A COMPARATIVE STUDY OF THE TEACHING OF
OFFICE PRACTICE BY PROGRAMMED INSTRUCTION AND
CONVENTIONAL METHODS IN KENYATTA UNIVERSITY.

BY

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DECLARATION

"This Thesis is my original work and has not been presented for a degree in any other University".

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"This Thesis has been submitted for examination with our approval as University Supervisors.

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DEDICATION

To The memory of My Beloved father, Mwalimu Timothy Maseki Mutavi.

I wish to express my appreciation to my supervisors, Dr. M.M. Patel, Dr. Henry E. Tabor for guidance and

I am also indebted to the students who participated in this experiment which would not have been undertaken

I am very grateful to the people who contributed to the writing of this thesis, diligence and cooperation.

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They gave me the strength to complete this thesis.
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ABSTRACT

This study investigated whether Programmed Instruction can be integrated with Conventional methods in the teaching of Office Practice.

The design for the study was an experimental one. (pretest - posttest control group design).

The subjects were thirty eight university students from Secretarial studies unit of Kenyatta University. There were both Bachelor of Education and Bachelor of Arts students in each group.

Four instruments and a programme were used to obtain data from students. The instruments were: two pretests and two posttests. The t-test for independent samples was used to test the hypotheses. Ho1: and Ho2. Significance level was set at the 0.05 level.

Findings:

1. The two methods, that is Programmed Instruction and Conventional teaching methods have a positive contribution to students performance.

2. Both methods produced improvement in mean performance.
3. Although after the treatment, the comparison between the experimental B.Ed group and the control B.A. group yielded no significant difference in their mean score, the general pattern suggested that Programmed instruction has a more positive contribution to overall performance.

4. The study therefore, shows that Programmed Instruction produced better mean scores than conventional methods.

The findings and conclusions of this study showed that

1. Students taught Office Practice by Programmed Instruction achieved higher score than those taught by Conventional Methods.

2. Programmed Instruction does improve the learning of Office Practice.

3. Programmed Instruction can be integrated with conventional teaching methods in the classroom as it is an effective teaching method.

4. Well written programmes can be used to train workers on the job.
CHAPTER ONE

THE PROBLEM AND ITS COMPONENTS

Introduction

Office practice is a component of Business Education and has received increasing emphasis in recent years both internationally and locally. This is due to developments in information technology and innovations for modern offices.

Kenya adopted the new system of education (8:4:4) in 1985. The rationale for the new system were:

- Improved technical and vocational training, which would ensure that the students graduating at every level have some scientific and practical knowledge that can be utilized for either self employment, salaried employment or further training.
- As a result of this new system typewriting with office practice is one of the options offered in form three and four. According to the Business Education syllabus (1985), the General objectives of office practice course are:

1. To enable the learner to appreciate the purpose and importance of good working habits and procedures in the office;
2. Acquire basic knowledge and skills in the use of materials and equipment commonly found in the office;
3. Develop personal qualities consistent with office etiquette;
4. Understand the inter-relationship of personnel in an office;
(5) Acquire knowledge, skills and attitudes necessary for further training;

(6) Intelligently identify suitable career opportunities.

As can be seen from the above objectives, the 8:4:4 curriculum endeavours to provide basic skills in office studies. Besides the formal school system, other specialized institutions teach office practice to provide potential office workers with relevant skills. While secondary schools provide broad based knowledge because of the growing concern for better trained workers in the international scene, there is need to review the methods of training in this area in order to cope with the new challenges, which Kaliski (1983) observes to be:

1. Increased office automation
2. High competition for few available jobs.

1.1 Background to the study

In any office, whether of a large organization or small organization, information will be received, sorted, acted upon, filed and passed on. This is called the clerical function. This function can be the responsibility of the secretary, the shorthand typist, the typist or of a general clerk or even of a receptionist.

The office provides the means by which each department in
an organization achieves its objectives. Information is used within the organization and also outside the organization. Office equipment such as typewriters, calculators and computers assist the office worker to perform her job with greater efficiency and speed.

Different methods and means of communication are used in an office. The documents are the means of communicating written information from one person to another, within and outside the organization. These documents may be transmitted internally by messengers or externally by document conveying belt system externally through the post office mail services, telex, facsimile telegraphy, word processing or by a computer service.

Oral communication is mainly through the telephone. Because of improved technology, telephones have changed greatly from those old fashioned switchboards to the new PABX (Private Automated Branch Exchange) which enables one to even make external calls without using the operator.

There are also digital call-connect systems with a micro computer that provide internal and external calling, memory, diverting of calls to other extensions, telephone conferences, with six extensions users. This system can place incoming calls automatically in a queuing system so that an operator...
Office automation has taken Kenya by storm. Not so long ago there was a big debate in the Kenyan Parliament as to whether the introduction of computer systems in offices would not rob workers of their jobs? But now office automation is no longer new in developing countries. Harrison (1960) observes that:

the micro-electronic revolution currently taking place in Industry and Commerce is having a big impact in the way offices function and consequently in the role of the office worker.

As Harrison predicted, the office of today is fully automated, computers, data processors etc are there to stay, not to take the jobs of the office worker, but to help him function better, more efficiently and with higher speed.

Increasing numbers of young people start their working lives in offices. In order to carry out intelligently the duties assigned to them they should update their knowledge and skills of office practice. This should include information which a clerical employee should know; knowledge about different office machines and their functions; methods and procedures of carrying out clerical duties, for example

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methods of handling correspondence and keeping records. There is, therefore a need to teach office practice to all students who would wish to work in offices, whether in small organizations or large organizations, and those wishing to go into self-employment. Thus office practice is a skill oriented subject and also serves to help change attitudes of potential office workers.

Advent of information science has affected changes on the nature of office practice, in particular computer revolution has brought radical changes in patterns of educating office workers.

Before the computer age, office workers only needed to learn how to use typewriters, calculators and duplicating machines, but now typewriters have changed, we now have electronic typewriters, word processors, and computers available in most offices. More and more people own personal computers. These new machines have created new demands of office practice. Office practice must now be able to equip office workers and students with the needed skills and knowledge to cope with the new technology. This in turn brings new demands for office practice, because all those workers who were trained to use the old machines must get retrained in order to update them to cope with technological innovation.
Retraining of office workers would require them to get time off from their regular duties, but because of shortage of well trained office workers, it is not always possible for employers to make time available to their employees for retraining.

The use of programmed instruction may solve this problem if workers are retrained on the job. They would only need a good "do it yourself" programme, and thus retrain without leaving their work stations and losing their emoluments.

With the introduction of the 8:4:4 system of education in Kenya in 1986, Business Education became one of the subjects considered to be very important. The importance and contribution of Business Education in Kenyan Education can be realized from the words of P.E. Kinyanjui, then Director of Education (Secondary) in 1986 when he observed that:

The secondary education curriculum is broad-based and builds on the concepts, principles and skills established in the primary cycle. Its main objective is to prepare the learner for self-reliance, training and further education. It will also help to lay a firm foundation for the development of self-discipline, integrity, adaptability, co-operation and patriotism.²

The main purpose of the new system is to enable school leavers at any stage, i.e. standard eight, form four, and university

to be self reliant, be able to get employment or enter into self employment. This is a new innovation in the Kenyan system of education, hence the need to cultivate new methods of teaching office practice to cope with the new emphasis on office related skills.

1.2 Statement of the Problem

The modern office worker faces a serious problem of accessibility to continuing relevant education for office practice for a variety of reasons:

1. There is dynamic new cultural context created by the computer age and other aspects of Information Science;

2. There are new skill demands arising from innovations relating to new roles in Office Practice.

The introduction of the 8:4:4 system of education has placed an added burden on learners and teachers in general. More contact hours are needed to be able to cover the stipulated syllabus, because there are too many skills to cover in too little time available. Therefore there is need to have a programme that will enable the coverage of these subjects in the little time available to prepare more needed office workers.
Programmed learning has been upgraded and truly recognized to be relatively superior to other instructional methods in developed countries. Although programmed learning has been increasingly used in those developed countries, it is quite new to developing countries. That programmed learning research is mainly based in other countries implies the need to investigate its suitability for teaching Office Practice in the Kenyan context.

It is therefore inevitable that new teaching options be found which will enable practicing and the potential office workers to maintain contact with new skills and concepts needed for efficient working.

One such option is programmed learning with the advantage of allowing learners to update their knowledge and skills at a convenient pace. Such an option has however only been tested in environments different from that of Kenya. So before any meaningful adoption is made, there would be need to investigate whether this option is better than conventional methods. This study therefore was an attempt to explore the relative effectiveness of programmed learning and conventional methods in the teaching of office practice. This was done with a view to synthesizing pedagogic implications for possible intervention.
1.3 Purpose of the Study

It has been noted that:

Outstanding performance in teaching as in any profession is achieved only by those who, in addition to a firm grounding in a communicable technology, bring to their practice a high degree of creativity and inspiration.3

With the introduction of the 8:4:4: system of education, the cry in the Kenyan Educational system has mostly been on a need for more laboratories, workshops, machines and equipment, more teachers, more books, with a great emphasis on lack of adequate funds. Little attention has been given to new teaching methods and how they can be integrated with conventional teaching/learning methods, in order to ease the difficulties imposed on the teacher by the current classroom situation. These problems are extremely severe where the teacher has to teach fifty or more students simultaneously as is the case in most schools and universities in Kenya.

Conventional teaching methods especially the lecture method have thus dominated the teaching of office practice. Since no effort has been made to find out whether other innovative teaching methods can be integrated in the classroom in Kenya, students may not be getting maximum benefit at present. Programmed instruction is a learner oriented system

and gives the learner the chance to put maximum effort in his learning. It is self-instructional and this makes the learner more responsible for his own learning.

Because of the increased number of students in a classroom, and increase in office automation, no teaching method should be ignored if it can free the teacher from being the giver of knowledge and become a facilitator of learning or a guide.

This study, therefore, was an attempt to compare the benefits that can be reaped from using integrated teaching methods, i.e. programmed instruction and conventional teaching methods in teaching of certain topics in office practice. This was an attempt to make the student the most important part in the teaching/learning situation. The student either learns or does not learn, but it is the responsibility of the teacher to use all possible methods of instruction that will maximize learning.

1.4 Objectives of the Study

The objectives of this study were:

(a) To compare the benefits that can be reaped from using both programmed instruction and conventional teaching methods to teach the topic of "Filing" in office practice.

(b) To find out whether students taught by programmed
instructions and those taught by conventional methods showed any significant difference in achievement score.

(c) To determine whether programmed instruction did improve learning.

1.5 Statement of the Hypotheses

(1) There is no significant difference in achievement scores between students taught office practice by programmed instruction and those taught by conventional methods.

(2) Programmed instruction does not improve the learning of office practice.

1.6 Significance of the Study

(a) Information gathered in the study will act as a basis for the design of office practice instruction.

(b) Since it was undertaken with teacher trainees, the study sensitized the student teachers to the relative effectiveness of programmed learning and conventional methods.

(c) It will also act as a stimulus for further research on the role of programmed learning in office practice.

1.7 Limitations of the Study

This study was limited to second year University students, both male and female. The students selected were from secretarial studies unit of Kenyatta University.
The study was limited to a comparison of two teaching methods mainly programmed instruction and conventional teaching methods. This was because there are many other teaching methods which were not included in this study because of limited available time.

The study was limited to a few topics because of the time limit, but the topics enabled the researcher to show what an integration of the two methods can do to improve teaching/learning in our system of education.

1.8 Definition of Terms

The following definitions are used in the context of both the problem and the hypotheses.

Programmed Instruction;

A method of learning where a coherent body of knowledge is presented in such a way that, in the absence of a teacher, a learner for whom it is intended is lead through a set of specific behaviours designed and sequenced to make it more probable that he will behave in given desired way in the future.

Conventional Teaching Methods;

Traditional teaching methods which are teacher or text book centred. The teacher does most of the teaching while the
students listen. The students are also taught in groups and most of the marking is done by the teacher.

Method:

In the instructional sense, a systematic plan for presenting information.

Operant conditioning:

A psychological term to indicate the conditioning which results when a subject is required to volunteer the correct response in order to gain reinforcement.

Task Analysis:

Break down a problem into smallest units (sub tasks) required for planning or presentation.

Feedback:

Used in two connections; (i) A student, having made his response, receives feedback from the programme, i.e. he is informed as to the correctness of the response.

(ii) Similarly, the programme writer obtains feedback by examining the responses made by students and can thus adapt the programme.

Reinforcement:

The process of confirming the progress of a student by
making him aware of his correct behaviour as he proceeds. It derives from the psychological view that rewarding an organism makes repetition of the rewarded behaviour more likely.

Initial Behaviour: consists of the behavioural repertoire the student brings to the instructional situation = raw material out of which the terminal behaviour will be shaped.

Intermediate behaviour: The student activity that the teacher uses for the student to reach desired educational objectives.

Terminal behaviour: Comprises the specified final set of accomplishments with which he is to leave the instructional course.

Intrinsic Programme: A programme which is self-regulating and does not rely on any extrinsic device such as a computer.

Linear Programme: An instructional sequence which takes each learner through the same steps and does not allow him to deviate.

Frame: The unit of presentation in an instructional sequence.

Behaviour: An action which can be seen and measured.
Branching Programme: A teaching sequence which allows the learner to choose an answer and routes him to information according to the choice which he has made.

Chaining: Integrating information so that each successive item overlaps.

Constructed response: An answer which involves the learner in conducting an item by writing or compelling a diagram.

Covert responding: An answer which the learner thinks in his own mind, i.e. which cannot be seen.

Criterion behaviour: the behaviour which the programmer expects of the student after completing the programme.

Pre test: the test which the programmer wrote and gave before she started on the instructional sequence, in order to ensure that the test was consistent with the programme objectives.

Post test: the test which the programmer gave after treatment.

Cue: A prompt contained in the instructional sequence to enable the learner to respond correctly.

Instructional sequences: is a progression of behavioural
steps which takes the student through to the attainment of a complex subject matter repertoire.

B.A.: Batchelor of Education

B.Ed: Batchelor of Education

D.O: District Officer

U.S.A: United states of America
CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

There is plenty of written literature on teaching by programmed instruction. Much of this literature is written by writers and for readers in developed countries. There is however little that has been written on their effectiveness in the third world in general and the Kenyan situation in particular. This review of literature will focus on those aspects that are applicable to the Kenyan situation. Drawing heavily on significant work on relevant research done in the field of programmed instruction will help the researcher to uncover ideas about variables that have proven important and unimportant in Programmed Instruction. It will also help to acquire information about work already done by other researchers and which can be meaningfully extended or applied to show the status of work done in Programmed Instruction in terms of conclusions and applications.

Although a good number of studies have been carried out to compare the effectiveness of teaching by Programmed Instruction with teaching by conventional methods outside Kenya, only one such research has been done in Kenya (Mwai, 1986). This was a comparative study of Teaching English Language by Programmed Instruction and Conventional Methods in
secondary school. It is further noted that Programmed Instruction would be a viable method for helping office workers cope with the demands of the modern office. However, the scarcity of the attention to the role of such Programmed Instruction in Office Practice is yet to be overcome.

2.1 The Role of Office Practice in the 8:4:4 Curriculum

Just before independence and soon after, the emphasis in education was to train Kenyans to take over jobs previously held by expatriates. There was a call to Africanise the workforce (Ominde, 1964). After Independence, the National goal of education was to create manpower, promote national unity, remove social and regional inequalities. Now that the above objectives have been fairly accomplished there is the new challenge to educate workers to cope with innovations in technology.

