

CHAPTER 6

THE ROLE OF THE PRINCIPALS AND HEADS OF DEPARTMENT IN COMPUTER INTEGRATED EDUCATION: POLICY AND PRACTICE

6.1 Introduction

This chapter presents the findings of the data collected from the questionnaires completed by Principals and Heads of Department regarding Computer Integrated Education (CIE) in their schools. The aim of the questionnaires was to examine the role played by Principals in the implementation and use of computer integrated education in their schools. In Kenya, Principals are responsible for overall management and organization of the school, formulating the school policy, standard of education, performance of students in examinations and they are in charge of revenue and expenditure in a school. The questionnaires for Heads of Department were also designed to provide information about their departmental use of computers in teaching and learning. Heads of Department are responsible for organization of their subjects throughout the school. They are required to assist teachers, advise them on teaching of departmental subjects, setting and marking examinations, keeping students' records and directing them to useful reference materials (Eshiwani, 1993: 124).

This chapter therefore, provides evidence of the roles played by the Principals and Heads of Department in the introduction and use of computers in their schools. It also explains the availability of school and departmental policies on the use of computers in teaching and learning. This includes also finance and resources allocation, availability of computers and support materials, the use of computers in a school, integrating computers into teaching and learning, training teachers in the use of computers, technical and physical problems, attitudes and views about the value of computers. The chapter ends by providing a summary of the main points.

The data analysis combines qualitative and quantitative methods. Qualitative data analysis has been used because it allowed the researcher to examine patterns of relationships and also to create new concepts and theory by blending together empirical evidence and

abstract concepts in order to come to terms with their diversity for the interpretation of data (Neuman, 1998:240). This included examining, sorting, categorizing, evaluating, comparing, synthesizing, and contemplating the coded data and graphical presentation of responses to different points. Both basic description and qualitative techniques have also been employed in order to demonstrate to readers the different groups of data, their characteristics, range and average. The questionnaires were scanned digitally using Statistical package: SAS version 8 and compiled by the Department of Statistics unit of the University of Pretoria. The data were then coded as appropriate for each item. Descriptive statistics were compiled for each variable and analyzed, and the findings reported using simple tabulation, graphical expressions and descriptive analysis of responses.

6.2 Research Findings

As indicated in Chapter 4 Section 4.5.3 the participants in the study were Principals and Heads of Department from public secondary schools in Nyanza Province. Although 30 Principals and 150 Heads of Department were initially sampled, data were collected from 25 Principals and 89 Heads of Department who completed and returned the questionnaires to the researcher. The results of the study about computer integrated education (whole school integration) is presented in the following section.

6.2.1 Information about responding institutions

All the Principals in the study were asked to provide information about their schools. This was regarded as an important point for this study since schools differ in terms of management and facilities for the implementation of computer education. In this response, all the Principals reported that their schools were public institutions that belongs to the community, and are run by Parent Teachers Association (PTA) on behalf of the parents, and the Board of Governors (BOG) on behalf of the government. The parents oversee the general welfare of their children in schools, in terms of academic performance, health care, and security and assist the school with funding. Similarly, the BOG has the duty to

oversee how the school is managed, academic matters, financial expenditure, school discipline, physical development and staff and students welfare. But the Principal is the manager of the school and secretary to the two boards. The Principals indicated also that public schools are not funded by the government, but receive bursary funds for bright students whose parents cannot pay the school fees. The information about the age of the schools is displayed in Table 6.1

Table 6.1: Age (Years) of schools that participated in the investigation

| No of years | Frequency | Percentages |
|----------------|-----------|-------------|
| 0-10 | 1 | 4% |
| 11-20 | 4 | 16% |
| 21-30 | 2 | 8% |
| 31-40 | 12 | 48% |
| Above 41 years | 6 | 24% |
| Total | 25 | 100% |

From the data in Table 6.1 it can be seen that most of the schools were more than 30 years old. The ages of schools were considered an important issue to be investigated because older schools were the former Missionary and Government schools that admits students from all parts of Kenya and could have more resources and better facilities for effective implementation and use of computers. Because some of the national schools (ages 41 and above) were supplied with computers donated by UNESCO to introduce computer education in secondary schools as indicated in Chapter 5. Secondly, the other information obtained from an interview with the Officer from the Ministry of Education indicated that some of these old schools are the National schools that were supplied with the Secondary Computer Syllabus. Thirdly, from my experience, some of the older schools have better resource centers. The findings indicated that one of the old girls' schools had 20 computers and a good computer center; one boys' school had 12 computers and a good computer room. There was also another girls' school that built a new computer room and had 10 computers. Further responses regarding the location in which the responding institutions were situated are summarized and shown in Table 6.2

Table 6.2: Location of the schools that participated in the investigation

| Location of school | Frequency | Percentages |
|--------------------|-----------|-------------|
| Rural | 19 | 76% |
| Urban | 3 | 12% |
| Suburban | 3 | 12% |
| Total | 25 | 100% |

The data obtained indicated that the majority of schools that participated in the investigation were located in rural areas, but a few were in urban and suburban locations. This distribution of schools reflected the general situation in Nyanza Province because there are very few urban centers, and most public secondary schools are situated in rural areas. Because the field sample was small (only 25 Principals) a statistical comparison between the responses of Principals from rural, urban and suburban schools was considered inappropriate. Likewise, a statistical comparison of the responses from Principals of Girls and Boys schools was considered inappropriate. Descriptive comparison of responses has been made where this adds to the interpretation of the data.

