

CHAPTER 5

INTERVIEWS WITH MINISTRY OF EDUCATION OFFICERS CONCERNING THE INTRODUCTION OF COMPUTERS IN PUBLIC SECONDARY SCHOOLS

5.1 Introduction

This chapter reports the research findings of a study that was part of the field research to collect data on how computers are used in public secondary schools in Nyanza Province, Kenya. It sought evidence on Government policy and curriculum regulations regarding the implementation of computers in teaching and learning. The data for this study were collected through structured interviews (see appendix 8 and 9) with key Education Officers and Curriculum specialists in the Ministry of Education. These officers were the only ones who were in a position to provide data about the school computer program in Kenya because they were the ones in charge of computer education in public schools. They had to explain government policy and curriculum regulations before I visited Nyanza Province to investigate whether the computer policy was being implemented in public secondary schools. The officers from the Ministry of Education were invited to participate in a face-to-face interview freely without any coercion from the researcher.

The data collected through these structured interviews were complimented by a questionnaire survey on the role of the Principals and Heads of Department on the use of computers in their schools (findings presented in Chapter 6) and semi-structured interviews with twenty computer teachers that is reported in Chapter 7. This chapter begins with a brief overview of the government decision to introduce computers into public secondary schools. Then it examines policy issues and challenges as the Officers perceived them and the findings of the investigation are presented in the relevant sections. The issues discussed include an overview of the current government policy, the reasons for introducing the policy, policy implementation and resource allocation, financial implications, benefits and limitations of the policy, curriculum regulations relating to computers in schools, development and distribution of support materials, and assessment. The other findings reported include problems and difficulties encountered

with implementation of the policy on computer technology. Drawing on the findings, the chapter ends with a summary of the main points.

Since this chapter is based on a qualitative study that involved data in the form of text, phrases, or symbols describing or representing people, actions and events in social life (Neuman 1998), data analysis has been based on themes, concepts or similar features. The findings have been reported using simple tabulation of responses where necessary and descriptive analysis. However, when analyzing a policy to determine whether it can meet or has met the needs that it seeks to address, the researcher considered how the policy was initiated, reasons for the policy, the impact and benefits. The other concern was whether the policy could be implemented, and whether the resources and skills are available to implement the policy (Pillay 1999:245). The researcher also examined policy implementation and financial involvement because these were identified by (Jansen 2001: 274-275) as being important influences on the effectiveness of government policy.

5.2 An Overview

The decision by the Kenya Government to introduce computers in public secondary schools was influenced by two major educational resolutions and policies. The first was in 1996 when the Ministry of Education announced that it had approached UNESCO to fund the project and train teachers to teach computer education. The Ministry of Education published a circular guideline NS/B/37/1/118 in 1997 approving the teaching of computer education in schools, and computer companies were requested to enter schools to display their products to promote the use of computers and announced that the subject would be examined in 1998. The Minister for Education noted that computer education was to be included in the timetable and in the curriculum where possible; teaching materials were to be developed and physical facilities were to be improved. It was noted also that implementing computer technology in public secondary school would bring about widespread changes in the school system, teaching strategies and teachers beliefs and improved physical facilities. The report further indicated what was missing (e.g lack of computers, trained teachers and physical facilities).

A crucial part of my research was to examine the content and context of government policy on computer education in secondary schools, and to analyze how effectively this policy was being implemented in public secondary schools. This was important since the government formulates educational policies and sets the overall structure and methods of implementation of the educational system in the country. A policy is a statement adopted by the government to provide a uniform plan for action or guide to action. In this connection, Pillay (1999:240) explains that a policy is developed to influence or shape the way people behave and that policies are the result or outcome of some need, so the need must be clearly understood by those concerned.

The other purpose of the study was to examine government policy on financing computer education. To do this it was necessary to obtain clear information from the government and Kenya Institute of Education (KIE) on the use of computers in schools, and the support materials supplied to schools before I visited secondary schools to get an insight into what actually happens in these institutions. This was necessary since teachers are expected to implement government policies and curriculum innovations, and the ways in which computers are used in secondary schools depend on the Principals, Heads of Department and classroom teachers. The interview questions were designed to explore these issues and this chapter presents findings and conclusions based on a number of personal interviews with officials in the Ministry of Education and the Kenya Institute of Education.

5.3 Current Government Policy on Computer Education in Secondary Schools

In an interview at the Ministry of Education at Jogoo House in Nairobi in August 2001, a senior education director was asked to explain current Government policy on computer education in public secondary schools. In response, the officer reported that there is a government policy stating that “computers can be used for teaching purposes.” This policy is based on the Education Act of 1968 Chapter 211 that included the use of resources in teaching and learning. However, he stated that there was no separate written policy document on the use of computers. The current policy guideline on computer education is contained in the Ministry of Education circular letter Number

INS/ME/A/2/14/5 of 31st January 1997 stating that “Schools are encouraged to offer computer subjects depending on the facilities available.” Moreover, in a recent development, Aduda (2002) reports in the Daily Nation Newspaper indicated that the Ministry of Education issued another statement to confirm that computer education is to be offered in schools as an optional subject to be examinable at Kenya Certificate of Secondary Education (KCSE). During an interview with one of the Kenyan Directors of Education at the Commonwealth of Learning (COL) Conference in Durban on 30th August 2002, it was confirmed that the policy document on the use of computers was still being formulated.