There is a need to teach workers how to manage information. More businesses operate in complex environment and one has to keep up with international trends. New methods of communicating for example the use of facsimile have emerged. Office workers need to cope with the rapid changes occurring in the business environment. In general, the role of Office practice in the 8:4:4 system is to integrate skills and knowledge and to bridge the gap between school and office (Shiundu, 1987).
Whether one will go into entrepreneurship into self-employment, he/she still needs to know basic information about office practice. Stanwell argues that whatever the size of business or office, information will be received, sorted, acted upon, filed for future reference and passed on. Swift and Stanwell (1970) p. 3. In view of this, the kiosk owner for example will need to keep his/her accounts very well, to record his/her purchases and sales, keep daily records and forecast goods needed for the following day, week or month. The wholesale shop owner on the other hand will need to know how to write an effective letter to the area D.O. to get permission to purchase rice from the cereals board. Ominde (1964 p. 304-325).

Before introduction of the 8:4:4 system of education Office Practice was considered to be a non academic subject. It was considered to offer professional education but only a few schools offered it. Generally it was offered to students once they had completed their academic education with a view of preparing them for office work. One of the reasons for introducing the new system of education in Kenya was to try and create a new breed of workers i.e. those who could become self-employed and those who could create jobs for others for example through entrepreneurship. The older system of education introduced by missionaries and the colonial government was to educate
Africans with a view to acquiring cheaper African labour compared to the more expensive Asian labour (Sifuna & Bogonko, 1986).

This new general emphasis on Education for self-reliance has made it imperative that all school goers and those on the job learn office practice. The Kenya National Examination Council syllabus of 1983 described the aim of teaching Office Practice to be:

1. to provide students with a basic understanding and knowledge of Office Practice procedures.
2. to prepare students to organize and present information directly related to the above procedures.

It also recommended the following information to be covered by students:

1. Postal information
2. Handling of mail
3. Telecommunication
4. Filing
5. Office standards, personnel and production
6. Secretarial duties
7. Source of information
8. Agenda and minutes of meetings and correspondence
9. Job application
Most of the above topics are included in the Kenya Secondary Education Business Education syllabus (1985) for Kenya Certificate of Secondary Education. Office Practice is offered in form three and four and is an examinable course at the end of form four. Office practice is useful education for all office workers as well as those in self-employment; in order to be able to function well in the world of competitive business. In the 8:4:4 system of education, the objective of Office Practice curriculum therefore endeavours to provide minimum skills in office related studies. This will enable the Kenyan office worker to cope with increased office automation and especially increased computerized services. Harrison (1960) predicted that in the future it is expected that computer terminals will allow bank customers to carry out more of their banking business from their offices, homes or even while shopping. His prediction has long become a reality in developed countries and is catching up in Kenya as well, for example the Standard Chartered Bank in Kenya currently offers "Money Link" services which allows a customer to do banking business 24 hours a day, including Sundays. This kind of development has removed much of the personal contact between
bank workers and their customers thus denying customers those extra services offered to them previously, for example the usual advice on investments, calculation and verification of interest. The bank customer therefore, will more than ever before need to know how to perform these small duties for himself, or how to find alternative source of the required information. He will have to learn to interpret financial data. The above reasons will continue to put office practice in the right place it will improve the status of office practice, and teachers of office practice will have to find better and more innovative methods of teaching office practice. Programmed Instruction is able to fill this need suitably. As it is able to give this extra needed training of consumers, those in schools, on and off the job. Office Practice teachers therefore need to review both the content and methods used in teaching office practice to be able to keep up with expected levels of competency.

Office Practice emphasises all the three levels of Learning namely:

2. Psychomotor - giving skills and
3. Affective - giving the right attitudes.

This is accomplished by the 8:4:4 office practice curriculum. According to the Business Education syllabus (1985) p. 11, the General objectives of Office Practice are to enable the
learner to:-

1. acquire communication and manipulative skills needed for efficiency within the office,

2. appreciate the purpose and importance of good working habits and procedures in the office

3. acquire basic knowledge and skills in the use of materials and equipment commonly found in the office

4. develop personal qualities consistent with office etiquette

5. understand the inter-relationship of personnel in an office

6. acquire knowledge, skills and attitudes necessary for further training

7. Intelligently identify suitable career opportunities.

The foregoing clearly show that, in the 8:4:4 system of education, office practice is taught/learned to provide students with a general information of office procedures and practices in the business world, with the aim of improving and developing communication skills of speaking, writing, listening, reading and thinking.

2.2 The Impact of Information Science on Office Practice

The office is a concept that has been undergoing a transformation that has been both evolutionary and revolutionary. Denyer (1980) p.v. compares the face of the office life of 1959 to that of 1980's and says that "it has
changed a great deal” in terms of equipment and procedures. Thelma Foster, a renowned writer of secretarial books, has but the thoughts and feelings of many office practice teachers on record when she says that for generations the office science has changed very little, but “suddenly everyone is expected to be familiar with new technology, and equipment often installed in the expectations that it will solve every problem” (Foster (1990): 18.

According to Foster (1990) automation in the office began with the calculator. Today, we have electronic calculators that fit in the wallet and computer equipment that can fit into the briefcase. All this is the result of information science, which has allowed automation. Kaliski (1983) describes automation as basically the concept of the use of machines to perform routine office functions formerly done by people. Automation is said to have first been used in the factories but later found its way into the office; and is seen in such activities as accounting, mail handling, filing, telephone switching systems and reprographics. Kaliski goes on to describe office automation as:

The use of self-regulating machines to perform routine office tasks with a minimum of human effort.4

Kaliski points out several reasons that have led most firms to automate their offices as being:

(a) Feasibility - Automation has proved to be cost-effective for most offices. One can get a good example from the first person one meets when visiting any organization; that is the receptionist. If one was inquiring about the cost of an item, the receptionist would not need to walk all the way to the Sales Department or make a call there, she would get the information there and then from her desktop computer. Some people may argue that the equipment is expensive but if we can compare the cost of automation with the additional revenue generated from using the computer we find that the benefits out weigh the costs. When a company does not use its computer on full time basis it can rent out computer time to other firms.

(b) Modernization: Human beings will always strive to improve their performance and modernization helps to do that by upgrading facilities. Because of the new age of improved technology, automation must be included in any improvement schemes.

(c) Status: In these days of stiff competition in all fields, a firm must do everything possible to be one of the leaders, and if not automated, it would seem old fashioned. Highly qualified office workers usually like to work in an office with electronic machinery like typewriters and computers; and not in those offices that only use manual
typewriters.

(d) Productivity: Automation usually increases productivity, a copy typist using an ordinary electronic typewriter will type one letter in ten minutes, but if she uses a word processor she can type five letters per minute. A file clerk using microfilming would need very small filing store, since microfilming reduces the size of a document greatly for example 8 thousand A4 sized document will go on a roll of microfilm 30 metres long, needing very small storage space, Foster 1990 p. 117.

(e) Efficiency: Automation makes maximum use of equipment and time available. A computer in an office can be used for many purposes for example it can print out data needed by the accounting department and can also be used by the salaries department to print-out monthly pay cheques.

Because of new technologies, increase in the volume of work to be done; especially paper work and management expecting greater office productivity Kutie and Rhodes (1983) p.v. more efficient methods must be found to enable office workers to meet their responsibilities efficiently.

(f) Specialization: Automation has encouraged workers to change from general to specialized jobs. As the saying goes "a master of one skill is preferable to a person who has a mere
acquaintance with all skills. Automation has therefore affected mode of working of office workers. It has reduced dramatically the number of clerical workers carrying out routine jobs for example in processing forms and filing duties of keeping records. Foster (1990) p. 19. This has encouraged the use of a few workers, each a specialist in his own field. Thus increasing workers productive ability since they are able to work faster with machines, produce better quality work faster. Again this will spell doom to the not so well trained office worker, she/he would definitely feel threatened. Therefore better ways of training office workers will be needed to help them adjust to automation and help them keep up with technological development.

Information science has had a positive influence on Office practice both on clerical side and secretarial side and this can be seen clearly from the words of B. Kaliski (1983) when he observes that:

> Just as data processing has revolutionized the clerical and accounting function of the office word processing has drastically altered the correspondence and report - writing function of the office. ^5

K.M. Trotman (1986) realized the same influence when she observed that:

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Almost every medium sized or large company will use computers to help run the office. As a secretary you will probably have to work with a computer in your day-to-day duties ------ computers could be used for example as a word processor, for filing printing invoices, working out statistical and communicating with other offices.

Word processing is described as the efficient handling of written communications; on the other hand data processing is the handling of information. Office automation has allowed us to have automated data processing (ADP) which is also described as "Labour saving" data-processing device. "Computers have had a long impact on office practice; computer data processing has helped to revolutionize the office. Distributed Data Processing (DDP) takes advantage of modern communications equipment to enable computer to computer interaction via phone lines. Data Bank which is a store-house of information on the computer contain databases which are comprehensive collections of information on a specific subject and this enables office workers to find information on most subjects easily.

The use of advanced technology such as needed in Automated office, demands better training in office practice. If office workers are expected to use the equipment, they need to be trained to work better and be more productive.

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training. The fact that secretaries can type a guide letter on the computer from a model letter dictated once and from which she can type individual letters; and the fact that there are dictaphones available, can very easily lead to the elimination of shorthand dictation and instead, have all written communication machine dictated. The dictator can then distribute the tapes for transcription to whomever copy typist or secretary is available, thus we can define word processing to be the integration of equipment, personnel, and procedures to achieve efficiency in written communication.

All this will lead to new ways of training office workers. It may also lead to some complicated arguments like the following ones put forward by Trotman (1986).

1. Because managers can obtain their own information they do not have to rely on the support - staff getting it for them. Information systems do the sorting and monitoring that these members of staff have traditionally done.

This would tend to make office workers feel threatened with displacement and this brings with it the need for better trained office workers who would also be knowledgeable in Human relations affairs. Those who will be able to show the other workers that automation does not take away jobs but make it possible for one to work better and be more productive.
Traditional office functions are becoming merged as a result of equipment which can handle all aspects of information processing. This suggests that those undergoing office practice training can learn to do more than one line of job, and therefore they should be knowledgeable in more than one field.

Generally it can be said that information science has put office practice students and teachers on their toes. They must train and retrain to keep up with increased office automation. Hellen Robb suggests that all office duties teachers should consider areas of study other than the traditional office skills of shorthand and typewriting. She suggests computer education for those with interest in new technology, which she says is intended for teachers of any subject in any sector of education or training, interested in use and management of computer in assisting teaching and learning. She quotes the main aims of such a course as being to enable the staff in educational and training institutions to:

1. Evaluate and implement the application of the computer to various disciplines
2. manage computing resources
3. Be aware of the potential impact of educational computing in curriculum development and teaching

...
Robb suggests that in order to teach effectively, teachers must feel in command, and to keep up with new technological advances is one sure way. She calls it the "third wave" or technological revolution. These new concepts and techniques will undoubtedly influence office work and office workers. There is therefore a great need to prepare the office workers of the future for the office of the future. A good way of keeping up to date with technological advancement is through research which enables us to explore previously unvented territories. We must remember Helen Robb's warning to the effect that teaching office skills is a dynamic activity and it is virtually impossible to stand still. Keeping up with technology will enable teachers to adequately meet the current and likely future needs of the student.

One should remember the words of Peter Coburn et al when he observed that the computer is a jack-of-all-trades in the classroom. It can be a work book page or a science laboratory, a teaching machine or a personal tutor. It is also capable of helping educators confront a challenge to their use of traditional instructional materials, (Coburn et al, 1982).

Computers have been used as a tool to facilitate programmed learning. One such project was the "Havering Computer Managed Learning System", implemented at the London Borough of Havering. This was a research project aimed to individualise instruction matched to pupil's needs and to present management information to the teacher. Broderick (1975).

The objectives of the project were to develop a computer managed learning system, write material to use with it, conduct some experiments comparing it with conventional teaching and to evaluate it in technical educational, and financial terms. It can be seen clearly that the computer is a very useful resource in the preparation, carrying out and evaluation of programmed instruction in Western countries; but its use in the Kenyan situation may be a thing of the future because of financial constraints.

2.3 The Option of Programmed Instruction

Programmed Instruction Definition:

Programmed instruction is defined in this thesis as a way of teaching, with the teacher being a facilitator of learning;
and as a method of instruction which has measurable objectives, pre-arranged sequences and methods of presenting materials, and which is self correcting.

Rationale

In Kenya very few teachers are familiar with this method of instruction although its potential as a teaching method has been explored in most developed countries. It is claimed to have originated from the educational philosophy which suggests the consistent use of positive reinforcement. Programmed Learning is soundly based on accepted educational principles.

E.G. Fry suggests that:-

Programmed learning has its origin among educational psychologists primarily concerned with learning theory and the basic principles on which program construction rests have been tested in both fields and laboratory.8

This in fact tells us that the teachers, the administrators and the students should not hesitate to introduce this teaching method. Fry goes on to say that this method has proved sound and that students do learn and learn efficiently.

Programmed instruction is not a new method of teaching. Gene C. Fuso (1962) noted that the basic procedure of programmed instruction was found as far back as the Socratic

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dialogue. But it is the development of a science and a technology based on a method employed by great teachers of the past. Programmed Instruction allows the teacher to be free to be a facilitator of learning. It gives the student a lot of needed practice, it caters for the rapid learner and the slower learner to proceed at their own pace.

In classroom teaching by conventional method, the learners are very dependent on the teacher, as shown in the following illustration:

<table>
<thead>
<tr>
<th>Classroom Teaching</th>
<th>Group work</th>
<th>Programmed Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total dependence on teacher</td>
<td>Some Independence</td>
<td>Total Independence</td>
</tr>
</tbody>
</table>

In group work there is increased participation by learners.

In programmed instruction there is almost total independence of the learner. In independent learning, there is maximum participation by the individual student.

Programmed learning focuses on certain learner with certain characteristics and the work done by the learner (programmed material) are for improved achievement of the learner. Programmed learning is a method whereby the learner proceeds through instructional material in short steps at his own pace receiving immediate knowledge of performance.
Callender (1969) notes that, the basic principle of a programme is that, the material is so constructed that the learner makes his response either by writing an answer or performing a physical task or merely speaking the response to himself aloud.

It is generally suggested that learners should not progress to a second step until they have understood the first one. Through the programme, the learner receives immediate confirmation of correctness of his answers before proceeding to the next step. The idea of reinforcement was basically the work of Professor Skinner at Harvard University. According to Skinner, the traditional classroom situation does not provide reinforcement or reward often enough or strong enough to allow effective learning. This places the task of teaching/learning on the programme; but it is still the duty of the programmer to construct good check points by carrying out an exact behaviour analysis of the skills to be learned before writing instructional sequence. In programmed instruction, there is no "marking" the way we know it, since the learner is now given the correct answer immediately following his response to a problem or statement.

Programmes are prepared to suit the needs of a particular group of students to achieve specific objectives and hence differ basically from textbooks, notes or manuals on topics.
Programmes make use of modern instructional techniques such as task analysis.