6.2.2 Category of schools that participated in the investigation

The field research was carried out in three different school settings. The Principals were asked to state the categories of their schools. Their responses are shown in Table 6.3

Table 6.3: Category of schools that participated in the investigation

| Category of schools | Number of schools | Percentages |
|------------------------|-------------------|-------------|
| Girls boarding schools | 11 | 44% |
| Boys boarding schools | 12 | 48% |
| Boys days schools | 1 | 4% |
| Mixed Day school | 1 | 4% |
| Total | 25 | 100% |

The above Table 6.3 indicates that more boarding schools than other schools participated in the investigation. In Nyanza Province, over 80% of secondary schools are boarding. The larger number of boarding schools could be attributed to a number of factors. Firstly, there is the historical development of secondary school education in Nyanza Province that dates back to the colonial period when Christian missionaries established boarding schools to educate boys and girls away from non-Christian and illiterate community influence. Secondly, the persistence of boarding schools is due to the widespread geographical location of secondary schools situated far away from homes of students attending them. Thirdly, parents approve the system because Kenya is a multi-ethnic society and boarding schools enable students from various regions to interact, share ideas and discuss social, economic and education issues such as computer technology. Fourthly, boarding schools also provide students with better facilities such as electricity for studying at night, and adequate time for studies. Lastly, boarding schools also provide security and good education particularly for girls who would opt for early marriage since the rate of girls school drop out is high in Nyanza Province and in Kenya as a whole. Although boarding schools charge high fees, the parents organize fund raising and the government provides bursary to bright students from poor families.

6.2.3 The number of students in the schools that participated in the investigation

Information concerning the number of students in each school was an important issue to be investigated. The data obtained were to provide a base on which to examine the ratio of students to computers and the facilities available in the schools that were investigated as discussed in section E of this chapter. The results were summarized and displayed in Table 6.4

Table 6.4: The number of students in schools that participated in the investigation

| No of Students | Girl schools | Boys schools | Boys Day school | Mixed school | Total |
|----------------|--------------|--------------|-----------------|--------------|-------|
| From 200-400 | 5 | 2 | 0 | 1 | 8 |
| 401-600 | 3 | 5 | 0 | 0 | 8 |
| 601-800 | 1 | 5 | 0 | 0 | 6 |
| 801-1000 | 1 | 1 | 0 | 0 | 2 |
| Above 1000 | 0 | 0 | 1 | 0 | 1 |
| Total | 10 | 13 | 1 | 1 | 25 |

Table 6.4 displays the number of students in the schools that participated in the investigation. The Table indicates also that there were more Boys' schools than Girls' schools who participated in the study. From the Table, it can also be seen that population of boys was larger than that of girls. The smaller number of girls in secondary schools in this study is not unique to Nyanza Province alone. The problem of girls' education in Kenya at all levels of learning has been a major issue. From my experience, most girls do not join secondary education due to three main reasons. Firstly there are cultural expectations. Traditional cultures in some communities who are still illiterate expect girls to perform family responsibilities such as looking after young siblings, helping the mother with domestic work and gardening, etc. So traditional cultural practices, values, beliefs and attitudes of some parents in Kenya frustrate the girl-child education and efforts to join school are stifled. Even with the recent government policy for compulsory education for all primary school children in Kenya the changes may not be effective unless the parents are forced to send all children to school and those who fail to do so are punished. Secondly, there are financial obstacles. Many parents are too poor to pay fees for secondary education even if the girls complete primary education and are willing to proceed to secondary school. The high cost of secondary education contributes to girl-child school drop out and so few girls proceed to higher education institutions, this results in few female teachers as indicated in this study. Ironically, although the tuition costs are a serious hardship for these families, the government has not come up with an alternative solution to encourage more girls to continue with secondary education. There is need for the government to attempt to reduce fees for girls in secondary school and higher education institutions to motivate more parents to educate their daughters. Thirdly, there is lack of parental guidance with regards to social problems during the critical period of girls' teenage life, with the result that there are many early marriages. Therefore, in order to reduce the disparity in girls' and boys' education, there is need for a review of fee structures, re-examining of the financial requirements of girls schools, and a re-assessment of out-dated cultural practices that inhibit girls' education. Educational planning and administration could also involve more women to ensure that decisions are made with a consideration of gender issues. There is a need for the government administration, religious organizations, and education institutions to intensify the

campaign to raise consciousness and awareness of the need for girls' education so that the females can catch up with formal education at all levels. Unless such changes are initiated, any attempts to make Kenya's population computer literate will have a very strong male bias.

6.3 Personal details of participants in the investigation

Since a whole school investigation approach was adopted for this study, the participants' background was another important factor to be considered in the integration and use of computers. It was therefore necessary to establish their identity and level of representation in the study by location. The information obtained was considered useful for comparison and further research. The findings revealed that the respondents were drawn from Girls, Boys, and Mixed secondary schools that were using computers at the time of the investigation. Table 6.5 summarizes the demographic data collected and information gathered on participants by location and gender.

Table 6.5: Participants in the study by gender and location

◆ Response from Principals in the schools that participated in the investigation

| Location of school | Principals | Male | Female |
|--------------------|------------|-----------|----------|
| Rural | 17 | 10 | 7 |
| Urban | 5 | 4 | 1 |
| Suburban | 3 | 2 | 1 |
| Total | 25 | 16 | 9 |

◆ Response from Heads of Department in schools that participated in the investigation

| Location of school | HODs | Male | Female |
|--------------------|-----------|-----------|-----------|
| Rural | 53 | 40 | 13 |
| Urban | 22 | 16 | 6 |
| Suburban | 14 | 9 | 5 |
| Total | 89 | 65 | 24 |

The data in Table 6.5 indicate that a total of 64% of Principals and 73% Heads of Department were male. This reflects that the teaching profession especially at secondary

school level in Nyanza Province is male dominated. This situation has led to concern about gender disparity in teacher training institutions, and the problems of girl child school drop out that is prevalent in Nyanza Province and in other parts of Kenya. A total of 68% of the Principals were from rural areas. Urban areas were represented by 20% of the Principals while suburban had only 12% Principals in the study. The majority of Heads of Department 60% were also from rural, areas and 25% of them were from urban areas.