In comparison with other developing countries, Kenya’s progress towards formulating policy to guide the implementation of computer education programs in public secondary schools is not typical. In an interview with an Education officer from Nigeria at the COL conference about the use of computers in secondary schools, she indicated that Nigeria was still conducting pilot studies in a few schools and the policy was still being formulated. Similar information was obtained from the Minister for Education in Seychelles. However, an Officer responsible for Technology in the Ministry of Education in Malaysia indicated in a private conversation at the COL conference that they have a policy on the use of computers. A report by Pearson (2001:280) also noted that Hong Kong has a policy document titled “*Information Technology for Learning in a new Era. Five Year Strategy 1998/99 to 2002/03* (herein *Strategy*) to promote the use of computers in schools. Therefore, many developing countries have embarked on developing policy statements on the use of computers in teaching and learning.

Even though there is no formal policy document on the use of computers in secondary schools in Kenya, the government officials that I interviewed assured me that the Kenya government supports the idea that computer education is important.

5.3.1 Reasons for adopting a computer policy for schools in Kenya

The interviewee revealed that the government gives high priority to the use of computer technology in schools in view of the fact that the “the country wants to be industrialized

in the year 2002.” Consequently, the officer reported that the government has to exercise control over the introduction and use of computers in public secondary schools in order to:

- *protect schools from being treated unfairly by various computer firms;*
- *guard against confusion on the type of software and teaching/learning materials from computer companies or individuals;*
- *oversee the implementation of computer education in schools.*

In view of these reasons, the interviewee reported also that the Ministry of Education mandated the Kenya Institute of Education to design computer education syllabi for secondary schools. In addition, the interviewee pointed out that the KIE through its technical education panel started a ‘computerization’ program on radio broadcast to create awareness of computer education in 1997.

5.3.2 Steps taken for implementation of the computer policy

Apart from the value placed on school computing by the Government, effective utilization depends on how computers can be integrated into school subjects, planning and changes in the teachers’ role. The interviewee was asked what steps have been taken to implement this policy. In response the interviewee replied that the government appointed an officer to be in charge of the computer project and to work with District Education Officers and inspectors of schools to monitor the implementation process. He also emphasized that the Education Act CAP 211 of 1968 is still in operation with amendments in 1980 and 1990s. The Officer summarized the information and stated that:

The law requires an officer inspecting a school to have a special regard to the maintenance of educational standards and to compliance with any regulations of the Education Act. This gives the officers power to inspect the use of computers in schools. Computer education were started as a means of promoting computer literacy in secondary schools and to provide computer education to many people in the country.

It was noted also that through the government's specific policy plan, some of the National Secondary schools were supplied with computers donated by UNESCO. The Secondary Computer Syllabus was also provided. He explained also that UNESCO and officers from the Ministry of Education mounted an in-service course on computer literacy skills to Principals and some teachers in secondary schools in 1997.

According to Pillay (1999:240) a policy is usually created in response to some need, and the need may have to be clearly understood by all stakeholders before any action is taken. A crucial factor relating to teachers' use of computers is the availability of the facilities, computer equipment and the personnel. The extent to which the curriculum and technology are implemented depends on clear policy guidelines and regulations. Knupfer (1993) noted that the teachers' existing attitudes, skills, and working conditions have great influence on their acceptance, style of implementation, and outcome regarding educational computing. The interviewee was asked to indicate who was responsible for implementing the policy and how the implementation was being monitored. In response the interviewee said that secondary school teachers and the inspectors of schools implement the project. He also stated that the Ministry of education (MOE) established the Kenya Institute of Education to design and develops national curriculum for schools, including the use of technology, and to work closely with supervisors of schools so that a uniform Secondary Computer Syllabus could be produced. In addition the officer reported that a second in-service course was organized at provincial level all over the country for computer teachers in 1998.

The officer noted that in order to supply computer equipment and books, the government allowed various computer firms to display their computers and relevant materials in secondary schools, to conduct workshops and seminars on computer awareness and to give demonstrations in liaison with District Education Officers.

5.3.3 The success of the implementation of computer policy in schools

The success or failure in the implementation of computer education policy in schools depends more on the effectiveness of the preparation of teachers, their willingness to use computers in classroom instruction than the nature of the hardware or software. Bitner and Bitner (2002: 95) point out that while attention to choosing appropriate hardware and software for classroom use is a prerequisite, “it is the skill and attitude of the teacher that determines the effectiveness of technology integration into curriculum.” But this is not an easy task because change can be intimidating and threatening. If computer education is to be truly beneficial and remain a valuable part of the educational system there must be good teaching techniques and sound innovational strategies, critical planning and evaluation throughout implementation. From my experience with the use of educational technology in Kenya (radio and television programs) it is evident that unless teachers have a definite plan for implementing computer technology in a meaningful way all the government efforts in any educational project will not be fruitful. Clark (2000) also found that teachers were not implementing computer education in classroom instruction. A report by Zhao and Cziko (2000:7) in UAS indicated that very few teachers used computers regularly in their teaching and the impact of computer integration on existing curricular was still very limited. This was because of lack of suitable training, technical and administrative support, a systematic incentive and lack of access to equipment, traditional pedagogical beliefs, and resistance to change. Thus, Bitner and Bitner (2002:96) listed eight factors that have been identified to be important to enabled teachers to implement computer technology into teaching and learning. These included:

- Fear of change: fear, anxiety, and concern that teachers have about change must be addressed;
- Training in basics: training must provide teachers with knowledge of the very basics of computer use;
- Personal use: personal productivity skills can be used as a means to foster the teacher’s interest;

- Teaching models: teaching models using technology as a tool in the classroom to help students achieve must be provided;
- Learning based: learning should be the impetus that drives the use of technology in the school;
- Climate: a climate must be created that allows teachers to experiment without fear of failure;
- Motivation: motivation to endure the frustration and turmoil of the change process must be present;
- Support: support that is ongoing and onsite must be provided.” Teachers need support in the technical area and in the curriculum area.

For the above reasons, I asked the interviewee “What data exists on the success of the computer policy?” The response from the officers indicated that:

- ◆ By the year 2000, the Ministry of Education had allowed only one firm to supply computers to schools;
- ◆ The Ministry started a radio program on ‘computerization in schools’ to create awareness of computers in schools in 1998;
- ◆ There are records of Inspectors of schools’ visits to schools in provinces from 1997 to monitor the use of computers and to assess the implementation of computer education and any problems encountered;
- ◆ In-service courses organized on basic computer literacy were attended by Principals and teachers in secondary schools during 1997 and 1998;
- ◆ The Kenya Institute of Education produced Secondary Computer Syllabus in 1996 for all secondary schools. Computers are available in some secondary schools and used in teaching and learning computer skills;
- ◆ Students have sat for Computer education examination at the end of Form iv- Kenya Certificate of Secondary Examination (KCSE) in 1998 to date;
- ◆ Inspectors of schools and curriculum developers are involved in marking the KCSE and carry out curriculum evaluation.

Arrangements were being made by the Ministry of Education and KIE to produce relevant course books that schools could use in teaching and learning computers. This detailed response from the Ministry of Education officials suggested that appropriate steps were being taken to introduce computer education to schools and that some monitoring procedures had been established. However, the official was unable to provide specific data about the success of the computer policy. For example, the officer did not have a list of the Principals and teachers who attended the computer in-service training course. Secondly, the curriculum specialist at KIE was not involved in the training programme, and had no evaluation report on the impact of the in-service computer literacy course.

5.3.4 Problems and difficulties with the implementation of computer policy in schools

Effective implementation of computer education in secondary schools requires clear policy guidelines of how to integrate the technology in teaching and learning. When there are no policy guidelines, or when the guidelines are vague, as they were in Kenya at the time of this study, it is unlikely that teachers will embrace the new ideas enthusiastically. The interviews with teachers referred in Chapter 7 indicated that a large number of teachers in schools were not aware of any policy documents available for the use of computers. When government officers pronounce education policies, they rarely make reference to how teachers will implement the policy. According to Jansen (2001), in most cases the implementation agenda is never on the policy agenda. Jansen (2001:274) feels that there is need for the government to make “concrete steps that would be taken to implement such policies, and such implementation plans need not accompany the immediate policy announcement but would typically follow thereafter.” Furthermore, the success of any such implementation effort will depend largely on the teacher who determines the daily school activities. Therefore, the personnel and professional relationships among teachers, students, and administration can have a great influence on the future of any curriculum innovation. UNESCO (2002) clarifies the issue of implementation and points the need to provide teaching and learning resources and

training of teachers in computer technology as discussed in Chapter three Sections 3.2.2 and 3.4. Lack of training is the greatest barrier of all that limits the integration and use of computers in teaching and learning. These factors identified in developed countries also apply to developing countries like Kenya.

In order to obtain more information on the integration of computers, the officer was asked to identify any problems and difficulties experienced with the implementation of the computer policy. The answer to this question was in two parts. The first one related to finance. The officer noted that computers are expensive to purchase and maintain, and it can be a heavy budget commitment for the government to supply all institutions training secondary school teachers with computers and to re-train the teachers. The interviewee stressed that the high cost of computers was causing a lot of concern to the government and that it could not afford to purchase computers for schools and to train teachers. In order to help solve the first problem of lack of computers, the government allowed computer companies and consultants to carry out computer awareness for teachers and some schools made arrangements with computer firms to loan them computers for teaching and learning. In the process, the government realized that the outcome was not encouraging because:

- *The Fees charged by computer firms were very high. For example, some computer firms charged ¹KShs 1000 per student per term for the use of computers.*
- *There was a problem with maintenance and repair of computers;*
- *There were not enough computers and software supplied to schools;*
- *Many teachers were not qualified to teach about computers, so computer firms hired their own teachers;*
- *The computer support materials such as software applications were sometimes not suitable.*

¹ At the time of this research 1 US\$= Kshs 78.00

Consequently the government had to identify funds from external sources to finance the project. The officer noted also that when computer education was introduced in the 1990s, the government had a high hope that the cost of purchasing computers would decrease so that institutions and schools would buy enough computers for use. But up to now, no specific tangible step has been taken to help solve this problem. The government does not have any financial commitment to supply computers to schools and other institutions of higher learning. The general world economic climate has been damaging to Kenya with the World Bank and the IMF putting tough conditions on financial support. However the officer noted that Non-Government Organizations (NGO) could donate computers and schools are free to seek funds and purchase computers within their financial limits.