Wilber Schramm sums up essential elements of programmed instruction as being:-

(a) an ordered sequence of stimulus items,
(b) to each of which a student responds in some specified way,
(c) his response being reinforced by immediate knowledge of results,
(d) so that he moves by small steps
(e) therefore, making few errors and practising mostly correct responses
(f) from what he knows, by a process of successively closer approximation, towards what he is supposed to learn from the programme.⁹

There has been a considerable amount of research on programmed instruction. Edling et al (1964) notes that, research in programmed instruction had surpassed research in all other teaching methods. He observed that by the beginning of 1963 nearly 200 experiments had been carried out. Unfortunately as noted before, all these experiments were done in developed countries.

2.4 Principles of Programmed Instruction

In all teaching/learning methods based on learning theory, the fundamental statement is that the environment can be arranged in such a manner as to increase student performance without dependence on aversive control. To increase student performance, the following behavioural principles have been suggested, Hartley (1972).

1. Specific course objectives.
2. Active involvement of student in the learning process.
3. Managing contingencies to ensure a positive environment.
4. Frequent assessment and immediate learner knowledge of performance.
5. Small sequential material presentation.
6. Mastery of each unit before further progress.
7. Writing materials and student control over pace of learning.

Edward B. Fry likewise observed three basic principles:-

1. Using small units of instruction.
2. Forcing the student to respond to each unit.
3. Informing the student of the correctness of the response”.  

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He also suggested that programmes can be identified through these principles and they can be produced within this general framework. B.F. Skinner, one of the first educationists to work with programmed instruction had his own principles and rules, associated closely with his theory of learning which dealt mainly with reinforcement of desired behaviour:

1. Each response must be reinforced immediately.
2. Only overt behaviour suitably reinforced, is learned.
3. Errors adversely affect learning.
4. Progress must be gradual and in small successive steps.
5. Assistance to the student must be withdrawn gradually.
6. The student's observing behaviour should be controlled.
7. Extensive Discrimination training is essential.
8. The student must "write" down the program.11

2.5 Types of Programmes

There are basically two main types, depending on the kind of response demanded of the student.

Linear Programme

Also known as the Constructed response. This is the type of programme that requires the student to write down an answer

to a question put before him by the programmer. It asks the student to frame his own answer to an open-ended question. The constructed response programme is associated chiefly with the work of psychologist B.F. Skinner at Harvard University. Fry (1963). Constructed response programmes are characterized by

1. **Use of small units (frames) averaging two sentences in length.**
2. **Forces student response, usually in the form of a short written answer following each item or frame.**
3. **The use of small, easily grasped steps in the presentation of the information (shapping).**
4. **The use, generally of linear arrangements.**

This "small step" or "Skinnerian" programme is done in such a way that learner errors are reduced to a low figure. Skinner believed that the absence of errors contributes to more efficient learning, as a correct answer is in effect a "reward" or "reinforcement" for the student— and an incentive to greater effort, or continuous effort, Callender (1969).

This is the stimulus response reinforcement sequence of operant conditioning and forms the basis of linear programming. The small steps aim towards a clearly defined and limited objectives, and understanding of the concept.
Skinner started work on this theory in 1950. After he realized the ineffectiveness of some conventional teaching methods, and after researches with animals and birds which centred around the effect of reinforcement, "overt" and observable behaviour is broken down into sets of responses – operants, conditions are then brought into play. According to Callender (1969) Skinner was of the opinion that every response that contributed towards the desired behaviour is reinforced; responses that do not contribute are ignored. In this way the behaviour of the subject is gradually shaped.

In Linear programmes, the learner writes in his answer, and the correct answer to each response is found by the side of the succeeding frame, which is covered over until the learner is ready to proceed to this item. This constructed response, according to Skinner, elicits deeper thinking and greater motivation than any other type of response. He also emphasizes the importance of active, overt responding to small amounts for specific stimuli, in order to relate stimuli and responses by providing immediate feedback.

In the Linear Programme, the student progresses at his own pace through a series of small steps, each step leading logically through the subject matter. Since it is important that the student make very few errors, the increments of information he is expected to absorb are necessarily small.
The student begins with frame one, and then proceeds to frame two. Programmes may have thousands of frames but the student takes only a small step between frames. Individual differences amongst learners are largely ignored. A basic assumption of the Linear programmes is that each stimulus should be designed to elicit the correct response by the student, and that his own construction of the response is an internal part of the learning situation. The response is not (to determine whether learning has taken place, but is an essential part of the learning itself. Linear Programmes are suitable for teaching facts, techniques and skills and can therefore be used for teaching filing, mail systems (the Post Office), methods of payments and other topics in office practice.

Branching Programmes OR Intrinsic Programming

This type of programme was devised by Norman A. Crowder. He developed it from his experiences in training armed forces personnel to understand and use complex electronic equipment, Lysaught and Williams (1963).
According to Crowder’s theory:—

the student is given the material to be learned in small logical units, immediately after he has read and digested one of thes units, he is given a short test on it.\(^{12}\)

Crowder’s programme calls for fewer responses for relatively large masses of stimulus material. A simple branching programme requires the student to proceed directly to the next step after a correct response. Errors side track or “branch” him to supplementary material designed to correct the particular error. Other programmes may give the learner much larger steps, for example, a whole page followed by multiple choice answers, from which the learner must select the correct one. The correct answers are given on a different part of the programme. If his answer is correct he proceeds along the mainstem of the programme, if not he is informed why his answer is incorrect, Taber J. et al (1965). The use of Branching Technique does not tie us strictly to multiple choice or fill in answers. In fact most frames in Linear Programme can easily be incorporated into Branching programme. Research has shown more advantages in using Linear Programmes than in using Branching programmes.

Linear Programme was used in this study merely because of time limit in the construction of the programme. This study

was an attempt to compare achievement scores between the experimental and control subjects, with a view to finding out whether there was any significant difference. The findings would be useful in that they might give an indication of how different methods of instruction may be integrated in the classroom in order to improve learning in Office Practice, which is one of the important components of Business Education Curriculum.

2.6 Characteristics suited for programmed instruction

1. Learners who prefer to work individually. Programmed learning is part of individualized learning.

2. Highly motivated learners, especially those with intrinsic motivation but who need more time to consider content, or to concentrate for longer periods than is usually available.

3. Learners who are persistent, responsible and disciplined; those willing to try again and again until they achieve the goal, (the completion of the programme). Those who can work on their own without supervision and can study anywhere.

4. Students who are visual learners those who remember more by reading and seeing than by listening.

5. Those students who require structure. Those who prefer how to solve a problem, give them examples and generally follow a certain pattern.

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2.7 Research on the Effectiveness of Programmed Instruction

B.F. Skinner, an experimental psychologist is considered to be the first researcher to work seriously with programmed instruction, Smith and More (1962). Skinner also developed the first teaching machines to be used with programmed materials. Skinner made the critical decision to apply the experiences gained in experiments with animals training to the education for human beings. E.B. Fry (1963) suggests that Skinner's work in Linear programming provided the primary impetus for program development in the 1950's. Skinner worked together with Holland and thus the name Skinner-Holland Technique, later on, Holland worked on the "Skinnerian" technique of programming. His emphasis on the importance of reinforcement is seen from his words:

Organisms learn by acting on their environment and being acted upon in turn by the consequences of their actions. Certain consequences strengthen behaviour; that is increase probability that the same response will occur again in the presence of the same stimuli.¹³

Skinner based his work in Programmed Instruction on his earlier findings that behaviour which is reinforced is more likely to reoccur. Thus when a hungry bird was reinforced by food when enlisting "required behaviour, is more likely to continue to respond to the food stimulus. As the action is mastered reinforcement is given with less frequency. If reinforcement is completely withdrawn, the behaviour will

¹³William A.D. Programmed Instruction Prentice Hall Inc. (1963)
eventually be extinguished (operant conditioning). Skinner was of the opinion that reinforcement or feedback or knowledge of results was the basis for all learners modifications of behaviour. Skinner found that it was impossible for the teacher to provide individual reinforcement for all students in the teaching situation and thus the observation, that in order for the teacher to give this individual attention, he must spend a lot of time in individual tutoring; which is impossible under the present classroom size of more than 40 students. Much of the learning also takes place covertly and the teacher cannot always know when a correct response has been made. Programmed Instruction allows the student to make overt responses and the teacher can tell when reinforcement should be given. The direct interaction between teacher and student allows the teachers to provide guidance towards correct response, reinforcement, and corrective feedback, exactly when needed. "Knowledge of correctness of a response", has been used in programmed instruction because it has a reinforcing effect and is seen as a most important human reinforcer.

According to Skinner, at each small step in a programme, the student is informed of his performance. This assumption that the student need to know after every response whether he is right or wrong makes it necessary to explicitly, and immediate supply the right answer to the student. As a result
of his experimental work, Skinner breaks down information to be learned into a sequence of "small steps" because he considered it to be important that the student should make as few errors as possible. The increments of information to be learned from one frame to another is limited, the student proceeds from the known to the unknown, the correct response is suggested by means of prompts or cues, and the correct answer then appears as a form of reinforcement in the next frame. This way, the student is given immediate knowledge of whether he is right or wrong before proceeding to the next frame. Skinner contends that the more often a student makes a correct response, the greater will be his motivation. He believed that:

.... constructed responses make student think more deeply about the material and enable them to gain a greater understanding... the programme does not test the student, but teaches him through requiring him to make a positive, thoughtful, and free response".¹⁴

Therefore, programmes should be seen as teaching rather than testing devices and students will benefit from them if they view them as a self-instructing programme.

Norman Crowder developed intrinsic Programming and the "Scrambled book". his work resulted with what is called "Branching programme, where information is given in larger

steps and followed by multiple choice questions and correcting the wrong choice through special frame sequences. One of the main differences between his work and Skinner, was that Crowder preferred to use errors (rather than prevention for them) as opportunity for further explanation, Fry (1963), Lysaught and Williams (1963), Taber et al (1965).

Evan Keislar made use of a simple form of multiple choice programming for his Arithmetic programme (Fry 1963). Later Keislar and McNail developed a programme to teach molecular theory to first graders. Sydney Pressey worked with multiple choice programmes and experimented with teaching machines, Taber et al (1965), Fry (1963). He worked with material designed to both teach and test at the same time. He used programmed materials as supplement to other teaching methods. He pointed out that a student will learn while taking a multiple choice test if he is told immediately whether his answers are right or wrong. Students learn not to give wrong answers again, and his right answers are strengthened.

According to Mary Mwai (1986) Skinner popularised Pressey's work with "teaching machines" when he wrote a report under the heading "Teaching Machines " published in "Science" in 1958. He described a system of programming which came to be known as Linear programme. After this, teachers became seriously interested in programmed Instruction. Skinner integrated Pressey's teaching machine with his set of stimulus
materials, the programme - to him the machine was an "autonomous devise" which would provide a tutorial experience without the presence of the teacher Mwai (1986).

Severin a student of Pressey carried out research to investigate:

The relative validity of two item responses to multiple choice questions.\(^{15}\)

His findings showed that:

1. The mean scores were about equal in both cases;
2. He concluded therefore "no more than two choices were needed if the criterion for choosing the technique was the amount the student learned.

Between 1960 and 1961, Denver Schools (USA) and the Institute of Communication research at Stanford University (USA) experimented with programmed instruction to teach language in secondary schools. Wilbur Schramm (1964). They reported a great deal of learning from the programme. They used two tests:

(1) The California test and
(2) The English 2600 test.

Three groups of students were used:

(i) The accelerated classes (gifted and bright)

(ii) Regular classes and

(iii) "Modified" classes (students who needed special help in the subjects).

At each level, half of the students were assigned to work on the programme, and half to usual classroom practice on English. According to Schram (1964) the results observed were that

(1) Accelerated classes learned significantly more from the program than from conventional practice.

(2) The regular classes did as well with the programme as with class practice.

(3) The modified classes did significantly better with classroom practice than with the programme.

On the California test, the mean for the three groups were 75, 70 and 64 respectively. Accelerated students progressed at an average rate of 273 frames per hour, the regular students at 233 and the modified students at 185. The error rate for the slower classes was 6.5 as compared to 2 percent for the accelerated classes, Schramm (1963). A lot of research has been done over the years on effectiveness of programmed instruction in Western Countries, especially in the United States. Schramm contends that:

Research has moved slowly carefully, towards identifying the characteristics that make for more learning from one type of program than from
In Africa in 1963, in Central Africa, programmed learning was introduced to teachers by the Federal Ministry of Education. Research in programmed learning began in January 1964, Hawkridge D.G. (1966). With the establishment of a programmed learning centre within the Faculty of Education at the University College of Rhodesia and Nyasaland at Salisbury. Interest in programmed learning was immediately expressed from both Zambia and Zimbabwe and has continued to broaden since. Specifically a Research Centre was established. According to Hawkridge (1966), the programmed learning centre was established with the purpose:

(a) To facilitate research into the potential of programmed learning in the African continent, especially in secondary schools; for Inservice Teacher education; and for Industrial Training.

(b) To offer training facilities to Industry, Commerce and Government…. In the techniques of programmed learning and the use of teaching machines.

The Research Division of the University validated, supervised, controlled experiments and published a large number of programmes. T. Plummer who did an in-school

experiment with programming mathematics drew the following conclusions from his experiences:

1. Programmes were successful with majority of pupils,
2. Especially those who had experienced failure in the subject.
3. Pupils acquired genuine interest in the subject and were keen to work.
4. Pupils make more rapid progress using programmes than do paralleled classes using conventional techniques.
5. There is more individual contact between teacher and pupil.
6. Progress is more evident and more easily checked.
7. Material presented to class was more thoroughly prepared.
8. Teacher learns in the preparation of a programme and is a better teacher after such experiences.
9. Teacher is relieved of monotonous marking and instead there is interesting and rewarding analysis of results, leading to feelings of achievement.
10. No problem with absence from class since a pupil continues where he left off and works harder to catch up.
11. Classroom atmosphere is one of smooth efficiency and concentration.
12. Programming in one subject has beneficial effect on
other subjects due to attitudes of concentration and willingness to work being developed.

13. Programmes are very useful for remedial work.

14. Homework setting is redundant. The pupils carry on with the programme for the specified time. The work is done and pupils ask for holiday work.\textsuperscript{17}

Plummer also concluded that certain subjects especially those that consist largely of the teaching of technique are ideal for programming; but in every subject there is some aspect that can be programmed usefully; and that teachers should learn to write and use programmes.

In the Kenyan situation Eshiwani, G.S. in 1974 investigated the Effectiveness of Programmed Instruction, Conventional Classroom Approach and Integrated Programmed Instruction in the teaching of probability (maths) to high school students in Kenya. Some of his main findings were that: programmed instruction resulted in time saving of about 50 percent; programmed instruction proved to be superior to the conventional classroom approach in teaching probability to form two students. Programmed instruction by itself or supplemented by the teacher was proved superior to conventional classroom approach in teaching probability to form two Kenyan students; programmed instruction could be used to improve the poor performance of Kenyan high school girls in Mathematics. From

\textsuperscript{17}Hawkridge, D.G. Programmed Learning in Central Africa context, University College of Rhodesia, Salisbury (1966) pg. 46-
the findings of his study, Eshiwani recommended that programmed material may be used effectively in the teaching of mathematics to high school students in Kenya; and that programmed instruction could be used especially because of the large number of students per class, Eshiwani, (1974).