6.3.1 Population of the teaching staff in responding institutions

In addition to the above information, all of the Principals were asked to provide demographic data about the teachers in their schools. The findings indicated that seven schools each had between ten to twenty one teachers, and eight schools had between twenty five to thirty four teachers, while nine of the schools each had between thirty five to sixty seven teachers. However, further analysis of the percentage of teachers by gender were as shown in Table 6.6

Table 6.6: Percentage of teachers by gender in the investigation schools
◆ Responses from rural areas

| Rural schools | Age of school (Years) | No of teachers | Percentage of females | Percentage of males |
|---------------|-----------------------|----------------|-----------------------|---------------------|
| 1. School A | 74 | 38 | 60 | 40 |
| 2. School B | 60 | 37 | 60 | 40 |
| 3. School C | 60 | 35 | 25 | 75 |
| 4. School D | 46 | 31 | 32 | 68 |
| 5. School E | 39 | 35 | 15 | 85 |
| 6. School F | 36 | 25 | 12 | 88 |
| 7. School G | 36 | 17 | 29 | 71 |
| 8. School H | 34 | 31 | 29 | 71 |
| 9. School I | 33 | 29 | 7 | 93 |
| 10. School J | 32 | 26 | 31 | 69 |
| 11. School K | 29 | 30 | 27 | 73 |
| 12. School L | 23 | 28 | 35 | 65 |
| 13. School M | 20 | 16 | 38 | 62 |
| 14. School N | 17 | 18 | 50 | 50 |
| 15. School O | 16 | 34 | 21 | 79 |
| 16. School P | 12 | 10 | 40 | 60 |
| 17. School Q | 3 | 11 | 20 | 80 |

◆ Responses from urban area

| Urban schools | Age of school | No of teachers | Percentage of female | Percentage of male |
|---------------|---------------|----------------|----------------------|--------------------|
| 1. School R | 68 | 67 | 30 | 70 |
| 2. School S | 54 | 64 | 54 | 46 |
| 3. School T | 40 | 40 | 25 | 75 |
| 4. School U | 38 | 63 | 63 | 37 |
| 5. School V | 38 | 30 | 40 | 60 |

◆ Responses from suburban area

| Suburban schools | Age of school | No of teachers | Percentage of females | Percentage of males |
|------------------|---------------|----------------|-----------------------|---------------------|
| 1. School W | 39 | 38 | 32 | 68 |
| 2. School X | 35 | 21 | 33 | 67 |
| 3. School Y | 33 | 20 | 50 | 50 |

From Table 6.6 it can be seen that there were differences in the percentages of male and female teachers in the schools that participated in the investigation. For example in schools A, B, S and U there was a high percentage of females than males, in schools N

and Y there were equal numbers, while in all other schools there was a higher percentages of male teachers.

6.3.2 Age distribution of Principals and Heads of Department who participated in the investigation

All of the participants who took part in the study were asked to state their age-range, because it was felt that teachers' use of computers may be related to their age. Younger teachers could have more skills in computing than older teachers because some of the younger teachers teaching mathematics and science subjects who graduated from the universities during 1990s were exposed to computer technology skills. The findings of this study are shown in Figure 6.1

Figure 6.1: Age (Years) of respondents who participated in the study

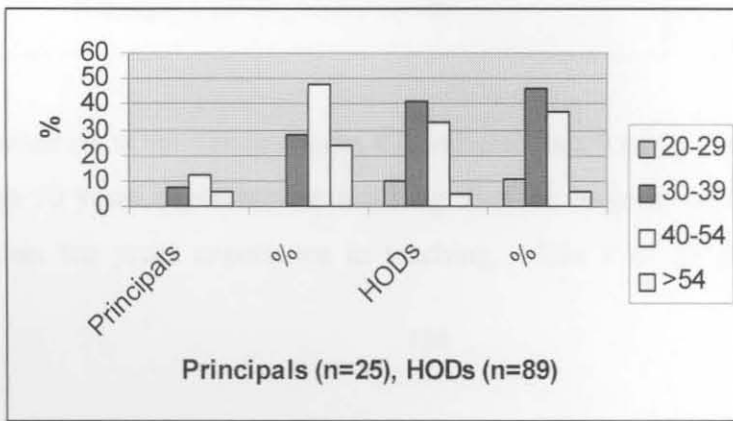


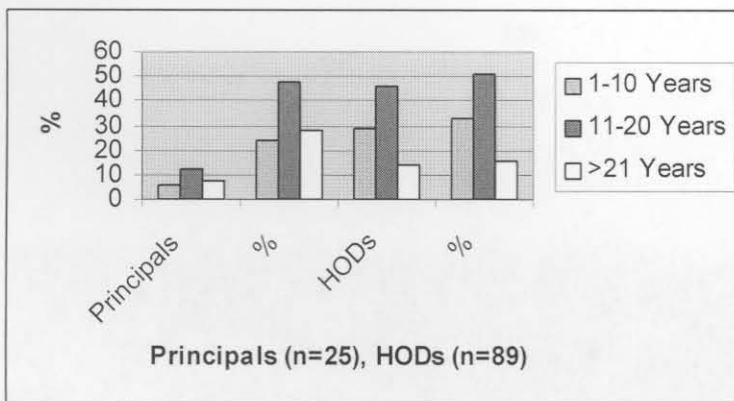
Figure 6.1 shows that of the 25 Principals who completed the questionnaire, the majority (48%) was between 40 and 54 years. In the age bracket of 54 and above there were 6 (24%) and the age group of 30-39 there were 7 (28%) Principals. The Heads of Department consisted of 89 participants, and 10 (11%) were in the age group between 20-29 but the majority of them 41 (46%) were in the age group of 30 to 39, while the other category of Principals in the age of 40-54 was represented by 33 (37%), and 5 (6%) represented above 54. These findings reflected the expected trend that Principals would be older than HODs. In Kenya teachers can be promoted to Head of Department after serving