The second major problem experienced by the government was a lack of trained teachers with computer literacy skills amongst those already employed. The Officer noted that *the number of teachers in schools is so large that proper training in computer literacy skills would require considerable funding*. However, teachers need considerable support in order to integrate computers into their teaching subjects. If funding is available, this can easily be done through in-service training to continually update them on changes in computer technology and the software products. Although this requires time to organize and run the courses, and the time to plan lessons that incorporate technology, it could be cost effective. In addition, the interviewee reported that *lack of computer rooms and rural electrification to all secondary schools were delaying the implementation of the policy*. From my experience, the majority of secondary schools have not put up computer rooms or had an extra classroom for computers since the time the government decided to introduce computer education in public secondary schools. Most of the schools in rural areas also lack a reliable source of electricity, and some have no source of electricity.

5.3.5 Financial policy on the use of school computers and resources allocation

In another interview question, the Officer was asked to state what resources have been allocated to computing in schools. The response from the Officer indicated that the Ministry of Education has not allocated *any* money for school computing. This has been due to continued financial difficulties. Nevertheless, the interviewee was asked whether

there is an investment policy and resources allocation for the implementation of Computer education. There was a negative response but the Officer reported that the government gives grants for development and expansion of school activities. Schools are expected to arrange with the Board of Governors (BOGs) and Parents Teachers Associations (PTAs) to obtain computers and other support materials. However, the interviewee noted that this policy has not worked well with some of the disadvantaged schools that cannot afford to buy computers. The Officer cited some of the reasons that inhibit some schools from funding computer education:

- *Some communities are poor and may not raise enough funds for computers; and in some schools there are low student enrollments so schools may not save and have enough money to buy computers;*
- *Negative attitudes of Heads of schools towards investment in computer education;*
- *Teachers' resistance to change, and general fear of the computer technology.*

Policy makers in education need to consider the cost benefit of investing in computer technology and assist all schools to provide computer education. An important strategy should contain a clear budgetary commitment from the government to support the development of support materials as well. This is one of the major reasons why computers have not been widely used in public secondary schools. According to Woodhall (1997:78) those officials responsible for allocating government funds or school budgets are unlikely to respond with extra funds and resources without convincing evidence that this will be cost effective. Woodhall (1997) points out that such evidence is lacking in Africa. Hence the need now for the formulation of policies that can work for the betterment of schools. Policies that are not properly formulated affect the capacity of schools to purchase the computer technology for teachers to use in teaching and learning. One of the difficulties in trying to convince governments, parents, NGO's or donors to fund the purchase of computing equipment for schools in developing countries is that the benefits are very hard to define. On the one hand, there can be general claims that when students gain computer skills they become more employable. But on the other hand there may be no jobs available. Similarly, there may be claims that integrating computers into

the study of traditional subjects (such as Business Studies) is a more efficient way of teaching, but this is very difficult to prove. Finally, there is the important question of whether or not the benefits of CIE in developed countries (where most of the research on CIE has been done) can be achieved in a developing country.

5.3.6 Evidence available on the use of computers in schools

One of the objectives of introducing computers into public secondary schools by the government was the desire to help Kenyan youths become computer literate, and to ensure students graduating from secondary schools were equipped with computer literacy skills to enable them to compete for jobs in the world market. In this connection, the officer was asked the question “What evidence is available on the use of computers in schools and its effects on teachers and students?” In reply, the interviewee confirmed that some schools, especially the National schools and others with adequate funds, do use computers. He further added that schools are guided by national government goals and objectives in the formulation of their policies on the utilization of computers which states that “the system of education should produce citizens with skills, knowledge, experience and personal qualities required to support her (Kenya) growing economy.” Computer education are undertaken to produce learners to participate effectively in the economic development of the country. Computer education is subjected to evaluation just like any other regular school subject so there are evaluation reports from:

- *Provincial Director of Education’s annual report to the Ministry of Education;*
- *The inspectors of schools’ reports;*
- *National examination registration and results; all of which provide the government with information about the implementation of computer education in schools.*

The interviewee reported that an evaluation on the use of computers was carried out in one of the secondary schools and a special report was issued on the introduction of computers. The Official was unable to supply details of this report, and it was not

available to the researcher. However, the Official indicated that this report revealed that private firms had invaded schools and given software packages that were not approved by the Ministry of Education so the Ministry advised the school to wait for the right syllabus and other computer support materials.

Regular evaluation reports help to improve the quality of teaching and learning with computers and inform the government about the teachers' views and what takes place in the schools. The decision by the Ministry of Education to try to control the software that was being used in schools has both advantages and disadvantages. According to Heinich at al. (2002:74) media materials should be appraised prior to use in teaching and learning. However, when there is no official mechanism for such appraisals, teachers need to be able to make their own judgements.