In 1978, Francis Obunga-Okambi carried out a Comparative Study of the Effectiveness of Programmed Instruction combined with Teacher Instruction in small groups and Conventional Classroom Teaching. He, like Eshiwani compared the performance of girls to that of boys. His sample was drawn from low cost primary schools in Kenya. He evaluated the pupils understanding of mathematics and also evaluated their reading ability. Some of his main findings were that: Boys learned better when they received programmed instruction supplemented by teacher instruction in sub-task of achievement of knowledge; in comprehension sub-task, he found that girls learned better when they go through self instructions materials; another finding was that both boys and girls interacted significantly with different teaching methods. Like Eshiwani he also found that programmed instruction scored well over traditional learning in saving student time. He recommended that programmed instruction could be used effectively to teach mathematics to primary school pupils to overcome the problem of large classes in the Kenyan schools, Obunga-Okambi (1978).
Mary N. Mwai in 1986 did a comparative study of teaching English language by Programmed Instruction and Conventional Methods in Kenya Secondary Schools. Her intention was to find out whether programmed instruction can be integrated in the teaching of English in combination with those conventional methods already in use in Secondary schools in Kenya. Mwai (1986). Her sample was 322 form three students from four different secondary schools in Kenya. She conducted programmes which were used to teach certain topics to the experimental group, the control group was exposed to conventional teaching methods, on the same topics. She tested mainly the areas of knowledge, application of knowledge and skill. In her own words the results of the study indicated that:

programmed instruction significantly improved the performance of the students in all the three areas tested --- students who were taught by programmed instruction also performed better in the final achievement score than those who were exposed to conventional teaching methods.18

According to Mwai (1986) programmed instruction has a more positive contribution to overall performance. She found programmed instruction to be more successful in teaching knowledge and application of knowledge. She also found that integration of programmed instruction with conventional teaching methods significantly increased students performance.

knowledge and application of knowledge. She also found that integration of programmed instruction with conventional teaching methods significantly increased students performance (achievement scores) in area tested in English. Mwai concluded that, "

Students who learned by programmed instruction also performed better in the final achievement score than those who were exposed to conventional teaching methods.  

The advantage of the group taught by Programmed Instruction over that taught by conventional method can be seen from their mean scores before the treatment (pretest) and after (posttest).

<table>
<thead>
<tr>
<th>Control Group</th>
<th>Experimental group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>31.92</td>
</tr>
<tr>
<td>post test</td>
<td>34.59</td>
</tr>
<tr>
<td></td>
<td>31.79</td>
</tr>
<tr>
<td>post test</td>
<td>40.7</td>
</tr>
</tbody>
</table>

It is clearly seen that programmed instruction improved learning. Mwai (1986) summarized advantages of programmed instruction to be the following:-

1. Programmed instruction promotes student involvement.
2. Provides for individual differences as individual

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of coverage based on the assumption that what is taught is what is learned, what is presented is assimilated.

5. Properly functioning programmed instruction can lead to positive behaviour.

Eshiwani, Obunga-Okambi and Mwai like all the other mentioned researchers felt that "Programmed instruction can do much to overcome difficulties that accompany mass education. This is more true in the Kenyan situation where there is a great need for educating more students with fewer teachers. But programmed instruction cannot replace the teacher, but can help him/her be more effective when combined with other conventional teaching methods.

In London at the City and Guilds of London Institute, Programmed Learning was used successfully to teach an educational Technology course for certificate in educational technology to train educational technology specialists for institutions and later on it was used to provide educational technology expertise for the classroom teacher. Davies (1978).

In 1976, in Salvador Brazil, several experiments were done with Programmed Instruction to teach Mathematics

to:-

1. Students who had received poor teaching in lower classes and
2. Adults.

The researchers used both Linear Programmed texts and "Information Mapping" (student-controlled random-access programming techniques) which was reported as resulting in reduced learning time and increased final test score. But generally both techniques of presentation were found to be effective. Romiszowski, (1978).

2.8 Differences between Programmed Instruction and Conventional Instruction

Programmed instruction differs from conventional teaching methods, like lecture method in the way the learning and management is controlled and managed to achieve the desired instructional occurrences resulting in expected outcome spelt in the objectives. Its main differences from conventional methods is how the learning environment is controlled and managed to achieve instructional elements.

Programmed instruction has many features which are different from conventional methods of teaching and learning
namely:

1. a student learns best if he proceeds by small steps;
2. each student can work each step at his own pace;
3. a student learns best if he is actively responding as he is learning
4. that he can confirm his answer immediately;
5. that a programme can be revised on the basis of student performance.

Programmed instruction has been used where large numbers of learners enter the educational system with wide individual differences, in level of exposure to the subject, previous experiences, age and interest to develop mastery in some particular areas of instruction for example those requiring mastery of certain skills like filing in office practice.

In conventional instruction, the teacher has a central role in the learning process, but it is also important to give students more responsibility for their own learning; programmed instruction is able to do this, because it gives emphasis to the behaviour of the student. When we consider Williams definition of teaching:

".... the performance of those activities and the manipulation of those conditions that produce
The above definition accepted as a statement of objectives and results of learning, makes it easier to answer the questions of what the teacher does. He is a facilitator of learning and emphasis in the classroom must always be on the behaviour the students and the various ways in which learning can best be produced. This implies that, different teaching methods must be used if the learner is to benefit at all.

In Programmed instruction, the material or programme is so designed that the learner makes few mistakes. The learner works from the familiar to the unfamiliar at a speed which allows him to assimilate new information and he is able to know from each stage that he has understood the material. In relationship to the conventional teaching methods, here the teacher (programmes) prepares the programme, he/she analyses the task to be performed and constructs the programme. In conventional teaching situation the teacher carries out most of the teaching and the student listens.

2.9 Chapter Summary

Although there is alot of written literature on teaching by Programmed Instruction, most of it was done for and by

---

scholars from developed countries.

Introduction of the 8-4-4 system of education has put office practice in the limelight where it rightfully belongs, since more emphasis is put on education for self-reliance, self-employment, and creation of employment in the field of entrepreneurship. All this has made it important for all schoolgoers, workers and the population in general to learn office practice. It has therefore become necessary for office practice teachers to find more innovative methods of teaching office practice, and Programmed Instruction is a good alternative.

Advancement in technology especially office automation has made this need of more innovative methods of teaching Office Practice very necessary. Many firms have been attracted to automatise their offices because automation is cost effective, modern, gives them higher status, increases production efficiency and encourages workers to specialize in one or two fields.

Information science has positively influenced office practice by offering more efficient ways of doing office task. The introduction of the computer in offices has greatly increased productivity. But also demands better educated and trained breed of office workers to enable them cope with the
new trends and innovation in office automation.

Programmed Instruction can be defined as a method of self instruction where by the learner proceeds through instruction material in short steps at his own pace, receiving immediate knowledge of correctness of his answers. Programmed instruction allows the teacher to be a facilitator of learning. Programmed instruction caters for all types of learners, fast learners slow learners and regular learners, but is most suitable for those who prefer to work individually, highly motivated learners, persistent learners, visual learners and those learners who require structure.

The programmed material helps learner to improve on his achievement standards. There are basically two main types of programmes Linear Programmes also called constructed response associated with psychologist B.F. skinner. Linear programme is done in small steps and errors are reduced to a low figure. It is based on the stimulus - response reinforcement sequence of operant condition. Then there is the Branching programme also called intrinsic programming which was designed by Norman A. Crowder. Branching programme differs from Linear programme in that, it calls for the student to have fewer responses for relatively large number of student materials, and errors
sidetrack learner or "branch" him to supplementary materials.

This study used linear programme because of limited time available. Programmed Instruction is governed by the principles of:

1. learning theory which state that the environment can be arranged in such a manner as to increase student performance without depending on aversive control and
2. The principle and rules of reinforcement of desired behaviour.

Extensive research has been done on programmed instruction in developed countries especially United States of America and Britain. But only one such research was done in Kenya by Mary Mwai in 1986. Most researchers agree that programmes do teach and that learning takes place successfully at all levels of ability and in teaching a great variety of academic subjects matters in both cognitive, Psychomotor and affective skills. But since most of these findings have not originated from studies in Kenyan situation, there is need to carry out a study like the present one that might come up with findings that should be most helpful to both office practice teachers and learners in Kenya.
CHAPTER THREE

THE RESEARCH METHODOLOGY

This chapter focuses on research methodology. Precisely, the chapter describes the design, the subjects, and sampling procedures; preparation of the research instruments; administration of the research instruments; scoring and coding of data for analysis and data analysis.

3.1 The Design

The design used in this study was the experimental design. (Pretest - Posttest control group design). The study tried to establish on an experimental basis whether there was any significant difference between the achievement score of students taught by programmed instruction and those taught by conventional teaching methods. The research objective was, therefore a comparative one. Two groups of students were used. One of which was the control group and the other the experimental group.

3.2 The Sample

The study sample was drawn from Bachelor of Education and Bachelor of Arts second year University students from Secretarial Studies Unit of Kenyatta University. The researcher chose these groups of students because their
courses covered Office Practice, within the framework of the new Information Technology.

Effects of General methods were checked by including B.A. students who had no chance of having been previously exposed to Programmed Instruction.

These students were potential teachers and/or office workers after graduation. Hence the reason for choosing these groups especially since programmed instruction was a possible tool for training young office workers. Since it was proficient, then the multiplier effect may be realised at University where future inservicing may be launched. These students were mature enough to diagnose their difficulties and discuss them with the researcher.

Sampling was done by choosing every 2nd name of the class list to obtain the experimental group with the remainder forming the control group. The researcher ended up with two groups, one of 18 and the other of 20.

The number of B.Ed students and B.A students in each group was as shown in the following table.
Table 3.2.1  Showing the number of B.Ed and B.A students in Experimental and Control Groups.

<table>
<thead>
<tr>
<th>Group</th>
<th>Control</th>
<th>Experimental</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ed</td>
<td>12</td>
<td>16</td>
<td>28</td>
</tr>
<tr>
<td>B.A.</td>
<td>6</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>20</td>
<td>38</td>
</tr>
</tbody>
</table>

3.3 Treatment

Table 3.3.1  Showing the treatment used on the experimental and control groups.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest 1.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Lectures</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Posttest 1</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Pretest 2</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Methods of Instruction</td>
<td>Programmed Instruction</td>
<td>Conventional</td>
</tr>
</tbody>
</table>
At the beginning of the scheduled class meetings the pre-test which had been constructed was administered to both the experimental and control groups. It was scored out of forty. The questions were taken from most of the topics to be covered in the Office Practice course. Most of the students had not been exposed to Office Practice before, but the questions included general information that is usually covered in the course. For example, the question of "what one understood by the term VAT, or the term consignor". Both experimental groups and control group scored generally low marks. There was therefore no significant difference in score between the two groups.

After pretest 1, the similar lectures were delivered to both experimental and control groups. A common posttest one was given to both groups. After pretest two the experimental group was taught by programmed instruction based on the Basic Rules of Alphabetical Filing - Programmed Instruction by Fahrner and Gibbs (1965). The control group was taught same basic rules of alphabetic filing using conventional teaching methods.
Each of the tests, pretest 1; posttest 1; pretest 2; posttest 2, were marked out of 40 (forty). Initially, both groups were exposed to conventional teaching methods. After pretest 2, the experimental group was taught the topic of basic rules of alphabetic filing using programmed instruction. The control group was taught the same topic through conventional methods. After pretest 2 was marked out of 40 (forty). Initially, both groups were exposed to conventional teaching methods. After pretest 2, the experimental group was taught the topic of basic rules of alphabetic filing using programmed instruction. The control group was taught the same topic through conventional methods. A common posttest 2 was then administered to the two groups.

3.5 Methods of Data Analysis

The t-technique was used to analyse the scores. The means were computed and differences between them found.

Within group comparisons were done for both the experimental and the control groups.

For the experimental group, the mean score of experimental B.Ed group on pretest one was compared with the mean score of experimental B.A. group on pretest one. Comparison between the mean score of the same two groups was done at posttest one, pretest two and posttest two.

Comparison was also done within the experimental group by comparing the experimental B.Ed mean score on posttest one with their mean score on posttest two. Likewise the experimental B.A. groups mean score at posttest one was compared with their mean score at posttest two.
Experimental B.A. groups mean score at pretest two was also compared with their mean score at posttest two. Also experimental B.Ed group's mean score at pretest two was compared with their mean score at posttest two.

Finally, the entire experimental group's mean score at post test one was compared with their mean score at posttest two. The above comparison process was repeated within the control group.

Between group comparison was done in the following manner:-

The mean score of the experimental and control groups at pretest one was compared. The mean score of these same groups at posttest one were also compared. At pretest two, comparison was done between the mean score of the experimental B.Ed group with the mean score of the control B.A. group. Also compared were the mean score of the experimental B.A. group with the mean score of the control B.Ed group at pretest two. The mean score of experimental B.A group at pretest two was likewise compared with the mean score of the control B.A. group at the same pretest. Comparison was also done between the mean score at pretest two of the experimental B.Ed. group with the mean score of Control B.Ed group.
Finally, comparison at pretest two was done between the mean score of the entire experimental group with the mean score of the entire control group.

At posttest two, the mean score of the experimental B.Ed group was compared with the mean score of the B.A. group. Comparison was also done between the mean score of the experimental B.A. group and the control B.Ed group, at posttest two.

At the same posttest two, the mean score of the experimental B.Ed group was compared with the mean score of the control B.Ed group. Experimental B.A. group’s mean score at posttest two was compared with the control B.A group at the same posttest.

Final comparison at posttest two, was between the mean score of the entire experimental group and the mean score of the entire control group. This was done to find out whether the two groups differed significantly in mean score to enable the researcher say with confidence whether there was a difference between the mean score of the population from which the sample was drawn.
CHAPTER FOUR

ANALYSIS AND INTERPRETATION OF DATA

The intent of this chapter is to present the results obtained from the analysis of the data - the tests administered to the students. It also includes a discussion of observations carried out by the researcher, referred to in the previous chapter. The researcher in this study set out to find out whether there was any significant difference in students' achievement in Office Practice which could be attributed to either Programmed Instruction or to conventional teaching methods.

4.1 Calculation of Means

The t-technique used to test the hypothesis is stated in chapter three section five.
Table 4.1.1 The mean scores and treatment of both experimental groups B.A. and B.Ed and control groups B.A. and B.Ed.

<table>
<thead>
<tr>
<th>TREATMENT</th>
<th>GROUP</th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B.Ed</td>
<td>B.A.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.Ed</td>
<td>B.A.</td>
</tr>
<tr>
<td>Pretest One</td>
<td></td>
<td>13.25</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12.41</td>
<td>10.5</td>
</tr>
<tr>
<td>Lectures</td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Posttest One</td>
<td></td>
<td>25.61</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26.25</td>
<td>26.83</td>
</tr>
<tr>
<td>Pretest Two</td>
<td></td>
<td>15.64</td>
<td>14.25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Methods of Instruction</td>
<td></td>
<td>Programmed</td>
<td>Conventional</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Instruction</td>
<td>Methods</td>
</tr>
<tr>
<td>Posttest two</td>
<td></td>
<td>32.31</td>
<td>34.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27.08</td>
<td>26.67</td>
</tr>
</tbody>
</table>

4.2 Comparison of means

Table 4.2.1 The Mean score of the experimental group (within group comparison).

