred as the ANOVA table as seen in table 18.

**Table 18: ANOVA Table**

Sources of Variance	CSS	df (n-1)	MSS	F
Scores	2467.46	1	2467.46	49.29
Error	5706.29	114	50.06	
Total	8173.75	115		

From table 18, the calculated f-distribution score is 49.29 while the f-distribution score from the table is 3.92. This gives us a significance acceptance. From this we can reject the  $H_0$  hypothesis and say that there is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

### 4.3 Pearson Product Moment Correlation

The Pearson product moment correlation ( $r$ ) is the most popular measure of correlation. It is used when both variables are continuous (parametric) like the data we have in table 15, where both have scores. To test the null hypothesis that there is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects, we can use the data shown in table 19 in appendix III for the I.C.T scores and other subjects for every learner respondent in the research findings. I.C.T scores are represented with X while other scores are represented with Y.



Using table 19 in appendix IV, we can analyse these finding for r as follows;

$$r = ((N\Sigma XY - (\Sigma X) (\Sigma Y)) / \sqrt{((N\Sigma X^2 - \Sigma X^2) (N\Sigma Y^2 - \Sigma Y^2))}) \quad r = 0.005041904$$

From this analysis we can conclude that there is significance. We therefore reject the  $H_0$  hypothesis that there is no significant difference in performance of learners with the newly introduced Information and Communication Technology subject in the P1 teacher training colleges with and without the inclusion of other subjects.

#### 4.4 Discussions

P1 teacher training colleges train teachers for a certificate course. Most of the learners come from rural areas as seen in table 1. This could be because most of the urban learners may opt to join other colleges that are not for teaching professions. Though the society values teachers, most of the urban people may not value teaching as a good profession depending on the previous understanding. The I.C.T subject has been there for long, but it was not incorporated in the teaching profession; hence making some of the people not to think it. This has made people get to other professions being offered in urban areas and not I.C.T.

Those students who had studied I.C.T in high schools and elsewhere are few as compared with the rest as can be seen on table 3 and table 4. This may not mean that those students were the only students who may have studied I.C.T in the high schools. May be some of the learners who had studied I.C.T opted to study other professions or even continue with I.C.T studies which was not initially offered in the teacher training colleges. Hence the

learners may not have known about the opportunity of continuing with I.C.T studies even when they were to be teachers.

Most of the learners come from provincial and district secondary schools, where the level of facilities may not be very good, as seen in table 5. None came from national high schools and very few (9%) came from private schools as seen in the table. This gives the P1 teacher training colleges the opportunity of training most of the common students and from low income population where the learners went to the schools available without the worry of the facilities in them. The funding in the secondary schools and facilities cannot be compared to national schools and private schools.

The responses from the learners give the picture that most of them had their study of I.C.T for the first time in college as seen in table 6 and table 7. This being the case, the teaching of this subject should be given priority to the learners in both the practical and theory studies as the analysis in tables 8 and 9 gives very little time available for I.C.T studies.

Most of the learners complained about the little time allocated and available for them to study I.C.T. Tables 10 and 11 shows the response where approximately ninety seven percent (97%) of the respondents agree that the time is not enough. Further in tables 12 and 13 we have the reasons given as to why they see time not being enough.

Since every respondents had the feeling that it is necessary to study I.C.T, then it could be important in having more priority in the time allocation to the study so as to support the practical and theory study of the subject effectively and to all as it will be used in as a service subject in research to other subjects study.

## CHAPTER FIVE:

### SUMMARY AND RECOMMENDATIONS

#### 5.1 Summary

The data was collected from the second year students in Moi teachers training college. A sample of 63 learners is taken randomly from the entire population of 362 learners.

The researcher discovered that most of the learners came from rural areas and attended the normal secondary schools. This made most of the respondents not have the opportunity to study this new subject elsewhere. The reasons could be that there is ignorance in all ways from the teachers and learners.

Learners have given full support to the subject in acceptance and willingness to study even more on the same. Since every learner agreed that it was necessary to study this subject, then full realisation and support is to be given to the subject.

The study and performance of this new subject (I.C.T) should be credited as it has assisted the learners to do better in their studies. Even as we limit ourselves to this research, it should be noted that the world is entirely relying on the usage of I.C.T in all its uses not only in studies.

The significance in the performance of students with the help of I.C.T should be given support to be realised in full as there are many advantages of using this subject in our day to day curriculum instruction in learning institutions. This is seen in the following

analyses. In the analysis of variance, the researcher found a score of 49.29 which is significant from the f-distribution score of 3.92. The student's t-test gave a significance of 0.02 while the Pearson product moment correlation, the significance is 0.005441904 in full. This gives significance to the three analyses used. The significance here is realised with the positive performance when I.C.T is included in the scores of the learners. The aim of the research was to find out if there was an impact in the student's performance with the introduction of the I.C.T subject. The I.C.T study is significantly influencing the performance of the learners positively.