5.3.7 Number of schools using computers and software available

Information was collected from the Ministry of Education about the number of schools using computers and the type of software available. The interviewee reported that a list of schools offering computers by district from 1995-1999 indicated that 30 National schools had computers. In Kenya, secondary schools are categorized into National, Provincial and District schools. The National schools were former government grant aided schools. These schools admit students from all parts of the country. At the time of the interview the Officer estimated that the number of National schools with computers could have risen to over 200, but there was not an up-to-date list. With regards to type of software used, the interviewee said that the government recommended *Word processor, Database, Spreadsheet and Programming packages but some schools use other software applications such as graphical packages, desktop publishing and computer accounting packages*. Besides, the officer reported that the government sent out a letter to all secondary schools indicating the requirement for a secondary school to start computer classes. The government recommended:

- ◆ Sufficient computers for staff and the number of students per computer to be in the ratio of 1-2 students;
- ◆ Computer rooms/classrooms must have appropriate furnishing such as carpets, and computer covers to protect computers from dust;
- ◆ Availability of fire protection device for emergency in case of any accidents during computer lessons;
- ◆ Sufficient ventilation. The rooms need to have windows with curtains because computers require rooms that are free from humidity;
- ◆ Enough space for electronic media library;
- ◆ Students and staff to have access to e-mail and the Internet;
- ◆ Supportive electrical suppliers for computer networking
- ◆ Enough diskettes, printers and metallic diskette holders;
- ◆ Manuals for teachers and students for effective use of computers;
- ◆ Relevant computer textbooks for students and teachers.

In addition there should be a syllabus for Computer education and teachers should be computer literate.

5.3.8 Reasons for introducing computers in public secondary schools

There is growing awareness that computers can be turned to educational advantage as a tool for instruction, as a source of information and as a subject matter in their own right. Many students have a natural interest in and are motivated to use computers. This positive attraction towards the medium lends it a real potential as a powerful learning resource. Heinich et al. (2002:214) also report that the computer has the ability to provide “rich learning experiences for students, giving them the power to influence the depth and direction of their learning. It has the ability to integrate a variety of media-still and motion pictures, graphics, and sounds, as well as printed information. The computer can also record, analyze, and react to students’ responses typed on a keyboard or selected with a mouse.” With all these capabilities of the computer, the researcher asked the interviewee to give reasons for the use of computers in public secondary schools. In response the interviewee stated that “many schools offer computer lessons for literacy

purposes, so that our country could have computer literate manpower to be in a state of preparedness for industrial take off in 2002.” For this reason, programs of instruction have been suggested to include *hardware; and Software packages such as word processing, spreadsheets, databases and programming*. The interviewee stressed that curriculum specialists and officers from the Ministry of Education and Kenya National Examination Council are involved in writing the syllabus and getting ideas to write textbooks.

The reasons that the interviewee gave for introducing computers into secondary schools were quite vague. They were based on the general idea that it would be good for the country if school students became computer literate. He did not support these general claims with any evidence that these vague benefits had been achieved in any other developing country. Nor did he seem to be aware of the specific ways in which developed countries were using computers in schools.

5.3.9 The role of computers in secondary schools

The introduction of computers in secondary schools in Kenya is one of the most significant changes in the school system in recent years. The interviewee was asked to state the major role of computers in secondary education. In reply the interviewee reported that computers play an important role firstly in *school administration: to keep school fees records, store information for correspondence, and to process examinations. Secondly, is used for teaching students computer literacy skills. Thirdly, is used for training teachers and the community in computer literacy*. Heinich at al. (2002) in USA report similar roles the computer plays in schools.

Furthermore, the officer noted that as a result of the introduction of computers in secondary schools, the schools’ administration are now producing their accounts in an organized manner and more easily than before.

5.3.10 Financial implications of the government's policy on computers in secondary schools

The last question in this section concerned the financial implications of computing in secondary schools. The information obtained indicated that the operation and financing of school computing had a definite implication for the government's budget and for the budgets of individual schools. The interviewee reported that: *there were no funds allocated for the use of computers in schools. The head teachers are free to look for funds and provide Computer education. It is an optional subject.* However, the researcher feels that if the government wishes to develop computer education properly, there is need for funds to be set aside for technology in schools.

Educational expenditure has risen sharply in Kenya in recent years, causing a budget deficit for schools. As a result of the deteriorating economic conditions in the schools, only secondary schools that are financially capable will offer Computer education. This leaves most of the schools to conduct theory classes which have a negative effect as far as the objectives of Computer education developed at the Kenya Institute of Education is concerned (i.e. to develop skills in the safe use of computers and software packages (KIE 1996:iii). This will also increase educational inequality in secondary education and bring imbalances such that very few students will get access to computing. Klees (1995) noted that using computers in education could necessarily increase inequalities within a country. This raises a serious question for the success of computer education in all secondary schools in Kenya, a point that will be addressed further in Chapter 6 and 7.

5.4 Kenya Institute of Education

Kenya Institute of Education is a curriculum development center, charged with a responsibility to conduct research, design and produce teaching and learning resources for schools and teacher education below university. Therefore, after interviewing the Officers from the Ministry of Education who confirmed that there was a computer policy for the use of computers in secondary schools for teaching purposes, the next step was to interview the curriculum specialists at the Kenya Institute of Education. The purpose of

the interview was to get information regarding the computer materials available for teachers and students. The government established Kenya Institute of Education (KIE) in 1957 to conduct research, design and develop curricula for schools and to provide teacher education below university education. Curriculum specialists are responsible for designing and producing teaching and learning resources for all the subjects taught in public schools. It was therefore important to talk to the officers in order to get a detailed picture of curriculum implications and to identify curriculum regulations relating to the use of computers in secondary schools. Therefore, the Director of KIE was asked a question “Do you have curriculum guidelines concerning the use of computers in secondary schools? In response, the interviewee said that there were regulations and explained:

KIE develops curriculum for school subjects in partnership with the Ministry of Education Officers. In the process we provide guidelines in respect of key issues in computer education programs such as ratio of computer to a child; curriculum issues; information from the syllabus of how many periods per week; and number of hours per topic.