as senior teacher, and as assistant teacher for some years. To become a principal of a secondary school in Kenya a teacher must have been a Head of Department for some years, and a Deputy Principal for not less than three years in addition to several years of teaching experience. So the length of time in a specific position, effective teaching, seniority and training play important roles in the appointment of teachers to various positions in school administration.

6.3.3 Participants' years of teaching experience

Experience on the job can help teachers to relate to new situations, to solve classroom problems (such as students' discipline during computer classes) and to help them find practical approaches to learning. Experience enables a teacher to draw upon professional insights and skills that include sensitivity to the specific interests, needs and abilities of students. The participants were asked to indicate their experience in teaching. This was important information because lack of experience in teaching normally interferes with teachers' confidence and professional competency. This happens mostly when newly appointed teachers are assigned to teach the subjects they are not particularly conversant to teach. Figure 6:2 demonstrates the position of participants in relation to their length of service in teaching.

Figure 6.2: Participants' experience in the teaching profession



The data contained in the above Figure 6.2 indicate that 6 of 25 (24%) of the Principals had less than 10 years experience in teaching. But the majority of them 12 of 25 (48%) had more than ten years experience in teaching, while 7 of 25 (28%) had more than

twenty years of experience in teaching. The findings for Heads of Department indicated that 29 of 89 (33%) Heads of Department had taught for less than ten years. While most of them 46 of 89 (51%) had more than ten years in the teaching profession, and only 14 of 89 (16%) had more than twenty years of teaching experience. However, it is worth noting that the large number of Principals with 10-20 years of teaching experience is in accordance with one of the requirements for one to be appointed to be a Principal and the same applies to Heads of Department' as mentioned in Section 6.3.2.

In addition to background information about the participants, they were asked to indicate the classes in which they taught and the subjects they taught. This question was asked to provide information that could be used to examine the subjects into which computers are integrated into teaching and learning in the schools investigated. The findings were summarized and revealed that 82% of HODs taught Form One, 72% Form Two, 79 Form Three and 84% Form classes, but most of the Principals taught in all classes in secondary school. Only a few Principals 48% taught form two classes. In addition, Heads of Department were asked to list the subjects they teach. Table 6.7 displays the results.

Table 6.7: Subjects taught by HODs in schools investigated

| Departmental Subjects specialization | Number of HODs | Percentages |
|--------------------------------------|----------------|-------------|
| Sciences | 22 | 25% |
| Languages | 20 | 22% |
| Mathematics | 22 | 25% |
| Humanities | 25 | 28% |
| Total | 89 | 100% |

From Table 6.7 it can be seen that Heads of Department in the study were distributed fairly evenly across the four subject areas. Further analysis by departments indicated that in Mathematics Departments most of them had a combination of Chemistry, Mathematics and Physics, while in Humanities most of them taught Accounts, Commerce and Business Education, Geography and History. However, in Languages, the majority taught English language, and some taught Literature and Kiswahili. However, in Science the majority taught Chemistry and Physics, and had a combination of Biology and Agriculture. This

trend for teachers to be teaching in more than one subject area (such as Mathematics and Chemistry) reflects the requirement in Kenya for secondary school teachers to have two subject specializations.

6.3.4 Principals and HODs' experience with the use of computers

In addition to years of experience in teaching, the participants were asked a question “ Do you have experience with the use of computers?” This question was asked to elicit information regarding the number of Principals and Heads of Department who were computer literate as a background basis to the introduction and use of computers in the study schools following the government directives that computers should be taught in secondary schools. The Principals and Heads of Department were provided with three options to use when answering the question. Their responses are summarized and presented in Table 6.8

Table 6:8: Principals and HODs experience with the use of computers

| Statements | Principals | Heads of Department |
|----------------------------|------------|---------------------|
| I have no experience | 28% | 36% |
| I have some experience | 72% | 63% |
| I have a lot of experience | 0 | 1% |

The prior computing experience reported by the Principals and Heads of Department was varied. Seven of 25 (28%) Principals did not have experience. Eighteen of 25 (72%) Principals had experience with the use of computers and of these 13 were male and 5 female. The results of Heads of Department showed that most of them (63%) had experience with the use of computers but a few (36%) had no experience. Only one (1%) reported having a lot of experience in the use of computers. This shows that the participants' experience was based on the training they received during the in-service course run by the Ministry of Education at Provincial level when computer education was introduced and since then very few of them have attended advanced training in computers. There were also Principals and Heads of Department who did not attend the

in-service courses organized by the Ministry of Education. This could have been due to lack of information regarding the computer in-service course hence the large number of participants with no experience in the use of computers shown in Table 6.8 above.

6.3.5 Principals and HODs' years of service in computer education in the schools that were investigated

The Participants were also asked to indicate for how many years they had been using computers in their schools for teaching and learning. Table 6.9 summarizes the findings as reported by the participants.