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Pretest 1</th>
<th>Posttest 1</th>
<th>Pretest 2</th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B.Ed</td>
<td>B.A.</td>
<td>B.Ed</td>
<td>B.A.</td>
</tr>
<tr>
<td>Pretest 1</td>
<td>13.25</td>
<td>6.0</td>
<td>15.64</td>
<td>32.31</td>
</tr>
<tr>
<td>Posttest 1</td>
<td>25.61</td>
<td>30.0</td>
<td>14.25</td>
<td>34.0</td>
</tr>
</tbody>
</table>

At pretest one the mean score for the experimental B.Ed group was 13.25 and that of the experimental B.A. group was
6.0.

tc = 2.306, \alpha = 0.05, \ t = 0.564 the researcher found no significant difference between these groups. Likewise, when she compared the same groups at posttest one \tc = 2.101, \alpha = 0.05, \ t = 0.42, there was no significant difference between these groups. At pretest two, the mean score for B.Ed experimental was 15.64 and that of B.A. experimental was 14.25, \tc = 2.120, \alpha = 0.05, \ t = 0.507, the researcher therefore found no significant difference between the two groups. At posttest two, mean score of B.Ed experimental group was 32.31 and B.A group was 34.0. There was therefore no significant difference between these groups.

Within group comparison, when we compare experimental B.Ed group performance between posttest 1 (one) and posttest 2 (two) we find that their mean score at posttest one is 25.63 while their score at posttest two is 32.31. \ t = 5.38 > tc = 2.131, \alpha = 0.05, there is therefore a significant difference in their score in the two tests. Looking at the experimental B.A group, mean score at posttest 1 was 30.0 and at posttest 2 was 34.0.

\tc = 3.182, \alpha = 0.05 > t = 2.48 there was therefore no significant difference in the mean scores between these two tests for B.A experimental Group. From the comparison of experimental B.Ed group mean score between pretest 2 = 15.64 and posttest 2 = 31.8, \ t = 9.39 > tc = 2.160, \alpha = 0.05 there is
a significant difference in the mean score in these two tests. Experimental B.A. group mean score on pretest 2 = 14.25 and on posttest 2 = 34.0 \( t = 5.1 > tc = 3.182; \alpha = 0.05 \) there is therefore significant difference in the group's performance on these two tests.

Finally, looking at the mean score for the entire experimental group between posttest 1 (one) and posttest 2 (two) ... posttest 1 mean score = 26.5 while mean score of posttest 2 = 32.65, \( t = 5.42 > tc = 2.093; \alpha = 0.05 \). There is therefore significant difference in the groups performance on these two tests.
Experimental B.Ed/B.A

Pretest 1

<table>
<thead>
<tr>
<th>B.Ed</th>
<th>B.A</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>N2</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>( X = 106 )</td>
<td>( X = 13.25 )</td>
</tr>
<tr>
<td>( X^2 = 1569 )</td>
<td>( X^2 = 72 )</td>
</tr>
</tbody>
</table>

\[
S^2 = 1569 - (106^2) + 72 - (12)^2
\]

\[
X^2 = \frac{14122}{8} + 2 - 2
\]

\[
= 1569 - 1404.5 + 72 - 72
\]

\[
S^2 = 1645.5 + 0
\]

\[
= 20.5625
\]
There is no significant difference.

Experimental B.Ed/B.A.

Posttest one

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>X</td>
<td>410</td>
<td>120</td>
</tr>
<tr>
<td>X</td>
<td>25.61</td>
<td>30</td>
</tr>
<tr>
<td>X²</td>
<td>11122</td>
<td>3616</td>
</tr>
</tbody>
</table>

Value of $S^2 = 33.32$

$t = 0.42$ which is less than $tc = 2.101, \alpha = 0.05$.

Experimental B.Ed/BA

Pretest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>X</td>
<td>219</td>
<td>57</td>
</tr>
<tr>
<td>X</td>
<td>15.64</td>
<td>14.25</td>
</tr>
<tr>
<td>$X^2$</td>
<td>3629</td>
<td>879</td>
</tr>
<tr>
<td>$S^2 = 8.529$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$t = 0.507$ which is less than $tc = 2.120, \alpha = 0.05$. 
### Experimental B.Ed/B.A

#### Posttest two

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N  = 16</td>
<td>4</td>
</tr>
<tr>
<td>X  = 517</td>
<td>136</td>
</tr>
<tr>
<td>X  = 32.31</td>
<td>34.0</td>
</tr>
</tbody>
</table>

\[ X^2 = 17329 \quad 4678 \]

Value of \( S^2 = 31.636 \)

\[ t = 0.171 \] which is less than \( t_c = 2.101, \alpha = 0.05. \]
### EXPERIMENTAL

**B.Ed Posttest 1 and Posttest 2.**

<table>
<thead>
<tr>
<th>X1</th>
<th>X2</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>23</td>
<td>25</td>
<td>-2</td>
</tr>
<tr>
<td>2.</td>
<td>21</td>
<td>22</td>
<td>-1</td>
</tr>
<tr>
<td>3.</td>
<td>25</td>
<td>31</td>
<td>-6</td>
</tr>
<tr>
<td>4.</td>
<td>25</td>
<td>37</td>
<td>-12</td>
</tr>
<tr>
<td>5.</td>
<td>12</td>
<td>16</td>
<td>-4</td>
</tr>
<tr>
<td>6.</td>
<td>29</td>
<td>34</td>
<td>-5</td>
</tr>
<tr>
<td>7.</td>
<td>19</td>
<td>36</td>
<td>-17</td>
</tr>
<tr>
<td>8.</td>
<td>33</td>
<td>37</td>
<td>-4</td>
</tr>
<tr>
<td>9.</td>
<td>30</td>
<td>36</td>
<td>-6</td>
</tr>
<tr>
<td>10.</td>
<td>30</td>
<td>37</td>
<td>-7</td>
</tr>
<tr>
<td>11.</td>
<td>20</td>
<td>36</td>
<td>-16</td>
</tr>
<tr>
<td>12.</td>
<td>20</td>
<td>31</td>
<td>-11</td>
</tr>
<tr>
<td>13.</td>
<td>28</td>
<td>31</td>
<td>-3</td>
</tr>
<tr>
<td>14.</td>
<td>25</td>
<td>31</td>
<td>-6</td>
</tr>
<tr>
<td>15.</td>
<td>33</td>
<td>40</td>
<td>-7</td>
</tr>
<tr>
<td>16.</td>
<td>37</td>
<td>37</td>
<td>0</td>
</tr>
</tbody>
</table>

\[ t = \frac{-107}{\sqrt{16 \times 1087 - (107)^2}} \]

\[ \sqrt{15} \]

Mean X 25.63

Mean X 32.31

Mean X 25.83

\[ t = \frac{-107}{\sqrt{16 \times 1087 - (107)^2}} \]

\[ \sqrt{15} \]
\[ t_{30} = -107 \]
\[ t = 5.38 \]
\[ t_c = 2.131, \alpha = 0.05 \]

There is significant difference.

**Experimental Group**

<table>
<thead>
<tr>
<th>Pretest 2</th>
<th>Posttest 2 - B.Ed</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>X2</td>
</tr>
<tr>
<td>1. 15</td>
<td>25</td>
</tr>
<tr>
<td>2. 11</td>
<td>22</td>
</tr>
<tr>
<td>3. 13</td>
<td>31</td>
</tr>
<tr>
<td>4. 14</td>
<td>37</td>
</tr>
<tr>
<td>5. 16</td>
<td>16</td>
</tr>
<tr>
<td>6. 17</td>
<td>34</td>
</tr>
<tr>
<td>7. 11</td>
<td>36</td>
</tr>
<tr>
<td>8. 16</td>
<td>37</td>
</tr>
<tr>
<td>9. -</td>
<td>-</td>
</tr>
<tr>
<td>10. 21</td>
<td>37</td>
</tr>
<tr>
<td>11. -</td>
<td>-</td>
</tr>
<tr>
<td>12. 19</td>
<td>31</td>
</tr>
</tbody>
</table>
N = 16
= 219
mean = 13.662
= 13.1

\[
t = \frac{-226}{\sqrt{\frac{14 \times 4186 - (-226)^2}{13}}} = \frac{-226}{24.06}
\]

\[t = 9.39\]
\[t_c = 2.160, \alpha = 0.05\]
\[t < t_c, \alpha = 0.05 < 2.48\]

There is significant difference.
### Experimental - B.A.

<table>
<thead>
<tr>
<th></th>
<th>Posttest 1</th>
<th></th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td></td>
<td>X2</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>34</td>
<td>-2</td>
</tr>
<tr>
<td>28</td>
<td>40</td>
<td>-12</td>
<td>144</td>
</tr>
<tr>
<td>28</td>
<td>31</td>
<td>-3</td>
<td>9</td>
</tr>
</tbody>
</table>

\[
\begin{align*}
\text{Sum} &= 120 & \text{Sum} &= 136 \\
\text{Sum} &= 30 & \text{Sum} &= 34 \\
\end{align*}
\]

\[
\begin{align*}
t &= \frac{16}{\sqrt{\frac{4 \times 158 - (-16)^2}{3}}} \\
t &= \frac{-6}{6.46} = -2.48
\end{align*}
\]

\(t_c = 3.182, \alpha = 0.05 > 2.48\)

There is no significant difference.
### Experimental B.A.

<table>
<thead>
<tr>
<th>Pretest 2</th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>X2</td>
</tr>
<tr>
<td>21</td>
<td>31</td>
</tr>
<tr>
<td>14</td>
<td>34</td>
</tr>
<tr>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>11</td>
<td>31</td>
</tr>
</tbody>
</table>

| X: 57     | 136        | -79        | 1741        |
| X:14.25   | 34         | -19.75     | 435.25      |

\[
t = \frac{-76}{\sqrt{\frac{4 \times 1741 - 979^2}{3}}}
\]

\[
t = -15.52 = -5.09
\]

\[
t = 5.09
\]

\[
tc = 3.182, \alpha = 0.05
\]

There is significant difference.
<table>
<thead>
<tr>
<th></th>
<th>Posttest 1</th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>X2</td>
<td>D1</td>
</tr>
<tr>
<td>1.</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>2.</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>3.</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>4.</td>
<td>25</td>
<td>37</td>
</tr>
<tr>
<td>5.</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>6.</td>
<td>29</td>
<td>34</td>
</tr>
<tr>
<td>7.</td>
<td>19</td>
<td>36</td>
</tr>
<tr>
<td>8.</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>9.</td>
<td>30</td>
<td>36</td>
</tr>
<tr>
<td>10.</td>
<td>30</td>
<td>37</td>
</tr>
<tr>
<td>11.</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>12.</td>
<td>20</td>
<td>31</td>
</tr>
<tr>
<td>13.</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>14.</td>
<td>25</td>
<td>31</td>
</tr>
<tr>
<td>15.</td>
<td>33</td>
<td>40</td>
</tr>
<tr>
<td>16.</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>17.</td>
<td>32</td>
<td>31</td>
</tr>
<tr>
<td>18.</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>19.</td>
<td>28</td>
<td>40</td>
</tr>
<tr>
<td>20.</td>
<td>28</td>
<td>31</td>
</tr>
</tbody>
</table>

\[ X = 530 \quad 653 \quad -123 \quad 1245 \]
\[ \text{Mean } X = 26.5 \quad 32.65 \quad -6.15 \quad 62.25 \]
The mean score of the control group was:

\[
t = \frac{-123}{\sqrt{\frac{20 \times 1245 - (-123)^2}{19}}}
\]

\[
t = \frac{-123}{22.67} = 5.42
\]

\[t = 5.42 > t_c = 2.093, \alpha = 0.05\]

There is a significant difference in the groups' performance in these two tests.

Table 4.2.2 The mean score of the control group

<table>
<thead>
<tr>
<th>Test</th>
<th>Pretest 1</th>
<th>Posttest 1</th>
<th>Pretest 2</th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ed</td>
<td>12.41</td>
<td>26.25</td>
<td>15.0</td>
<td>27.08</td>
</tr>
<tr>
<td>B.A.</td>
<td>10.5</td>
<td>26.83</td>
<td>15.0</td>
<td>26.67</td>
</tr>
</tbody>
</table>
The mean score of the control B.Ed group on Pretest 1 (one) is 12.41 and that of the B.A. group on the same test is 10.5, tc = 2.365, $\kappa=0.05 > t = 0.58$ it was found that there was no significant difference between the mean score of the B.Ed and B.A groups within the control group.

At posttest 1 (one) the mean score for B.Ed group was 26.25 while that of B.A group was 26.83, tc = 2.120, $\kappa=0.05 > t = 0.309$. There was no significant difference in the two groups' performance on this test.

The mean score of the control B.A. group on posttest 1 (one) was 26.83 while their mean score on post test two was 26.67; tc = 2.571, $\kappa=0.05 > t = 2.15$ there was therefore no significant difference in the groups' performance between post- test one and posttest two.

On pretest two and posttest two the control group B.Ed students mean score was 15 on pretest two and 27.08 on post-test two; $t = 13.55 > tc = 2.201, \kappa=0.05$. there was therefore a significant difference in the group's performance in pretest one and posttest two.

Control group B.A. students' means score on pretest two was 15 while their mean score on posttest two was 26.67; $t = 6.35 > tc = 2.571, \kappa=0.05$ there was therefore significant difference in the groups performance between these two tests.
At pretest 2 the control B.Ed group's mean score was 15.0 and the B.A. score was also 15.0, $t = 0$, $t_c = 2.120$, $p = 0.05$ there was no difference at all in the performance of these two groups on this test.

At posttest 2, the control B.Ed group's mean score was 27.08 and the mean score of the B.A group was 26.67, $t_c = 2.126$, $p = 0.05 > t = 0.279$. there was therefore no significant difference in performance of these two groups on posttest two.

Looking at the performance of the control group B.Ed students, in comparing their performance between posttest 1 (one) and posttest 2 (two) their mean score on posttest one is 26.25 while their mean score on posttest two is 27.08 $t_c = 2.201$, $p = 0.05 > t = 0.767$ there was found no significant difference in Group's performance between posttest one and posttest two.

The total control group's mean score on posttest one was 26.44 and their mean score on posttest two was 26.94. $t_c = 2.567 > t = 1.86$ there was therefore no significant difference in their mean score at posttest one and at posttest two.
Control B.Ed/BA - Pretest One

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N  = 7</td>
<td>2</td>
</tr>
<tr>
<td>X  = 87</td>
<td>21</td>
</tr>
<tr>
<td>X  = 12.41</td>
<td>10.5</td>
</tr>
<tr>
<td>$X^2$ = 1187</td>
<td>233</td>
</tr>
</tbody>
</table>

Value of $S^2 = 16.89$

$\text{t} = 0.58$ which is less than $t_c = 2.365, \alpha = 0.05$

Control B.Ed/BA - Posttest One

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N  = 12</td>
<td>6</td>
</tr>
<tr>
<td>X  = 315</td>
<td>161</td>
</tr>
<tr>
<td>X  = 26.25</td>
<td>26.83</td>
</tr>
<tr>
<td>$X^2$ = 8421</td>
<td>4395</td>
</tr>
</tbody>
</table>

Value of $S^2 = 14.193$

$\text{t} = 0.309$ which is less than $t_c = 2.120, \alpha = 0.05$. 
### Control B.Ed/B.A. - Prettest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>X</td>
<td>180</td>
<td>90</td>
</tr>
<tr>
<td>X²</td>
<td>2862</td>
<td>1484</td>
</tr>
</tbody>
</table>

Value of $S^2 = 18.5$

\[ t = 0 \text{ which is less than } t_c = 2.120, \alpha = 0.05. \]

### Control B.Ed/B.A. - Posttest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>X</td>
<td>325</td>
<td>160</td>
</tr>
<tr>
<td>X²</td>
<td>8877</td>
<td>4330</td>
</tr>
</tbody>
</table>

Value of $S^2 = 8.64$

\[ t = 0.279 \text{ which is less than } t_c = 2.120, \alpha = 0.05. \]
Control B.Ed Group

<table>
<thead>
<tr>
<th>Posttest 1</th>
<th></th>
<th>Posttest 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>X2</td>
<td>D1</td>
<td>D2</td>
</tr>
<tr>
<td>1. 32</td>
<td>28</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>2. 26</td>
<td>27</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>3. 19</td>
<td>28</td>
<td>-9</td>
<td>81</td>
</tr>
<tr>
<td>4. 29</td>
<td>34</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>5. 28</td>
<td>25</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>6. 26</td>
<td>25</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7. 29</td>
<td>27</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>8. 27</td>
<td>26</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9. 20</td>
<td>25</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>10. 28</td>
<td>28</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11. 24</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12. 27</td>
<td>28</td>
<td>-1</td>
<td>1</td>
</tr>
</tbody>
</table>

\[
X = 315 \quad 325 \quad -10 \quad 164
\]

Mean \(X=26.25\) \(27.08\) \(-0.83\) \(13.67\)

\[
\frac{-10}{\sqrt{\frac{12 \times 164 - (-10)^2}{11}}}
\]
\[ t = \frac{-10}{13.03} = 0.767 \]

\[ t' = 0.767 \]

\[ t_c = 2.201, \alpha = 0.05 \]

There is no significant difference.