In addition, the interviewee explained that since Computer education falls under Applied Subjects, the number of hours per week for Computer education remains the same as for Technical Subjects (about 2 hours and 15minutes). Furthermore, the officer emphasized that KIE has the mandate to ensure the program is relevant and up-to-date, and able to adapt to the challenging needs of computing education in the country.

5.4.1 Reasons for the computer curriculum guidelines

Another area of investigation concerned the reasons for developing computer guidelines. In response, the Director of KIE reported that the computer guidelines were developed to promote the quality and uniformity of Computer education in all secondary schools. The interviewee stressed that the guidelines:

- *Are a policy document stating why a curriculum is set for schools;*

- *Provide a foundation for further exploration of the computer subject;*
- *Provide learners with information to learn on their own;*
- *Look into what would be the best mode of computing in schools; and to restructure it if there is a change in teaching instead of revising the whole curriculum.*
- *Aim to avoid variations in schools due to available materials.*

Furthermore, the Officer stressed that in any curriculum development process such as the computer studies in schools, the Inspector of schools chairs the meeting. He also noted that Inspectors of schools are members of the course panel and represents the Ministry of Education in put into all curriculum innovation.

5.4.2 Pedagogical theory that underpins computer education in schools

In another interview, the Director of KIE was asked what pedagogical theory underpins Computer education in schools. This question was asked in order to identify how the computer syllabus was intended to influence the teaching of computing in schools. The information obtained emphasized the following points:

- *The highly centralized curriculum provides uniformity;*
- *All schools use the same syllabus;*
- *Learning objectives are the same for all students;*
- *Expected learning outcomes are similar in all classes;*
- *The syllabus emphasizes both theory and practical;*
- *Schools use similar teachers' guide notes;*
- *Teachers are using similar training course materials;*
- *Time allocated to Computer education is similar in each school;*
- *The students sit for the same examination at the end of the course; and*
- *Teachers also sit for a similar examination (computer literacy courses run by commercial colleges or institutions offering computer education)*

The officer's answer focused on the "technical" aspects of the syllabus, he did not provide any theoretical rationale or refer to any theoretical approaches such as outcomes-based education or constructivism.

5. 4. 3 Goals of Computer education in secondary schools

Another important factor relating to teachers' use of computers is the goals of Computer education in secondary schools. According to Davis (1993:27) a goal is the foundation of all instructional activities. It determines what will be included in the course and helps teachers to select the knowledge that has most worth. In this connection, the Director of KIE was asked to state the goals of Computer education in secondary schools. In reply, the officer reported that the goals of Computer education are included in the syllabus and are summarized as follows:

- *To develop skills in the safe use of computers and other support materials;*
 - *To help students to be acquainted with fundamental concepts of computing;*
 - *To enable students to appreciate programming and acquire the knowledge to write and run simple programs;*
 - *To help the learner to acquire a firm base for further education, training and the world of work;*
 - *Above all, to provide the learner with a firm foundation of computer literacy*
- (KIE-Secondary Computer Syllabus1996:iii-iv)

Looking at the above points, it can be seen that Computer education aims to provide the foundations for learners for professional jobs and to participate adequately in a technological information society. Button et al. (2002) from USA, and Kirkman (2000) in UK and the South Africa National Curriculum Statement for Grades 10-12 (Schools) Information Technology (2002) expressed similar purposes of computer education in schools.

5.4.4 The role of the curriculum developer in computer education

In another discussion, the KIE Curriculum Specialist was asked to explain the role he plays in the introduction of computer education for schools. In reply the officer stated that he *“plays a major role in the coordination of Computer education for schools.”* In this regard he *“calls relevant educators and computer experts to research and develop the Computer education Syllabi and other materials,”* and to *suggest the textbooks to be used in the teaching of the subject.* In addition, the interviewee reported that a Computer education committee was appointed at KIE in 1995 to carry out the following activities:

- *To initiate and guide appropriate curriculum development;*
- *To keep under constant review the existing syllabus in the subject or curriculum area and make necessary recommendations to the course panel;*
- *To keep under constant review all examinations conducted in the country in the relevant subject or curriculum area and make recommendations to the course panel;*
- *To review and recommend books for use in Computer education.*

5.4.5 Reasons for establishing the computer education committee

The Curriculum Specialist was asked to state the reasons why the Computer education committee was established. In response to this question, the Curriculum Specialists stated that *“at KIE if there is curriculum to be developed, it has to be with the members of the panel.”* The interviewee explained that the Computer education committee is composed of representatives from the experts in the subjects, lecturers from the university, and professionals from industries. The officer noted that the committee produced the Computer education syllabi used in secondary schools and the students taking the Computer education subject sat for a National Examination that was written with input from the panel.