Table 6.9: Number of years Principals and HODs have used computers in their schools

| Length of service | Principals | Heads of Department | Total |
|-------------------|------------|---------------------|-------|
| Nil | 7 | 45 | 52 |
| 0-1 Years | 10 | 31 | 41 |
| 1-2 Years | 2 | 6 | 8 |
| 2-3 Years | 3 | 2 | 5 |
| 3-4 Years | 4 | 3 | 7 |
| 5 Years | 0 | 1 | 1 |
| Total | 25 | 89 | 114 |

The above Table 6.9 demonstrates that most of the Principals (40%) had been using computers in their schools for only one year, and 2 of 25 (8%) had used computers for two years. While 12% of Principals had 3 years and 16% had four years experience in computer education but 28% had not used computers at all. However, the findings from Heads of Department indicated that 34% had used the computer in their teaching for up to one year, and 7% for two years. While another 2% had used computers for three years. There were also 5% Heads of Department with four years of working in computer education and one who had used computers for five years. 51% had not used computers in

their teaching. This shows that most of the participants' started to use computers at the time when computers were introduced in their schools.

6.3.6 Highest academic qualification attained by the Principals and HODs in the schools that participated in the investigation

All of the participants were asked to state the highest academic qualification they had. The results indicated that the majority of the Principals (96%) had a university education. Only one of them was a diploma holder. The response from Heads of Department showed that 77% were university graduates and 18% had Diplomas. None of the participants had a PhD degree. Table 6.10 displays participants' qualifications and academic certificates.

Table 6.10: Principals and HODs academic qualifications

| Highest qualification | Principals | Heads of Department | Total |
|-----------------------|------------|---------------------|-------|
| Diploma Certificate | 1 | 16 | 17 |
| B.A degree | 1 | 3 | 4 |
| BEd degree | 18 | 63 | 81 |
| BSC degree | 3 | 5 | 8 |
| MA/MBA/MEd/MPh | 2 | 2 | 4 |

The above academic qualification displayed in Table 6.10 was typical of Principals and HODs in Kenya. It is a requirement for one to have a degree to be appointed as a Principal in addition to seniority in the position of Deputy principal, being an effective academic leader in terms of students' performance in national examinations, being a competent teacher and school administrator. But teachers with a Diploma in subjects where there are no teachers with degrees and other requirements could be appointed as Heads of Department.

6.3.7 Principals' professional training

In addition, the participants were asked a closed question "Are you a trained teacher?" Their responses indicated that all of the Principals were trained teachers and (95%) Heads

of Department were also trained but (5%) Heads of Department were untrained teachers. Table 6.11 provides more information.

Table 6.11: Number of participants who are trained teachers

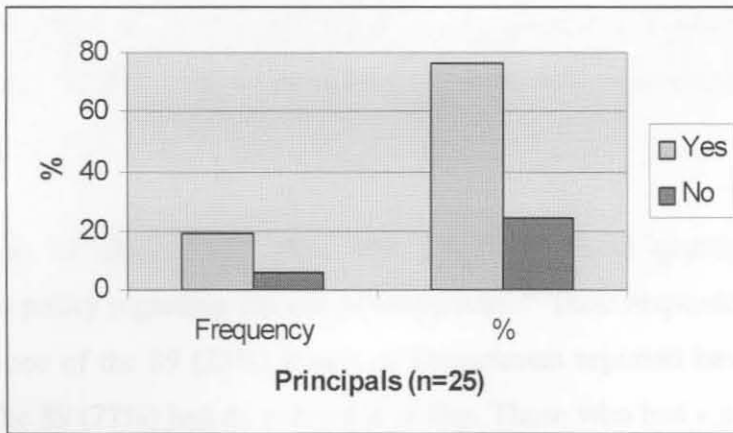
| Responses | Principals | Heads of Department | Total |
|-----------|------------|---------------------|-------|
| Trained | 25 | 84 | 109 |
| Untrained | 0 | 5 | 5 |
| Total | 25 | 89 | 114 |

From the above Table 6.11 it can be seen that only five Heads of Department were not trained as teachers. They were mainly in the sciences, technical and mathematics subjects where Kenya has a shortage of trained teachers.

6.4 The introduction of computers in schools: Policy and practice in the schools that participated in the investigation

As discussed in Chapter 2 Sections 2.2 and Chapter 5 Sections 5.3, the question of policy and practice in the implementation of school computing has been an issue that runs through all educational sectors in developed and developing countries. Rudd (2001:212) feels that it is the responsibility of educational researchers and practitioners to evaluate such policies vigorously and in meaningful ways. In this connection, this section reports the findings on how the government policy on computer education was being implemented by the Principals of the schools investigated in Nyanza Province. Therefore, the Principals were asked a closed question “Does your school have a policy on computer education?” The responses were summarized and reported in Figure 6.3

Figure 6.3: Schools with policy for computer education



It can be seen from Figure 6.3 that 19 of 25 (76%) of the Principals had a computer education policy and only 6 of 25 (24%) of them had no policy on the use of computers. But none of the Principals who reported having a computer policy had a written policy document, so these policies were not well defined, and hence not realistic. Therefore, the Principals whose schools had a policy on the use of computers were asked an open-ended question “What is the essence of the school policy on computers in education.” Their responses were summarized and presented:

- Computer study is compulsory in Form One and Two but Form Three and Four learn specific programs such as spreadsheet.
- All students are supposed to be computer literate by the time they complete secondary education.
- Computer programs to be integrated into curriculum subjects areas where necessary and to be taken by all teachers.

Although these Principals did not have a written policy, they had some idea of what would be included in the written policy document. So the researcher noted that at each point in the policy implementation process, a policy is formulated as individual schools interpret and act on it.