### Control B.A. Group - Posttest 1 and Posttest 2

<table>
<thead>
<tr>
<th>Posttest 1</th>
<th>X1</th>
<th>X2</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>29</td>
<td>30</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>22</td>
<td>-2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>31</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>30</td>
<td>-5</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>27</td>
<td>28</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>30</td>
<td>19</td>
<td>-11</td>
<td>121</td>
</tr>
</tbody>
</table>

\[ X = 161 \]

\[ X = 160 \]

\[ -21 \]

\[ 153 \]

\[ Mean = 26.83 \]

\[ 26.67 \]

\[ 3.5 \]

\[ 25.5 \]

\[ t = \frac{-21}{\sqrt{\frac{6 \times 153 - (-21)^2}{5}}} = -2.15 \]
\[ t = 2.15 \]
\[ tc = 2.571, \quad = 0.05 \]

There is no significant difference.

**Control Group - B.Ed, Pretest 2/Posttest 2**

<table>
<thead>
<tr>
<th>Pretest 2</th>
<th>Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
<td>X2</td>
</tr>
<tr>
<td>1. 20</td>
<td>28</td>
</tr>
<tr>
<td>2. 11</td>
<td>27</td>
</tr>
<tr>
<td>3. 16</td>
<td>28</td>
</tr>
<tr>
<td>4. 20</td>
<td>34</td>
</tr>
<tr>
<td>5. 9</td>
<td>25</td>
</tr>
<tr>
<td>6. 11</td>
<td>25</td>
</tr>
<tr>
<td>7. 16</td>
<td>27</td>
</tr>
<tr>
<td>8. 17</td>
<td>26</td>
</tr>
<tr>
<td>9. 18</td>
<td>25</td>
</tr>
<tr>
<td>10. 18</td>
<td>28</td>
</tr>
<tr>
<td>11. 11</td>
<td>24</td>
</tr>
<tr>
<td>12. 13</td>
<td>28</td>
</tr>
</tbody>
</table>

\[ = 180 \quad 325 \quad -145 \quad 1857 \]

Mean X \( \bar{X} \) = 15

Mean X1 = 27.08, Mean X2 = 12.08, Mean D2 = 154.75
\[
t = \frac{-145 - (-145)}{\sqrt{\frac{12 \times 1857 - (-145)^2}{11}}} = -13.55
\]

\[t = 13.55 > t_c = 2.201, = 0.05\]

There is significant difference.

Control B.A. - Pretest 2 and Posttest 2

<table>
<thead>
<tr>
<th></th>
<th>X1</th>
<th>X2</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19</td>
<td>30</td>
<td>-11</td>
<td>121</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>22</td>
<td>-13</td>
<td>169</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>31</td>
<td>-19</td>
<td>361</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>30</td>
<td>-7</td>
<td>49</td>
</tr>
<tr>
<td>5</td>
<td>15</td>
<td>28</td>
<td>-13</td>
<td>169</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>19</td>
<td>-7</td>
<td>49</td>
</tr>
</tbody>
</table>

\[X = 90 \quad 160 \quad -70 \quad 918\]

Mean X=15

\[\bar{X} = 26.67 \quad 11.67 \quad 153\]

\[
t = \frac{-70}{\sqrt{\frac{6 \times 918 - (-70)^2}{5}}} = -6.35
\]
\[ t = 6.35 > t_c = 2.571, \quad \alpha = 0.05 \]

There is significant difference.

<table>
<thead>
<tr>
<th>Control Group - Posttest 1/Posttest 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
</tbody>
</table>

\[ X = 476 \quad 485 \quad -31 \quad 317 \]

\[ \text{MeanX} = 26.44 \quad 26.94 \quad 1.72 \quad 17.61 \]
\[ t = \frac{-31}{\sqrt{18 \times 317 - (-31)^2 / 17}} = \frac{-31}{16.7068} = 1.86 \]

\[ t = 1.86, \quad tc = 2.567, \quad \alpha = 0.05 \]

There is no significant difference.

**Table 4.2.3 The Mean score of the experimental and Control Groups on Pretest One.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ed</td>
<td>13.25</td>
</tr>
<tr>
<td>Experimental</td>
<td>11.8</td>
</tr>
<tr>
<td>B.A.</td>
<td>6.0</td>
</tr>
<tr>
<td>B.Ed</td>
<td>12.41</td>
</tr>
<tr>
<td>Control</td>
<td>12.0</td>
</tr>
<tr>
<td>B.A.</td>
<td>10.5</td>
</tr>
</tbody>
</table>

At Pretest one the mean score of the experimental group was 11.8 while the mean score of the control group was 12.0 \( tc = 2.120, \quad \alpha = 0.05, \quad t = 0.093 \), there was therefore no
significant difference in the achievement of these two groups on pretest one.

Experimental/control - Pretest one

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N  = 10</td>
<td>9</td>
</tr>
<tr>
<td>X  = 118</td>
<td>108</td>
</tr>
<tr>
<td>Mean X  = 11.8</td>
<td>12.0</td>
</tr>
<tr>
<td>$X^2$  = 1642</td>
<td>1420</td>
</tr>
</tbody>
</table>

Value of $S^2 = 21.976$

$t = 0.093$ which is less than $t_c = 2.120$, $\alpha=0.05$

There was therefore no significant difference in the achievement of these two groups at Pretest one.

Table 4.2.4 The mean score of the experimental and control groups on Posttest 1.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A.</td>
<td>30.0</td>
</tr>
<tr>
<td>Experimental</td>
<td>26.50</td>
</tr>
<tr>
<td>B.Ed</td>
<td>25.61</td>
</tr>
<tr>
<td>B.A.</td>
<td>26.83</td>
</tr>
<tr>
<td>Control</td>
<td>26.44</td>
</tr>
<tr>
<td>B.Ed</td>
<td>26.25</td>
</tr>
</tbody>
</table>
At posttest one, the mean score of the experimental group was 26.5 while the mean score of the control group was 26.44. 

\[ t = 0.0365 \text{ which is less than } t_c = 2.021, \alpha = 0.05. \]

There was therefore no significant difference in the achievement of these two groups at posttest two.

Table 4.2.5  

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ed.</td>
<td>15.64</td>
</tr>
<tr>
<td>Experimental</td>
<td>15.33</td>
</tr>
<tr>
<td>B.A.</td>
<td>14.25</td>
</tr>
<tr>
<td>Control</td>
<td>15.0</td>
</tr>
<tr>
<td>B.Ed</td>
<td>15.0</td>
</tr>
<tr>
<td>B.A.</td>
<td>15.0</td>
</tr>
</tbody>
</table>

At pretest two the experimental B.Ed group’s mean score was 15.64 while the mean score of the control B.A group was 15.0, \( t_c = 2.101, \alpha = 0.05. > t = 0.303 \), there was therefore no significant difference in the achievement score of the two groups on pretest two.
The mean score of pretest two of the Experimental B.A group was 14.25 and that of the control groups, B.Ed students was 15.0, \( t = 0.322 < t_c = 2.145, \alpha = 0.05 \). There was again no significant difference in achievement score.

At the same pretest two, the mean score of the experimental B.A group was 14.25 and that of the control group BA students was 15.0, \( t = 0.232 \) which is less than \( t_c = 2.306, \alpha = 0.05 \). There was no significant difference in their achievement score.

Likewise at pretest two, the experimental B.Ed group’s mean score was 15.64 and that of the control B.Ed group was 15.0, \( t_c = 2.064, \alpha = 0.05 > t = 0.416 \). there was again no significant difference in the two groups achievement score.

Since at pretest two, the mean score of the entire experimental group was 15.33 while the mean score of the entire control group was 15.0; \( t_c = 2.042 > t = 0.197 \) there was no significant difference in the achievement score between these two groups. Then, the researcher concluded that there was no significant difference in achievement score between the experimental and control groups at the beginning of the next part of the study. Since students had only been exposed to conventional teaching methods before this study. Differences arising later on in the students’ score would be attributed to Programmed Instruction.
Experimental B.Ed Group/Control BA Group

Pretest Two

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>6</td>
</tr>
</tbody>
</table>

\[ X = 219 \quad 90 \]

Mean \[ X = 15.64 \quad 15.0 \]

\[ X^2 = 3629 \quad 1484 \]

Value of \( S = 18.73 \)

Value of \( t \) was found to be

\[ t = 0.303 \] which is less than

\[ t_c = 2.101, \alpha = 0.05 . \]

Experimental BA/Control B.Ed -

Pretest Two

<table>
<thead>
<tr>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>12</td>
</tr>
</tbody>
</table>

\[ X = 57 \quad 180 \]

Mean \[ X = 14.25 \quad 15.0 \]

\[ X^2 = 879 \quad 2862 \]

Value of \( S^2 = 16.34 \)

\[ t = 0.322 \] which is less than

\[ t_c = 2.145, \alpha = 0.05 . \]
Experimental BA/Control BA

Pretest Two

N1 N2
N = 4 6
X = 57 90
Mean X = 14.25 15.0

\[ X^2 = 879 \quad 1484 \]
Value of \( S^2 \) = 25.09

\[ t = 0.232 \text{ which is less than } t_c = 2.306, \alpha = 0.05 \]

Experimental B.Ed/Control B.Ed

Pretest Two

N1 N2
N = 14 12
X = 219 180
Mean X = 15.64 15.0

\[ X^2 = 3629 \quad 2862 \]
Value of \( S^2 \) = 15.22

\[ t = 0.416 \text{ which is less than } t_c = 2.064 \]
Entire experimental Group/entire control Group pretest two

N1 = 18
N2 = 18
X = 276
X = 272
mean X = 15.33
X2 = 4508
X2 = 4346
Value of S2 = 15.05

t = 0.197 which is less than
tc = 2.042, \( \alpha = 0.05 \).

Table 4.2.6: The Mean score of the Experimental and Control groups on posttest two.

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.Ed</td>
<td>32.31</td>
</tr>
<tr>
<td>Experimental</td>
<td>32.65</td>
</tr>
<tr>
<td>B.A.</td>
<td>34.0</td>
</tr>
<tr>
<td>Control</td>
<td>27.08</td>
</tr>
<tr>
<td>B.Ed</td>
<td>26.94</td>
</tr>
<tr>
<td>B.A.</td>
<td>26.67</td>
</tr>
</tbody>
</table>

At posttest two, the mean score of the experimental B.Ed group was 32.31 and that of the control B.A. group was 26.67;
t = 2.011 which is less than tc = 2.086, \( \alpha = 0.05 \). There was therefore no significant difference in the achievement score of these two groups at posttest two. However, at the same posttest two, the mean score of the experimental B.A. group was 34.0 and the mean score of the control B.Ed. group was 27.08;

\[ t = 3.95 > tc = 2.145, \alpha = 0.05 \]. There was therefore a significant difference in the achievement score of these two groups at posttest two.

Also, at posttest two, the mean score of the experimental B.Ed group was 32.31 and that of the control B.Ed group was 27.08; \( t = 2.64 > tc = 2.056, \alpha = 0.05 \). There also was a significant difference in the achievement score between these two groups at posttest two.

Likewise, the mean score of the experimental B.A. group at posttest two was 34.0 while the mean score of the control B.A. group was 26.67;

\[ t = 2.968 > tc = 2.306, \alpha = 0.05 \]. There is therefore significant difference in achievement score between these two groups at posttest two.

At posttest two, the mean score of the entire experimental group was 32.65 while the mean score of the entire control group was 26.94.
t = 3.419, > t_c = 2.029, \alpha = 0.05. There was, therefore, a significant difference in the achievement score at posttest two between the experimental group and the control group.

**Experimental B.Ed group/Control B.A group**

Posttest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>X</td>
<td>517</td>
<td>160</td>
</tr>
</tbody>
</table>

Mean X = 32.31 26.67

\[ X^2 = 17329 \quad 4330 \]

Value of \( S^2 = 34.339 \)

\[ t = 2.011 \text{ which is less than } t_c = 2.086, \alpha = 0.05 \]

**Experimental BA group/Control B.Ed group**

Posttest Two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>X</td>
<td>136</td>
<td>325</td>
</tr>
</tbody>
</table>

Mean X = 34.0 27.08

\[ X^2 = 4678 \quad 8877 \]

Value of \( S^2 = 9.21 \)

\[ t = 3.95 > t_c = 2.145, \alpha = 0.05. \]
Experimental BA Group/Control BA Group

Posttest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>X</td>
<td>136</td>
<td>160</td>
</tr>
</tbody>
</table>

Mean $X = 34.0$ $26.67$

$X^2 = 4678$ $4330$

Value of $S^2 = 14.667$

$t = 2.968$ which is more than $tc = 2.306$, $\alpha = 0.05$. 

Experimental B.Ed Group/Control B.Ed group

Posttest two

<table>
<thead>
<tr>
<th></th>
<th>N1</th>
<th>N2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>X</td>
<td>517</td>
<td>325</td>
</tr>
</tbody>
</table>

Mean $X = 32.31$ $27.08$

$X^2 = 17329$ $8877$

$S^2 = 26.86$ (value of $S^2$)

$t = 2.64$ which is more than $tc = 2.056$, $\alpha = 0.05$. 

This shows that the difference between posttest one and posttest two was significantly different. Programmed instruction and traditional lecture methods have a positive contribution to improving student performance in the experimental group, while the control group shows an increase in performance. The mean scores of improvement in this group were made up from 16 to 17 in posttest one and an average of 7.5 in the posttest two of 17.12. The improvement of the posttest one and two shows a positive change. This means that the difference between posttest one and the posttest two was significantly different.
Experimental Group/Control Group

Posttest Two

\[ \Sigma X = 652 \quad 485 \]
\[ \Sigma X^2 = 22007 \quad 13267 \]

Mean \( \bar{X} = 32.65 \quad 26.94 \)

Value of \( S^2 = 26.409 \)

\[ t = 3.419 \text{ which is more than } \frac{t_c}{0.05} = 2.029, \alpha = 0.05. \]

From the information in table 4.2.5 and table 4.2.6 it can be seen that the difference between pretest two and posttest two was significantly different. Therefore, the two methods, Programmed Instruction and Conventional teaching method have a positive contribution to students' performance. Both methods produced some improvement in mean performance. The experimental group's mean score went up from 15.33 at pretest two, to 32.65 at posttest two. The mean difference of 17.32 could not have occurred by chance, and there was a significant difference in the group's performance in these two tests. The control group's mean score likewise went up from 15.0 to 26.94. The mean difference of 11.94 could not have occurred by chance.
Despite the fact that at posttest two, the comparison between the experimental B.Ed group and the control B.A. group yielded no significant difference in their mean score, since t = 2.086 > t = 2.011, all the other mean comparisons between the experimental groups and the control groups showed significant differences in achievement score at posttest two. This fact was clearly shown in comparison between the entire control group at posttest two, since t = 3.419 > t = 2.029 at \( \alpha = 0.05 \) level, which was highly significant.