## **5.2 Recommendations**

The researcher recommends that for the teacher training colleges to have learners with equal entry strengths in the study of I.C.T, all the high schools should start offering I.C.T as a subject. This will make the rural and urban learners to be equal in the knowledge of technology application.

Internet usage should be availed in all learning institution to make sure that all the learning environments are having similar opportunities of research as the I.C.T offers the relevant knowledge to assist one be able to browse the web pages for the world covered as a village.

Always for smooth training of I.C.T, the entire teacher training colleges should employ laboratory technicians for their continuous servicing and regulate students practicing time

in the laboratory. Otherwise, it is difficult for an instructor to remain the laboratory all through to allow students have more time for practice.

The research recommends that more research should be carried down to discover more on this subject implications to the education system as at present the government talks of introducing e-learning in schools. This is to be noted some school do not understand anything about e-learning not even the teachers.

### **5.3 Suggestions for further Research**

The researcher suggests that more research be carried out in this field of study regarding the introduction of I.C.T studies in some of the following areas such as the facilities availability in the teacher training institutions, the personnel for training, servicing and maintaining these I.C.T facilities and the laboratory standards.

Further research should be carried out in the software facilities available in these teacher training colleges to show the similarities in the methods of study and the closeness to the methods per the software being used.

Further research should be carried out to find out the administrative support given to this subject in replacement and upgrading of the software and other facilities in the I.C.T study.

## 5.4 Conclusions

The subject of technology that is I.C.T has a big impact to the life of people and not only the learners in teacher training institutions. In this research, we can conclude that it will be good if all the learners had studied I.C.T before joining college to enable the usage of the technology in studies to be more efficient.

Learners would prefer to have more time in the applications of I.C.T as seen in table 11 and 13 in this research. It is good that the government is trying to make I.C.T studies applicable to all regardless of the location of residence, the schools attended or the gender of the learners.

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## APPENDIX I

### QUESTIONNAIRE

#### Note to the interviewee.

This is a questionnaire to collect information important in the development of the newly started I.C.T subject together with its usage to other subjects, as it is a service subject.

You are requested to give the correct and only correct information. Your co-operation is highly valued, as this will determine the success of the survey. Please do not write your name anywhere on this questionnaire. The confidence is guaranteed to you that your views will be treated confidential in all circumstances.

#### PART A

##### Learner Background Information

S/N .....

*(Tick or comment as requested)*

1) Where is your home located?

a) Market place

b) Municipality

c) Just rural

2) What is your sex?

a) Male

b) Female

3) Had you taken computer studies in secondary school before joining college?

a) Yes

b) No

4) Had you taken computer studies elsewhere before joining college?

a) Yes

b) No

5) Categorize your last secondary school you attended before sitting for your O level exams (form four)

a) National

b) Provincial

c) District

d) Private

6) Where is your home located?

a) Market place

b) Municipality

c) Just rural

7) Did you start your I.C.T studies for the first time here in college?

a) Yes

b) No

8) Had you done any other course related to computer studies like typing or secretarial before joining college?

a) Yes

b) No

**PART B**

**Learner Information on the I.C.T Studies**

1) How can you categorize the time you spend in theoretical I.C.T Study aspects in a week?

- a) 2 hours and below
- b) 2 – 4 hours
- c) 4 – 8 hours
- d) above 8 hours

2) How can you categorize the time you spend in practical or applied I.C.T Study aspects in a week?

- a) 2 hours and below
- b) 2 – 4 hours
- c) 4 – 8 hours
- d) above 8 hours

3) Is the time you spend in theoretical I.C.T study aspects in a week enough to your satisfaction?

- a) Yes
- b) No

i. If no, what is the reason?

A. Little time due to other subjects demand

B. No interest

C. Any other reason .....

.....

4) Is the time you spend in practical or applied I.C.T study aspects in a week enough to your satisfaction?

c) Yes

d) No

i. If no, what is the reason?

A. Little time due to other subjects demand

B. No interest

C. Few computers to share

D. Limited access to the computer laboratory

E. Any other reason .....

.....

5) What is your view about I.C.T studies in the teacher training colleges?

a) Very necessary

b) Necessary

c) Not necessary

6) Give an opinion to the study of other subjects in teacher training colleges today?

.....

.....