The six Principals who reported having no policy were asked to give reasons why they did not have policy on the use of computers? In response, one Principal from an urban school reported that they did not have a policy but “in practice, computers have been used and confined to teaching and learning computer literacy skills as recommended in the computer syllabus.” Another two Principals reported lack of enough computers for students and teachers, and one Principal complained of lack of competent computer teachers arguing that teachers are computer illiterate and cannot integrate computers into teaching and learning their subjects. Two Principals indicated that computers had just been purchased and not yet installed and parents are not aware of the need to finance computer education and employ teachers. But the overall findings indicate that all Principals who participated in the investigation supported the government computer policy and noted the need to have a clear policy guiding the implementation and use of computers in their schools.

In addition, Heads of Department were also asked a closed question “Does your department have a policy regarding the use of computers?” Their responses gave different pictures. Twenty-one of the 89 (23%) Heads of Department reported having a computer policy but 68 of the 89 (77%) had no computer policy. Those who had a policy on the use of computers were asked another open-ended question “What is this policy?” Their replies were analyzed and reported as shown in Table 6.12

Table 6.12: Departmental policy on the use of computers

| “Yes” response option | Frequency | % |
|---|-----------|-----|
| Computer taught according to Government policy | 30 | 34% |
| All students to be computer literate | 17 | 19% |
| All teachers to attend computer courses | 13 | 15% |
| To provide computing materials | 10 | 11% |
| All official paper work done on computer | 4 | 4% |
| Students’ assessment tests to be computerized | 7 | 8% |
| Examination results analyzed and stored in computer | 8 | 9% |

Although there were no written Departmental policies on the use of computers, the statements in Table 6.12 indicate that HODs had thought about the issues that would need to be addressed in a written policy. They were also trying to make their departments follow the government policy statement on the use of computers in schools.

Furthermore, Heads of Department who reported having a computer policy in Table 6.12 were asked another question to give more information regarding the reasons behind the formulation of the Departmental policy. Their replies were summarized and seemed to be reasons for using the computers and not for having a policy. But since the word “reason” has several meanings, the reasons given by the HODs could still be the reasons for having a computer policy as indicated in Table 6.13.

Table 6.13: HOD’ reasons for having a policy for the use of computers

| Reasons | Frequency | % |
|--|-----------|-----|
| No responses | 33 | 37% |
| To teach students basic computer literacy skills | 25 | 28% |
| To ensure students fit into technological world | 10 | 11% |
| To access new learning resources | 6 | 5% |
| To produce neat and attractive work | 6 | 7% |
| To improve teaching/learning various subjects | 5 | 6% |
| To keep records of students’ work | 4 | 5% |

From the above responses, it can be seen many Heads of Department did not have a computer policy. So they were asked an open-ended question to give the reasons why they did not have departmental policy on the use of computers. They gave several reasons that were summarized and presented in Table 6.14

Table 6. 14: HOD’ reasons for not having a policy for the use of computers

| | Frequency | % |
|-------------------------------|-----------|-----|
| Lack of access to computers | 35 | 42% |
| Not yet decided | 27 | 30% |
| Installation system not done | 17 | 19% |
| Computers recently introduced | 10 | 11% |

The response in Table 6.14 indicates the reasons of not having departmental policy on the use of computers in teaching and learning. From this it can be seen that most of the HODs who responded to the question reported having problems with computers as the main reason for not having a computer policy.

However, a look at the responses from Heads of Department indicates that in some schools the heads did not have a departmental policy on the use of computers, while the Principals stated clearly that the school has a policy so there seems to have been a contradiction of responses. This can be interpreted to mean that in some schools computers were used for administrative work only so the heads had not included computers in their departmental scheme.

6.4.1 Priority given to computer-integrated education in study schools

Question 4 for the Principals sought information on the priority given to the integration and use of computers in teaching and learning in their schools. Table 6.15 shows their responses.

Table 6.15 Priority of CIE in the schools that participated in the investigation

| Rating | Frequency | Percentages |
|---------|-----------|-------------|
| High | 11 | 44% |
| Average | 8 | 32% |
| Low | 6 | 24% |
| Total | 25 | 100% |

Most of the Principals regarded computer integrated education as important and rated the integration very high, but some of them were not very keen on the idea of computer-integrated education in their schools. This could be due to the beliefs of some teachers that the use of computers would replace them from teaching, negative attitude towards computers, and lack of understanding of the benefits of computers in teaching and learning, since some of them were not computer literate. However, those who responded

positively were asked to state the reasons why they gave a high, average and low priority to the integration and use of computers in teaching and learning in their schools. The reasons stated by the Principals were summarized and included in Table 6.16

Table 6.16: Principals' reasons for giving high priority to the use of computers

| Reasons | Frequency | % |
|---|-----------|-----|
| To make all students computer literate | 10 | 40% |
| To improve quality of teaching/learning subjects | 5 | 20% |
| To provide computers for teachers/students to use | 4 | 16% |
| No response | 6 | 24% |

Some of the findings in Table 6.16 are similar with the research findings of Dexter et al. (1998) and Ertmer et al. (1999:65) indicating that the use of computers helps to improve the quality of learning. In addition, the Principals who had no priority for computer-integrated education provided the following reasons as shown in Table 6.17

Table 6.17: Principals' reasons for not having a policy for CIE

| Responses | Frequency | % |
|---|-----------|-----|
| Lack of finance to start computer education | 3 | 50% |
| Teachers have not learnt computer skills | 2 | 33% |
| Computers are few | 1 | 17% |

The above finding indicates that 50% of Principals who had no computer policy gave lack of finance as one reason for not having a policy. But looking at Tables 6.16 and 6.17 it can be argued that most of the Principals had a good reason for the need to have a computer policy. This means that the majority of Principals who participated in the investigation had a vision of the need for a policy to guide the implementation of computer education in their schools, although some of them had various problems as indicated in Table 6.17