5.4.6 Integration of computers into traditional subject teaching

Many research reports discussed in Chapter 2 (e.g. Cornu, 1996; Van Veer, 1996; Cameroon, 1999) have emphasized the value of integrating computers into the teaching of school subjects. The interviewee was asked to comment on this topic in relation to secondary school subjects. In reply the officer noted the importance of integration and suggested “*computer integration into the teaching of secondary schools subjects*”, arguing that it will help a lot to promote the use of computers in teaching and learning. The interviewee suggested that KIE would invite subject teachers, University lectures, computer specialists, and the Officers from the Ministry of Education to attend a Course Panel to identify specific topics that could be integrated into computer programs. The subject Panel would then work out how the integration would be and to write a guideline for implementation.

5.4.7 Production and supply of computer support materials

Educational use of computers is usually associated with support materials. Some of these resources include:

- Computer syllabus
- Teachers’ notes that give a short statement of the main points of a program and indicate how it is to be used.
- Students’ materials such as pamphlets, worksheets and tasks, and other visual media produced to reinforce or extend the medium.

Previous studies from developed countries (Becker, 1999; Carol, 1997; Vannatta and Beyerbach, 2000) indicated that lack of computer materials was one of the factors affecting effective utilization of the technology in teaching and learning. In an effort to establish a clear picture of the supply situation, the interviewee was asked to state what Computer education materials are produced and sent to schools. In reply, the officer reported that “*only the syllabus for the Computer education program has been produced*

and schools are expected to purchase copies at the institute.” The officer stressed that “due to liberalization the public can develop computer materials.” In such a situation, “any book written for Computer education for use in public schools must pass through Kenya Institute of Education for vetting.” Although the Kenya Institute of Education has an obligation to research and prepare students’ manuals and teachers’ guide notes this has not been possible. The interviewee reported that the Kenya Institute experienced a lot of financial problems, lack of equipment and personnel to develop computer education materials, the computer course requirement is extensive and needs a lot of time, and that the subject was not a priority at present.

In another related question regarding the supply of the Secondary Computer Syllabus to all secondary schools, the interviewee reported that *“only schools that were instructed in 1996 to offer computer education received the 1996 computer syllabus free. However many other schools purchased their own computer syllabus but there was no up-to-date record.”*

These responses suggest that the curriculum specialist did not place a high priority on the use of computers in secondary schools. He seemed unwilling to explore ideas such as using the expertise of a few trained computer teachers to produce guidelines, seeking funding from donors, or establishing a computer center within KIE.

5.4.8 In-service course organized by KIE for computer teachers

Another function of KIE is to organize in-service courses and workshops for teachers involved in the implementation of curriculum. Implementation is one of the most complex tasks in the curriculum innovation process. Well-trained and enthusiastic teachers are essential for the success of the curriculum innovation. Consequently, classroom teachers need to know how to incorporate computers into their teaching strategies and other activities in addition to knowing how to use the software. The interviewee was asked to state how often computer in-service course or workshops are organized for teachers? The interviewee reported that these workshops are held once a

year for each subject. The number of people invited ranges from 20 to 30 for a period of two weeks. The cost estimates are shown in Table 1.

Table: 5.1 Cost estimate of running a computer seminar at KIE

Item	Kshs	Period
Accommodation	1000.00	Per night
Lunches	150.00	Per day
Supper	200.00	Per night
Allowance	100.00	Per day
Total	1450.00	14 days Kshs 20,300

(Based on one person the cost of travel to and from school, and that of facilitators, but the cost of support materials are not included.¹)

Furthermore, the interviewee was asked to provide information regarding budget allocation for computer meetings and seminars. In response, the Officer indicated that *the KIE gives one budget for the department and this is difficult for a detailed study since the cost covers all the departmental expenditure and it is not easy to account separately for computer seminars or meetings.* The interviewee reported also that *money for all the departmental expenditure was estimated at Kshs 500,000 per year and that was not enough for organizing seminars or workshops.*

It is important that the curriculum specialist in charge of computer education organize seminars to review the progress or problems teachers come across with the implementation of the computer materials such as the syllabus and the programs obtained from commercial computer firms. Such a forum would enable teachers to exchange ideas and improve the curriculum as required. However, this appears to be difficult to achieve within the current budgetary arrangements at KIE.

¹ At the time of this research 1 US\$= Kshs78.00

5.4.9 Evaluation report on the use of computers in secondary schools

The last question in this section was about evaluation reports on the use of computers in secondary schools. Evaluation is an essential element in curriculum innovation. Indoshi (2001:20) believes that evaluation “would show the worth of a project as it progressed as well as all the success after its completion.” Evaluation of a curriculum program like Computer education should take place during and after the project is implemented. One of the functions of KIE is to carry out evaluation of materials developed at the curriculum center. The evaluation enables curriculum specialists to determine the extent to which the resources developed are meeting the teaching and learning objectives for which they were designed. The second function is to provide KIE with feedback information on the basis on which it can improve the course for the benefit of the learners. This involves reviewing the objectives, the content and organization, methods of teaching including media and assessment of the course (Bunyi, 1995:147).