## APPENDIX II

### Check List

**Learner Examination in other Common subjects**

**S/N .....**

1) Score in I.C.T studies

a) Below 50

b) 50 – 65

c) 66 – 80

d) Above 80

2) Average score in other common subjects

a) Below 50

b) 50 – 65

c) 66 – 80

d) Above 80

3) Total average score for the common subjects I.C.T Included

a) Below 50

b) 50 – 65

c) 66 – 80

d) Above 80

### APPENDIX III

**Table 15: The Results on Respondents Scores in the examinations**

<b>Respondent</b>	<b>I.C.T (%)</b>	<b>Others (%)</b>	<b>Both (%)</b>
01	82	69	76
02	76	72	74
03	77	67	72
04	69	69	69
05	62	52	57
06	68	67	68
07	68	67	68
08	67	62	65
09	75	62	69
10	70	62	66
11	80	64	72
12	63	64	64
13	76	67	72
14	72	60	66
15	69	66	68
16	77	70	74
17	77	66	72
18	73	71	72
19	75	68	72
20	80	66	73
21	75	73	74
22	60	58	59
23	67	53	60
24	72	58	65

25	64	58	61
26	67	56	62
28	59	45	52
29	58	66	62
30	52	60	56
31	71	61	66
32	63	57	60
33	71	61	66
34	51	54	53
35	64	54	59
37	75	62	69
38	52	61	57
39	76	73	75
40	72	62	67
41	63	58	61
42	70	63	67
43	79	58	69
44	73	59	66
45	84	63	74
46	71	64	68
47	79	68	74
48	83	71	77
49	75	64	70
50	62	44	53
51	75	61	68
53	69	55	62
54	72	56	64
56	79	55	67
57	72	55	64



58	82	62	72
59	71	56	64
60	73	62	68
61	69	61	65
63	84	57	71
<b>Mean</b>	<b>70.9</b>	<b>61.6</b>	<b>66.3</b>
$\Sigma X$	<b>4110</b>	<b>3575</b>	
$\Sigma X^2$	<b>294708</b>	<b>222597</b>	

**APPENDIX IV**

**Table 19: Pearson Product Moment Correlation (r) Scores Table**

<b>Respondent</b>	<b>X</b>	<b>Y</b>	<b>X<sup>2</sup></b>	<b>Y<sup>2</sup></b>	<b>XY</b>
1	82	69	6724	4761	5658
2	76	72	5776	5184	5472
3	77	67	5929	4489	5159
4	69	69	4761	4761	4761
5	62	52	3844	2704	3224
6	68	67	4624	4489	4556
7	68	67	4624	4489	4556
8	67	62	4489	3844	4154
9	75	62	5625	3844	4650
10	70	62	4900	3844	4340
11	80	64	6400	4096	5120
12	63	64	3969	4096	4032
13	76	67	5776	4489	5092
14	72	60	5184	3600	4320
15	69	66	4761	4356	4554
16	77	70	5929	4900	5390
17	77	66	5929	4356	5082
18	73	71	5329	5041	5183
19	75	68	5625	4624	5100
20	80	66	6400	4356	5280
21	75	73	5625	5329	5475
22	60	58	3600	3364	3480
23	67	53	4489	2809	3551
24	72	58	5184	3364	4176
25	64	58	4096	3364	3712
26	67	56	4489	3136	3752
28	59	45	3481	2025	2655
29	58	66	3364	4356	3828
30	52	60	2704	3600	3120
31	71	61	5041	3721	4331
32	63	57	3969	3249	3591
33	71	61	5041	3721	4331

34	51	54	2601	2916	2754
35	64	54	4096	2916	3456
37	75	62	5625	3844	4650
38	52	61	2704	3721	3172
39	76	73	5776	5329	5548
40	72	62	5184	3844	4464
41	63	58	3969	3364	3654
42	70	63	4900	3969	4410
43	79	58	6241	3364	4582
44	73	59	5329	3481	4307
45	84	63	7056	3969	5292
46	71	64	5041	4096	4544
47	79	68	6241	4624	5372
48	83	71	6889	5041	5893
49	75	64	5625	4096	4800
50	62	44	3844	1936	2728
51	75	61	5625	3721	4575
53	69	55	4761	3025	3795
54	72	56	5184	3136	4032
56	79	55	6241	3025	4345
57	72	55	5184	3025	3960
58	82	62	6724	3844	5084
59	71	56	5041	3136	3976
60	73	62	5329	3844	4526
61	69	61	4761	3721	4209
63	84	57	7056	3249	4788
<b>N=58</b>	<b><math>\Sigma X = 4110</math></b>	<b><math>\Sigma Y = 3575</math></b>	<b><math>\Sigma X^2 = 294708</math></b>	<b><math>\Sigma Y^2 = 222597</math></b>	<b><math>\Sigma XY = 254601</math></b>