6.4.2 The implementation of school policy for the use of computers in teaching and learning

The Principals were asked another open-ended question to indicate the steps they have taken towards the implementation of a policy for the use of Computer Studies in their schools. This question was asked because Principals of schools in Kenya are supposed to implement National Educational policies and to prepare teachers and students for such changes in curriculum innovation. In order to implement government policies the Principals are expected to formulate school policy and provide plans for the implementation programme. The data obtained from the question were analyzed and summarized in the following Table 6. 18

Table 6.18:Steps taken by Principals to implement a computer policy in their schools

| Responses from Principals | Frequency | % |
|--|-----------|-----|
| All teachers / students have access to computers | 20 | 80% |
| Included computer studies in school curriculum | 6 | 24% |
| Acquired some new computers and printers | 5 | 20% |
| Appointed computer teacher | 3 | 12% |
| Started teaching computers in Form One classes | 2 | 8% |
| Built computer room/laboratory | 2 | 8% |
| Asked parents to support computer education | 2 | 8% |
| No steps taken | 5 | 20% |

As can be seen from the list in Table 6.18 most of the Principals had taken different steps to implement the school policy. Two 8% of them in particular had put the matter before the parents to organize fund raising for purchasing computing equipment. However, there were also 20% of the Principals who had not taken any steps to implement computer policy because they had not introduced computers in teaching and learning.

In addition to the different actions taken by the Principals to ensure that the government computer policy was implemented in their schools, they were also asked another a closed question to state if teachers were implementing the policy for computer education. This question was asked to provide information about the use of computers in the study schools, and to help in identifying schools in which teachers used computers in teaching

and learning as discussed in Chapter 7. The responses from Principals were analyzed and displayed in Table 6.19

Table 6.19: Principals response on teachers’ implementing computer policy

| Responses | Frequency | Percentages |
|-----------|-----------|-------------|
| Yes | 20 | 80% |
| No | 5 | 20% |
| Total | 25 | 100% |

The majority of the Principals (80%) reported that teachers in their schools were implementing the computer policy as stated by the government and only 20% were not implementing the policy. Although the schools did not have a written policy document, the Principals who reported having a computer policy were clear about what policy requirement was all about and decided to implement the government policy statement on computer education. In Kenya, education is highly centralized and Principal of schools are the Ministry of Education administrators at school level, and the Government policy automatically becomes the school policy. The policy intentions are accepted and implementation is a matter of the technical ability and will of the implementing schools, together with availability of physical and other teaching and learning resources. There can be no deviation or resistance to the educational policy messages.

Nevertheless, Principals who responded “yes” were asked another closed question to rate how effectively teachers were implementing the school computer policy. The replies are shown in Table 6.20

Table 6.20: Rating of effective implementation of computer policy by the Principals

| Rating | Frequency | % |
|----------------|-----------|-----|
| Very effective | 6 | 24% |
| Effective | 14 | 56% |
| Fair | 5 | 20% |
| Not effective | 0 | 0 |

Most of the Principals rated the implementation of computer policy as effective while some of them rated the implementation very effective, but a few of Principals reported that teachers were implementing the policy fairly. Some of the Principals indicated that due to lack of competent computer teachers, the policy could not be implemented effectively.

6.4.3 Priority given to implementation of school departmental computer policy

In addition to the responses from the Principals on policy issues, the Heads of the Departments were asked a similar question but in a different format. They were asked to rate the priority they gave to the implementation of their departmental policy on computer education at their schools? Their replies were summarized in and presented in Table 6.21

Table 6.21: Rating of Computer policy implementation by the departments

| Responses | Frequency | % |
|-------------|-----------|-----|
| High | 16 | 18% |
| Average | 13 | 15% |
| Low | 14 | 16% |
| No response | 46 | 51% |

Most of the Heads of Department did not respond to this question. This could have been due to the fact that some Heads of Department might have not been aware of what should happen with policy implementation and the need to have a departmental computer policy. Secondly, there was no computer policy guidelines provided to HODs on how to implement the policy and in some schools the computer was used for teaching computer education and did not fall under their departments. But as Table 6.21 indicates some Heads of Department had high regards for the implementation of the policy. Some of them had computer policies different from that of the Principals. For example, seven of them reported that “all examination results must be analyzed and stored in the computer, and another one said “all students tests must be computerized.” At the same time some of them gave average priority, but there were also those who reported low priority. Furthermore, Heads of Department were asked another open-ended question “How are

teachers in your departments implementing the computer policy? The findings are displayed in Table 6.22.

Table 6.22: Response from HODs on teachers implementing computer policy

| Responses | Frequency | % |
|--|-----------|-----|
| To ensure all students take computer literacy course and CIE | 42 | 47% |
| Storage and retrieval of students marks | 7 | 8% |
| Process and print teaching materials | 6 | 7% |
| Use computers to analyze students' marks | 5 | 6% |
| Teachers train in computer literacy | 5 | 6% |
| No response | 24 | 26% |

Most Heads of Department who responded to this question indicated that teachers implemented departmental computer policy to teach computer literacy and to integrate computers in teaching and learning traditional subjects. Some of them reported using computers in administrative work. The findings support the review of literature on functions of the computers in the school discussed in Chapter 2 Sections 2.3.