It is therefore clear that the null hypothesis that there is no significant difference in achievement score between students taught Office Practice by Programmed Instruction and those taught Office Practice by conventional teaching methods is rejected. The results show that the difference between means of 5.71 could not have occurred by chance and it is proven significant at 0.05 and 0.01 levels.

The study therefore shows that Programmed Instruction produced better mean scores than conventional methods. This means that, the experimental group which was taught by Programmed Instruction performed better in posttest two, than the control group which was taught by conventional teaching methods.
5.1 Introduction

This study sought to find out whether students taught by Programmed Instruction and those taught by Conventional methods showed any significant difference in achievement score.

The following null hypotheses were proposed and tested statistically:

1. H01. There is no significant difference in achievement scores between students taught Office practice by programmed Instruction and those taught by Conventional Methods.

2. H02. Programmed Instruction does not improve the learning of Office Practice.

The sample of this study consisted of thirty eight students from Secretarial Studies Department of Kenyatta University. The instruments used were:

- Two pretests
- Two posttests, and
- A programme.
In data analysis, appropriate means, and percentages were calculated. The t-test for Independent samples was used to test $H_{01}$ and $H_{02}$. The null hypotheses were significant at 0.05 level of confidence.

5.2 Summary of findings

From the data analysis in chapter four of this study, it can be seen clearly that the use of Programmed Instructions as a method of teaching is very promising in the teaching of Office Practice as there is strong evidence that significant increases in student performance can be achieved by its integration in the classroom.

There is no doubt that those students who learned by programmed Instruction performed better in the final achievement score than those who were exposed to conventional teaching methods. At the beginning of the study, students in the experimental group and those in the control group had little difference in performance as is shown by the mean score of the first pretest. The mean score for the experimental group was 11.8 while that of the control group was 12.0. This indicates that there was no significant difference in the performance when both groups were taught through conventional teaching methods.
When both the experimental group and the control group were exposed to conventional teaching methods, there was no significant difference between the B.A. experimental group and B.A. control group. There was no significant difference in the achievement score of the B.Ed experimental group and B.Ed. control group. When comparing the total experimental group to total control group the mean score of the experimental group at posttest one was 26.50 and the mean score of the control group was 26.44. There was therefore no significant difference in the achievement score.

There was also a major difference between the achievement score of the experimental group when taught by conventional teaching methods and after being exposed to Programmed Instruction. The mean score for the experimental group when taught by conventional methods was 26.50 while their mean score when taught by Programmed Instruction was 32.65. This suggests that Programmed Instruction was far more successful in teaching Office Practice than conventional teaching methods.

At the final achievement test, posttest two, there was a significant difference between the mean score of the experimental group and the control group. After the experimental group had been exposed to Programmed Instruction and the control group exposed to conventional teaching
methods, the mean score for the posttest two for the experimental group was 32.65 while the mean score of the control group was 26.94. Since both groups had previously only been exposed to conventional teaching methods, it was concluded that the differences that arose after, were as a result of the experimental method, that is, Programmed Instruction.

Both Programmed Instruction and Conventional teaching methods achieved gains in students' final achievement score, therefore neither of the two methods can be discarded. Both groups improved in general performance during the course of the experiment. The performance of the experimental group shot up from a mean score of 11.8 to 32.65 and the mean score of the control group also shot up from a mean score of 11.88 to 26.94.

Although both methods achieved gains in student performance the general pattern however suggests that programmed instruction was more successful in teaching Office Practice. The Business world of today is rapidly changing and all projections point to continual change. Change in Industries affected by reasons like growth of population, number of people living in the cities and towns, the rise of living standards, all demand improved services. Growth of technology has also brought rapid changes in business
especially in the area of Office Machines. Since the business office of today is the core of business activities where information is processed, records are kept, dictations taken and transcribed, mail is received and sent, communications of all kinds are used; the Office Practice teacher must teach well and use all the available materials and teaching methods if she/he is to help her/his students achieve the set goals in the most reasonable time. If she/he is to guide learning and enable each student learn as rapidly as an individual learner can, then Programmed Instruction should become one of her main instructional methods.

The researcher also observed that instructional methods found in most Kenyan Universities and secondary schools involve the teacher lecturing, writing on the chalkboard and using the textbook, leave little time for the teacher to pay attention to individual students. This situation is made worse by the large number of students per class. Use of Programmed Instruction would cater for these individual differences.

The researcher, through informal interviews with her colleagues and other Office Practice teachers in colleges and secondary schools observed that office practice is referred to in many different names. For instance, some colleges would refer to part of it as "General Office Procedures". The Secretarial Studies Unit of Kenyatta University previously
referred to part of Office Practice as "Business Communication". Currently, it refers to the advanced course of Office Practice as "Office Management".

The researcher also observed that the set textbooks used in teaching Office Practice change according to the teacher currently teaching the course. This fact shows that Office Practice is a complex subject and calls for the teacher to explore several teaching methods to achieve the subject set goals.

The researcher also observed that students taught by Programmed Instruction had learned to function Independently using resources other than a textbook during the experiment time. Students taught by conventional methods revealed that, those taught by Programmed Instruction had achieved significantly higher results.

Programmed Instruction which was used in this study is one of the methods that can be integrated with conventional methods already in use in the classroom.

The results of this study are consistent with the findings of earlier investigators, (Eshiwani 1974) in that programmed instruction was used successfully to teach mathematics to secondary school students, (Obunga-Okambi 1978) in teaching of mathematics to primary school pupils.
succefully by programmed intruction and (Mwai, 1984) in that Programmed Instruction was successfully used to teach English language to secondary school students. The results of the use of Programmed Instruction in this study have been so positive that they command further trials and examinations.

5.3 Conclusions

The following conclusions were made within the framework of this study’s limitations. They were mainly based on various questions posed and on the results of hypotheses tested.

Results on the difference in achievement scores between students taught Office Practice by Programmed Instruction and those taught by conventional methods revealed that, those taught by Programmed Instruction had achieved higher score.

Results on the question of whether Programmed Instruction does improve the learning of Office Practice showed that Programmed Instruction improves the learning of Office Practice.

The above conclusion was supported by the findings of research study done previously by Mary Mwai (1986). This study compared the teaching of English language by Programmed Instruction and conventional methods in Kenya secondary
5.4 Implications

The following implications are based on the findings and conclusions of this study.

The findings and conclusions of this study have shown that: there is need for exploring further use of this method (Programmed Instruction) in teaching at the University level with the aim of making the student the most important person in the teaching/learning situation. Since Office Practice is a course that is needed by all Office workers, and also by those who may want to become self employed, it is therefore, very necessary for all students to learn Office Practice. It is therefore necessary for all involved; teachers, educators and students to realize that students mastery of Office Practice is going to be an aid to their getting employment/or creating employment. There is, therefore, a need to re-examine the approach to teaching/learning in the Kenyan Universities, secondary schools and various business schools.

The results of this study show that Programmed Instruction can be integrated with conventional teaching methods in the classroom as it is an effective teaching method.
The results of this study also show that Programmed Instruction may be combined in a new package with other innovative teaching methods so as to make one unified and uniquely powerful teaching/learning experience. Since the two methods are effective, it is advantageous to use Programmed Instruction, especially where the teacher is not present. Programmed Instruction can be used successfully at the University since University students are used to working on their own.

Integrating Programmed Instruction in teaching will help to improve teaching methods so as to improve student performance, to reach satisfactory levels of achievement in reasonable amounts of time. Especially since teachers and educators in general are aware of individual differences in ability and pace of learning among students. Although teachers always try to provide all students with an element of individual attention during teaching, with the present day large classes, all other students tend to be neglected whilst the teacher devotes attention to one individual. The teaching process should be student oriented but although some teachers are highly skilled and capable of teaching large classes efficiently, it is very difficult to satisfy the needs of each and every student of every intelligence.

Results of this study have also showed that Programmed
Instruction may well enable us to reach the individual student with a precision, intensity and effectiveness, never achieved before. Because the idea behind Programmed Instruction is that the student will work through the Programme at his own pace, gathering information and answering a series of logically framed questions. Only when he gives the correct answer will he be encouraged to proceed to the next step in the Programme.

The teacher provides that important human element needed in an effective teaching/learning situation. It follows then, that Programmed Instruction should be integrated with other Instructional methods as a supplement and not as a substitute of those other teaching methods.

Teachers should let Programmed Instruction, where appropriate, sit in for the teacher when absent or sit in for some of the topics to be covered. A good example would be for revision purposes, when a student has failed a course and he/she needs to prepare for supplementary examination. The programme can also be used for teaching purposes where there may be an established procedure to follow, for example in teaching the rules for filing and indexing in Office Practice. It would also be very useful where a student has either had a long period of absence during which time a topic was dealt with; or where a student has experienced individual difficulty.
Programmed Instruction is capable of making teaching/learning a happy and memorable experience for the student and the teacher. Instead of using a monotonous lecture method, the teacher can increase variety of her teaching methods by including Programmed Instruction every now and then.

Since increased technology demands better trained office workers, Office Practice teachers must find better and more innovative methods of teaching. The results of this study suggest that Programmed Instruction is one of those innovative methods that can be used successfully.

Programmed Instruction can change and improve the role of the teacher from being the giver of knowledge to being a guide, thus changing the basic assumption that because a teacher teaches, the student learns, as this does not always happen.

Use of Programmed Instruction will relieve the teacher from the full load of informing his/her students. Thus enabling him/her to devote more of her/his time on discussions and solving problems with his/her students.
Programmed Instruction would also be a useful tool in the training of Office workers. Good programmes could easily take the role played by some of the resource persons at Secretarial seminars. Good programmes written on job familiarization could be a way of teaching and keeping new employees busy during the first few days on the job. Good programmes could be added to the resources and other supportive materials used for "on the job training" for office workers who are unable to take time off for re-training and refresher courses.

A programme, such as the one used in this research could be used by office clerks, who are preparing to take professional office procedures examinations.

Office workers trained in the early days or in institutions that did not emphasize word and information processing, especially with the present day office emphasis on new technology, would find a good programme package very useful in making themselves up-to-date to cope with increased technology in the office.

Other business subjects that could benefit from Programmed Instruction include Bookkeeping, Accounting, Business English and even shorthand could be taught to typists by programmed instruction in conjunction with individual progress methods. Leslie et al (1972).
Programmed Instruction can also be used to teach simple bookkeeping and filing procedures to women groups' leaders who are usually expected to keep records of their groups finances and business transactions. Many of these women group leaders have a good basic education and could easily learn these simple office procedures through a well written programme.

5.5 Recommendations for Further Research

More intensive study should be done in other universities and colleges to find out whether Programmed Instruction can be used to help those students who fail certain courses revise for another examination while they continue to the next year of study, instead of being asked to repeat the year.

It would be valuable to carry out a study to determine whether Programmed Instruction can be used successfully in other business courses and other courses offered in different disciplines.

A valuable study would be one in which an attempt would be made to determine whether Programmed Instruction could be used effectively to teach correspondence or distant education courses.
A survey to determine the percentage number of teachers who are familiar with Programmed Instruction would be valuable, to determine whether Programmed Instruction should be included in the curriculum for teacher training colleges.

It would be useful exercise to set up workshops where practising teachers could be instructed in the art of Programme writing and how to use Programmed Instruction in general. Workshops of this type if set up in different parts of the country could be a source of Programmed material which could be exchanged to be tried out in different parts of the country. Once a Programme has been written, validated by participants at different workshops, and tried out on several students, it can be run-off the duplicator and be distributed countrywide, to be used on students of the same level of education.

Since this research was done over a short period of time, it is important for further research to be carried out to find out whether a programme that provides maximum learning also produces maximum retention or transfer over a long period of time.

Programmed Instruction is a form of individualized Instruction and each student is expected to work on his own, the Programme takes care of slow learners since they have all
the time to go through it at their own pace. But, a problem might arise when there are fast learners in the group. Research should therefore be carried out to find ways and means of occupying the fast learners who go through any programme faster than others. If the fast students sit around to wait until the slow ones complete their work, this becomes a negative reinforcement as they have nothing to do.

Programme writers should find ways and means of writing the type of programme that will not allow guesses as suggested by Hellen Robb (1993) when she states that:

One of the problems of Programmed materials is that it encourages guesses on the part of the student and that some guesses can be correct.

The results of this study have been so positive that it would be worthwhile to try programmed instruction in our classrooms.

Programmed instruction is long overdue in our classrooms, especially when given the present situation of large classes, few qualified teachers and extremely few teaching resources. The continual changes and improvements in our educational system has been demonstrated in the implementation of the 8:4:4 system of education, demands the use of more innovative teaching methods of which Programmed Instruction is a good example.
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**APPENDIX I**


APPENDIX 1 A

PRETEST ONE (1)

Total marks is forty (40)

Explain the following Business terms briefly.

Q1. (a) The clerical function
    (b) Personnel Officer
    (c) PAYE
    (d) Freight
    (e) Referee
    (f) Consignor
    (g) Classified Mail
    (h) Franking
    (i) Poste Restante
    (j) Salutation
    (k) STD
    (l) Delivery Note
    (m) Drawer
    (n) Crossed Cheque
    (o) Alphabetical Order
    (p) VAT
Q2. (a) Explain the following Business terms by making a list of types of organizations.

- Profit making organizations
  - Manufacturing
  - Services

(b) Non-Profit making organizations

Q3. Name three reference books which you expect to find in any office.
POSTTEST ONE (1)

Total marks is forty (40)

Q1. (a) Briefly summarize the comparison between large and small organizations.

(b) Mention four functions of the office.

Q2. (a) One of your Junior clerk’s task is to deal with all incoming and outgoing mail. She has asked you for some notes to remind her how to deal with the mail. Draft these notes for her.

(b) Describe briefly the use of a Franking machine.
   Give any advantages and disadvantages of using this machine.

Q3. (a) When would you use the following Office machines?
   - Photo-copier
   - Ink Duplicator.

(b) Describe the functions of one of the above machines.
   Give three advantages and three disadvantages of
Q4. (a) Name five services offered by Kenya Post and Telecommunications Services.

(b) Select two of the following methods of business communication, and explain briefly, giving examples when and why it would be advantageous to use them.

- telephone
- telex
- facsimile.

Q5. Explain briefly the functions of a Personnel Manager.
APPENDIX 2 A

PRETEST TWO

Total Marks is Fourty (40).

Section A - Fill in the blanks.

Q1. The main reason for filing is 

Q2. The four methods of classifying files are:
   (a) 
   (b) 
   (c) 
   (d) 

Q3. What is Indexing?

Q4. Which method of classifying files is suited for names of customers or personnel?
Section B - Arrange the following names in proper filing order.