Consequently, the interviewee was asked to provide information about evaluation reports available on the implementation of the Secondary Computer Syllabus. In response, the interviewee recognized the role that evaluation plays in the improvement and development of new materials, but there was no report. The officer explained that due to lack of personnel and funds, there has been no visit to schools to get feedback on the use of computers or the implementation of computer education. He also indicated that *“as an applied subject there are problems such as lack of facilities and teachers do not have sufficient guides for teaching. Our understanding of the reasons for teaching this subject is to provide professional skills. It is not clear whether it is to be an expert or what? And all these problems affect evaluation of the subject.”*

Accountability in formal educational practices is an area of concern. Scholars and authors such as Heinich, Molanda, Russell and Smoldino (1996, 2002) and Ellington, Percival and Race (1993) noted that accountability is a demand for some form of public demonstration that schools do what they are supposed to do, and that they do it effectively. Teachers are accountable for what takes place in their classes, and the public

is concerned with both the value for money and the cost-effectiveness of employing any medium. This can only be determined by evaluation exercises. This is extremely important when the curriculum innovations are expensive and funds are limited. In order to keep ideas and information flowing to provide the basis for computer education, curriculum specialists need to visit secondary schools to meet the teachers and school administrators to exchange views and collect data on the use of computers in teaching and learning.

5.4.10 General comment on the obstacles to integration of computers into subjects

The main area of comment made by the interviewee related to lack of facilities in schools for teaching and learning with computers. This included unsuitable classrooms and a lack of computers, suitable programs for CIE. The KIE officer noted the need for the government to come up with policy guidelines for all schools to put up suitable rooms for computers. Furthermore, the main concern of the KIE was lack of trained manpower to design integrated computer resources. Since KIE is responsible for curriculum development the interviewee felt the need to have a computer center for in-servicing teachers on CIE and for developing support materials.

5.5 Summary

This chapter has described and presented the results of the interviews with Senior Education Officers at the Ministry of Education and Curriculum Specialists at KIE concerning the introduction and use of computers in public secondary schools. The research findings identified the aims and policies of the Ministry of Education in Kenya on the use of computer in teaching and learning in secondary schools. It has produced six important findings regarding the government views and policy on computing. The first is that there is a very general policy contained in the government policy document number INS/ME/A/2/1A/51 of 31st January 1997 stating that schools are encouraged to offer computer subjects that will provide vital skills required by employers. The Ministry of Education appointed an officer to coordinate and oversee the implementation of

Computer education in schools. It was also reported that the Ministry of Education organized in-service courses for Principals and teachers on the use of computers. Secondly, the results revealed a lack of computers and relevant support materials. The government reported having no funds to purchase computers for schools. Schools were encouraged to look for funds or computers to implement the computer education policy. Thirdly, there was evidence on the use of computers in public secondary schools though there was no up-to-date list of the schools implementing the computer policy. However, the significant aspect of this policy is that computing is seen as essential for all students and not just an activity to be pursued by just a small group of privileged or exceptional students. It has also been established that schools do integrate computers into teaching and learning traditional subjects on a small scale, but computers were used mainly to teach computer literacy, and students sit for national examinations that are set with input from curriculum developers.

Fourthly, it was noted that the Kenya Institute of Education appointed a Curriculum Specialist to design and produce curriculum materials for the use of computers. It was established KIE had only produced a Secondary Computer Syllabus (SCS) for all secondary schools, in order to provide a uniform standard of computer education in secondary schools, and to promote the quality of computer education in schools. In addition, the findings indicated that KIE had not organized any writing workshop or seminars for teachers on the use of computers in teaching and learning. However, it was noted that the Ministry of Education and KIE started a radio programme on computerization in schools to create awareness of computer education to all teachers, students and the public.

The fifth, finding concerns training teachers in the effective use and integration of technology. The data obtained indicated that teacher training in computer education has not been conducted adequately. There was no indication of any plan for developing teacher education curriculum for pre-service training. It is essential that initial training must occur early in the teacher education course to introduce the basics of computer use. These computer basics should include training in relevant subjects and software

appropriate for use in secondary schools should also be included in this training (Stetson and Bagwell, 1999: 47).

Although various approaches have been adopted to re-train teachers in the use of computers, this has been inadequate. KIE curriculum specialists need to be trained to design computer materials for schools. It is also important that all serving teachers be trained in computer skills. This will enhance and promote the use of technology in schools.

Another important findings concern evaluation report. The findings indicated that there was no evaluation report on the use of computer education syllabus developed at KIE. There was also no report on how schools were using computers in teaching and learning. However, it is important to note that evaluation is an indispensable part of curriculum development. Evaluation report would provide feedback on the impact and benefits of computer education programme to the students in secondary schools. The results of the evaluation would help in the improvement of the quality of the content of Secondary Computer Syllabus, and to inform the government about the teachers' views on the effectiveness of CIE in schools.

Finally, it is commendable that the government policy provides a framework for the introduction of computers and computer education in Kenyan schools. However, there are many practical difficulties that prevent these policies being put into practice. Nevertheless, the information obtained in this part of the study provided a useful starting point from which it was possible for the researcher to investigate what takes place with the use of computers in secondary schools. In the next chapter, Chapter 6, the researcher presents the research findings on the implementation of the government policy on the use of computers in teaching and learning in public secondary schools in Nyanza Province.