1. Brown
   Brown Mary
   Brown M.

2. Ducane
   Duncan
   Vannot
   Van Homer

3. Mwangangi
   Mrs. Mary Mwangangi
   Mrs. Mary Mwangi
4. President Daniel Arap Moi
General Lenges
Secretary J. Kamotho
Chairman B. Gichaga

1. ........................................
2 .................................
3 .................................
4 .................................

5. Dr. William P. Seare
Urther Flemming M.D.
Thomas Rado M.A.
John S. Adamasi, L.L.D.

1 .................................
2 .................................
3 .................................
4 .................................

Directions
1. Here are the questions you will be asked. As the questions are presented to you, you should decide:
   a. Whether you understand the meaning of the question and
   b. How to answer the question accurately.

2. You will be asked to write your first name on the answer sheet. You will be asked to write your last name on the answer sheet.
APPENDIX 2 B

The Program

How to use This Program

growing any further. Then continue:

1. This is a Learning Instrument - It is not a test.

2. Your knowledge will not be scored on your responses in the program. You will be scored on an achievement test after you have completed the program:

3. This program makes Learning quicker and easier for you.

4. Relax - work at a rate of speed that is comforable for you.

Directions

1. Read every word in the order it is presented to you. To be able to understand the alphabetical filing rules and to score well on the achievement test, you cannot skip or skim.

2. You will be required to write your responses as directed by your teacher.

3. After you have written your response, check it against the correct response on the back of the question frame.
4. If you find that your response is not the same as that given in the program, turn back and find out why before going any further. Then continue on to the next frame in the Program.

5. If you stop working on the Program before completing it, always stop at the end of a set or on a review item. Do not stop in the middle of a sequence.
SET 1. INTRODUCTION TO ALPHABETICAL FILING

SET 2. PERSONAL NAMES

Surname
Given name
Identical names
Surname prefixes
Use of "Saint"
Academic degrees
Titles not used
Titles used
Hyphened names
Nicknames
Filed as written
Given name not distinguishable
Nicknames not distinguishable
Abbreviated given names
Seniority.

SET 3. BUSINESS AND FIRM NAMES

Containing surname and given name
Identical surnames and given names
Surname only or no surname
Firm endings
Abbreviated endings

Letters not abbreviations
"The"
"And"
"Of"

One-word or two-word names

Titles

Places

Apostrophe

Foreign places

SET 4 GOVERNMENT AND SPECIAL NAMES

Names of all governments

Descriptive words of foreign countries

United states government

Descriptive phrases

Ranking of departments, bureaus, divisions

State county, and city names

Associations and Clubs

Public schools

Churches, Colleges, universities, Private Schools, Hospitals, and Hotels.

SET 5 NUMBERS AND ADDRESSES

Numbers spelled out

Numbers of more than one digit
Identical firm names in different cities
Identical firm names and city names in different states
Multiple firm locations in one city
Corner locations
Numbered streets
Building numbers
  - not spelled out
  - order filed
  - more than one firm location on one street.
STOP

READ THIS BEFORE STARTING THE PROGRAM

READ COMPLETELY THROUGH THE BOOK ON TRACK A BEFORE COMING BACK TO TRACK B.

DO NOT READ DOWN THE PAGE.

NOW TURN THE PAGE AND BEGIN
TRACK A - Proceed to Set 1

INTRODUCTION: METHODOLOGICAL STUDIES

TRACK B

(* Dr. H. Jan 6, 2023

TRACK C

Artificial Intelligence in the 21st Century

of These Findings,

It is the latter ( )

TRACK D

(Before/after)

TRACK E

Three different conditions with three trials

(Both exactly the same Plus Slow)

The findings are not matched with the findings of the University of California.

383
Which name is filed last?

(a) Dr. William P. Sears
(b) Arthur Fleming, M.D.
(c) Thomas Radford, M.A.
(d) John S. Adams, L.L.D.

It is the letter ( )

"Martin L. Brown Bakery" is filed (before/after)

"Martin Brown Coffee"

"Drake’s Orion Corp." is filed (before/after)

"Drake Shoe Shop"

The distinguishing words in "University of California at Los Angeles" are
Academic degrees are not used in filing personal names.

Shorter form used on identical names.

Consider everything up to the apostrophe.

These words distinguish this Los Angeles University from another.
Alphabetical filing is the only story this program has to tell. Write your response to each blank then look at the correct response in the corresponding frame on the NEXT PAGE.

The type of filing this program tells about is 1/A

Now turn to frame No1, page 4 and check your response .......

Which name is filed last?

A. John R. Le Mone

B. Roger G. Harrison

C. Jack W. Lemon

D. Wayne B. Harrington

It is the letter ( )

"Stuart T. Johnson AutoPartic is filed ______
(before/after) "Stuart Johnson Brake Services". 109/C

"Loma's Staple Furningtings" is filed
(before/after) "Loman Teakwood mfg. Co." 165/D
"Hotel Zanzibar" is filed (before/after) University of Arkansas.

Prefixes are used as part of the surname, for example, "Mr."

When S' is used, the "S" is considered in filing.

"Zanzibar" comes after "Arkansas".
These words: Adams
Baker
Charleston
are listed in alphabetic order by the ___ (first/second) letter in the names.

Titles, such as "General," "Secretary," "Chairman," etc are not used in filing personal names.
"General Thomas A. Bradley" is filed before "Burton Davis" because "General" is not used.

General Lou Aaron is filed ___ (before/after) Chairman Ted Ryan.

Which firm name is filed last?
(a) Woodrow Aiken Electric Co.
(b) Tom Jones Travel Bureau
(c) William Jones Suits
(d) John Aiken Plumbing

It is the letter ___

Which firm is filed last?
(a) Baker Plate and Seal Corp.
(b) Baker's Apple Pie Co.
(d) Baker's Lingerine

It is the letter ___
The titles "Chairman" and "General" are not used.

"Underprivileged Children" comes after "Saint Regis."
These words: Abbington
ACKERMAN
Atkinson
are listed in alphabetic order by the first/second letter of their names.

"General George Washington" is filed before "President Ulysses S. Grant". 57/B

When a firm name contains only the surname, or no surname at all, it is filed as written. Littleton Dairy is filed as Littleton Dairy because there is no given name. The first word for filing "Johnson Plumbing Co" is

Which firm name is filed last? REVIEW
(a) Dr. Albert's Cough Syrup
(b) Frank Cook's Family Restaurant
(c) Capt. Zorro's Fencing School
(d) Dad's Zippy Cola

It is the letter (_)

Which name is filed last?
(a) Church of Our Saviour
(b) Hotel Jackson
(c) University of Bridgeport
(d) Hospital of Mercy

221/E
57/B after

111/C Johnson No given name, so it is filed as written.

167/D A Remember, titles are used in firm names as written.

221/E A "Our Saviour" is the last in the order of distinguishing words.
Alphabetic filing is the arranging of names in order by the ________ of the names.

"Speaker Arthur Reynolds" is filed ___ (before/after) "President Pro Tem William Styles"

"Ledbetter's Shoe Store" is filed ___ (before/after) "Richard's Bedding Supplies."

Which firm is filed last? REVIEW
(a) Ronnie's Dept. Store
(b) San Juan Air Lines
(c) Victor Roger's Stationery Store
(d) Saniflush Sewage Company
It is the letter (___).

Which name is filed last? REVIEW
(a) Vic Baker's Pool Hall
(b) Slim-Line winter Clothes
(c) Tennis Association of California
(d) Association of Wine Makers
It is the letter (___).
4/A alphabetic letters

Which name is last?

58/B before "Speaker: and "President Pro Tem" are titles and are not used in filing personal names

112/C before

It is letter [ ]

168/D B Remember, "San Juan" is the name of a place with more than one word, so it is filed as one word.

"Wien" is filed as if it were

222/E D

as Washington High School of Lakeland

Citicorp National Bank of Niscale

(2) The Reynolds Paper Co.
Some people might file "John Smith" under "John", and some would file it under ____________________________ 5/A

Which name is field last?

(a) President John R. Brinkley
(b) General Oscar A. Trent
(c) Secretary Marvin Atkins 59/B
(d) Chairman Attley Gordon

It is letter ( )

"Norma Meeker's Dress Shop" is filed ____________________________
(before/after) "Mechanical Reproduction Arts, Inc." 113/C

Use the English spelling for the names of foreign places.

(Foreign) Habana = Havana (English)
Wien = Vienna 169/D

"Habana" is filed as if it were "Havana."
"Wien" is filed as if it were ____________________________

Which name is filed last? REVIEW

(a) Washington High School of Lakeland
(b) Alban Women’s Club
(c) Citizens National Bank of Midvale
(d) The American Paper Co.

It is the letter ( )
And no telling where some people would file it!

Titles are not used in filing personal names.

When a firm name contains no surname at all, it is filed as written.

Banks are filed as written. Public name schools are filed first under the of the city. "Lakeland" comes after "Citizens".
If everyone filed "John Smith" under the last name "Smith," then the papers of John Smith could always be filed and found under the name _____ 6/A

Which name is filed last?

(a) Helen Ruth Sabrina
(b) James J. St. Mark
(c) Charles r. Sager
(d) Ruthellen C. Ainvell

It is the letter _____

"John Evans Jewelers" is filed ____ (before/after)

"Citizens National Bank:

"Copenhagen" is the English spelling for "Kobenhavn."

The name should be filed as ________ 170/D

Which name is filed last?

(a) St. Mary's Hospital
(b) University of Arkansas
(c) Mid-City Hotel
(d) Second Methodist Church

It is the letter (____)
"St." used as "Saint" and combined with the surname.

Hospitals, Universities, Hotels, and Churches are filed by the distinguishing word or words.
When everyone files the same way, it becomes a standard procedure for filing and finding. Then __________ can always file and __________ the papers.

7/A

EXCEPTION: When a religious or royal title is used without the surname, the title is used in filing.

"Queen Mary" is filed after "Oscar Peterson" because "Queen" is a royal title used without the surname.

61/B

"Lord Stanley" is filed ___ (before/after) "Stanley Maddox."

Which firm name is filed last

(a) John Arbuckle's Coffee Shop
(b) Zekè Andrew's Used Cars
(c) Dryker Stamping Mill
(d) Applegate Bakery

It is the letter (___)

"Florence" is the English spelling for "Firenze."

"Firenze" is filed as __________

171/D

END OF SET 4
Everyone can dream, can't we?

Royal and religious titles are used when no surname is given.

Surname only. File as written.

No answer here. Begin Numbers and Addresses. ———>
For everyone to ___ and find information quickly, it is best to use a ___ procedure.

"Sister Joan Mary" is filed ___ (before/after) "Alice Matson."

Firm name endings are used in filing. Examples of endings are: Corporation, Limited, Incorporated, etc.

"Jones, Incorporated, is filed before" Jones, Limited" because "I" comes before "L".

"Mars, Associated" is filed ___ (before/after) "Marx, Incorporated".

Kobenhavn = Copenhagen; Firenze = Florence

Which name is filed last?

(a) Firenze Art Supply Co.
(b) Berlin Opera House
(c) Aden Shipping Co.
(d) Kobenhaven Furniture Co.

It is the letter (___)

SET 5

NUMBERS AND ADDRESSES

Turn the page ----->
Royal and religious titles are used with given and middle names when the surname is not used.

With identical surnames, "Associated" places it before "Incorporated."

No answer required here. Proceed to frame 225. -->
A standard Procedure is used so that ________ can file and find information ___________ 9/A

"Lord Oscar Byron" is filed ________ (before/after) "Lady Anne." 63/B

"Stratton Corporation" is filed ________ (before/after) "Stratton Limited." 117/C

Which firm name is filed last? REVIEW
(a) King's Men Valise, Ltd
(b) Monte Broge Hair Styling
(c) Keith's Auto Parts
(d) King's Men's Store

It is the letter (___)

Numbers in firm names are filed as if they were spelled out. The number 8 is mentally spelled out as "eight." 225/E

The number 4 is mentally spelled out as ___________
everyone quickly

"Lord" is not used because "Byron" is a surname. "Byron" comes before "Lady."

"Corporation" comes before "Limited"

Remember, s is not considered

"Men's" is used as "men."

four
The purpose of this program is to help you to learn ________ procedures for ________ filing

Which name is filed last?
(a) Count Wilhelm Morro
(b) King John
(c) Sir Anthony James
(d) Lord Nelson

It is the letter ( ________ ) in name.

"Albert Musgrove, Limited" is filed ________
(before/after) "Musgrove, Incorporated."

END OF SET 3

The number 2 is mentally spelled out as ________
10/A standard alphabetic

64/B A Titles used with given name only, not with surname.

118/C before Watch that given name! Discriminate between "Albert" and "Incorporated."

No answer here. Proceed to next set -------->

226/E two
Which name is filed last?  
(a) Dr. Arnold Turner  
(b) General Ted Ryan  
(c) George Fischer, M.D.  
(d) Secretary Miles Radford

"Anderson Plating Company" is filed ________ 
(before/after) "Anderson Plating Shop ________

The number 3 is filed ___________ (before/after) the number 9.
Degrees and titles are not used in filing personal names - EXCEPT royal and religious titles used without the surname.

Ace Lighting Corporation, Limited

No answer here. Proceed to the next frame ————>

Ace Lighting, Associated

No answer here. Proceed to the next frame ————>

Country

after.
When two or more words in a personal or firm name are joined by hyphens, they are used as separate words.

"John Alm-Quist" is filed before "James Almaden" because "Alm-Quist" is used as "Alm" and "Quist."

Which firm name is filed last

(a) Ace Lighting Corporation
(b) Ace Lighting, Limited
(c) Ace Lighting, Associated
(d) Ace Lighting, Incorporated

It is the letter (___)

Names pertaining to any national government are filed under the name of that country.

The "Republic of France" is filed under "France."

The "Kingdom of Sweden" is filed under _________

The number 6 is filed ________ (before/after) the number 7.
No answer here. Go to the next frame

66/B before Hyphened words are used as separate words.

120/C B Continue on page 2

174/D Sweden

228/E after
Tell your teacher that you have completed the program and are ready to demonstrate that you know the rules for alphabetic filing. You can demonstrate your knowledge by scoring high on the achievement test.
NB: Copy of the complete Programmed Instruction Manual is available separately because of its large size.
APPENDIX 2C

POSTTEST TWO

Total marks is forty (40)

Q1. Arrange the following names in proper filing order.

(a) Dr. William P. Sears
(b) Arthur Fleming M.D.
(c) Thomas Redford M.A.
(d) John S. Adam L.L.D.

(a) Sister Joan Maina
(b) Aldo Mathai
(c) Lord Oscar Byron
(d) Lady Anne

(a) Mary Willson-James
(b) Dr. Jennifer Riria-Ouko
(c) Timothy R. Wilsonite
(d) General John Patet.

(a) Arthur Du Pont
(b) Williard Dumbaster
(c) John E. MacDougal
(d) Ouko - MackKanyengo
(a) Thomas Barnes Supplies
(b) Haris Repair Shop
(c) Walter Johnson Value Co.
(d) Zake Brown’s Ski Shop

Q2. (a) Give five prefixes to surnames

(b) When surnames and given names are identical in firm names the next word used in filing is ________
   - Give an example.

(c) ABC Bata Company is filed before Abbot Bata Company.
   State the filing rule that governs this statement.

(d) Give four filing rules followed when filing firm names.

(e) Write the following in full, correct filing order.
   - The Akamba Roofing Co.
   - Embu and Meru Transport
   - Bank of Credit and Finance.
   - Inter City Transport Co.

Q3. Name three reference books which you expect to find in any office.