6.4.4 Guidelines for the implementation of computer education in the schools that participated in the investigation

The last question in this section for the Principals sought information on the guidelines for the teachers to implement the policy in the classroom. The findings were as shown in Table 6.23

Table 6.23: Types of teaching materials teachers' use to implement computer policy

| Responses | Frequency | % |
|--|-----------|-----|
| Teachers use the computer syllabus for reference | 20 | 80% |
| There is a timetable for computer lessons | 16 | 64% |
| They use computer manuals, guidelines, handouts | 10 | 40% |
| Teachers use computer textbooks for reference | 4 | 16% |
| No response | 5 | 20% |

The findings from the Principals regarding the use of Secondary Computer Syllabus to implement computer policy concur with the response from the Curriculum Specialist at Kenya Institute of Education reported in Chapter 5 Sections 5.4.7.

6.5. Finance and resources allocation for the use of CIE in schools

Section D of the Principals' questionnaire and section C of the Heads' of Department questionnaire (See appendices 3 and 4) contained questions about finance and resources allocation regarding CIE. The Principals were asked an open-ended question "Computers are expensive to purchase and maintain, whom do you think should be responsible for the cost of computers in your school?" This question generated various responses as shown in Table 6.24

Table 6.24: Who should finance CIE in secondary schools

| Responses | Frequency | % |
|---|-----------|-----|
| The Ministry of education | 10 | 40% |
| The parents of the students | 5 | 20% |
| The school and politicians to organize fund-raising | 5 | 20% |
| Board of Governors/Parents Teachers Association | 3 | 12% |
| Non-governmental Organization and well-wishers | 2 | 8% |

As shown in Table 6.24, most of the Principals believed that the Ministry of Education should provide funds for computer education in secondary schools. However, the findings reported in Chapter 5 Section 5,3.6 from an interview with Senior Education Officer indicated that the government had no funds to finance computer education in secondary schools. So Principals were asked another question to justify their responses to the answers in question one in section D and their replies are contained in Table 6.25

Table 6.25: Principals' justification to responses in question one in section D

| Responses | Frequency | % |
|--|-----------|-----|
| Ministry of Education has a policy of cost sharing | 12 | 48% |
| Parents are the source of funds | 5 | 20% |
| Politicians and the school can organize fund-raising | 3 | 12% |
| Their children benefit from computer education | 3 | 12% |
| It's an expensive project, needs external funding | 2 | 8% |

From the above findings, it can be seen that all the Principals provided answers to justify their responses listed in Table 6.24. For example one Principal from an urban school stated that the Ministry of Education should provide funds "to show that the government

is committed to computer education because this is the only source of guaranteed finances.” Another Principal from a rural area reported that “Parents are the main source of funding in schools, and their children are the beneficiaries.” Still another Principal from a suburban school said that “Parents must take positive responsibility despite high cost. It is inevitable, one cannot do without computers.”

However, when the Principals were asked a closed question “ Do you think the Ministry of Education should provide funds for computer education in your school?” Almost all of them 23 of 25 responded positively, and only 2 of 25 gave a negative answer. But when the Principals were asked another open-ended question “Why do you think so?” They provided varied answers as shown in Table 6.26

Table 6.26: Why the Ministry of Education should provide funds for CIE in schools

| Responses | Frequency | % |
|---|-----------|-----|
| Ministry of Education should provide computers for teachers | 10 | 44% |
| To subsidize parents effort to purchase computers | 5 | 20% |
| To enable schools to purchase more computers and software | 4 | 16% |
| Computers are too expensive, and parents cannot provide funds | 4 | 16% |

As can be seen from the responses to this question, the Principals were able to provide more information why they felt the Ministry of Education should finance computer education in schools. One of the Principals argued that “other countries have gone far in IT so we cannot be left behind in the modern world so the government should provide funds” Another one said “Parents are overburdened with school fees, the government should assist them.” In conclusion, the researcher noted that the information contained in Table 6.24, 6.25, and 6.26 indicated that the views of the Ministry of Education on who should provide the funding for computer education in schools was different from the views of the Principals. The Principals felt the government should finance computer education in schools but the government said there are no funds for computing in schools.

6.5.1 The cost of purchasing computer equipment

Question five in this section sought information on the cost of purchasing each of the computers available in schools. The participants were given a list of Figures to choose from, and the findings revealed that 30% of Principals spent about Kshs ¹60,000.00, 40% of the Principals used about Kshs 50,000.00 and 20% spent 30,000.00 to purchase each computer. Only 10% of the Principals reported spending less than Kshs 30, 000.00 to purchase each computer.

Furthermore in question 6 of this section, the Principals were required to provide information of the percentage of their school budget they allocate for purchasing new computers, software, repair and maintenance, and other materials. The data obtained indicated that 52% of the Principals had set aside 11% of their budget for purchasing new computers, software packages, related print support materials and for maintenance and repair. However, it appeared as if the purchasing of new computers as well as maintenance and repair made up a very small percentage of the annual school budget. But the other findings revealed that less than a half of the Principals 48% did not have a budget for computing equipment. The problem could be attributed to the fact that secondary schools in Kenya get money from school fees that they save for the purchase of equipment in addition to the support from the Ministry of Education cost sharing programme. Schools with few students may not have adequate funds for purchasing new equipment. However, researchers (Carol, 1997; Clark, 2000; Eshiwani, 1997; Scheffler and Logan, 1998) also reported the problem of lack of adequate funds for computer education.

Similarly, Heads of Department were also asked to state the finance and resources allocation for the departments. The findings revealed that 57% of them did not have any departmental funds for computers because the school purchases equipment for departments. But 43% Heads of Department reported that the school allocated to them funds that was not adequate for purchasing computers. So they were asked another

¹ At the time of this research during July and September 2001, 1US\$ =Kshs 78.00

question “What is the source of this funding?” Their responses were summarized and the common answers included school fees, and donations from people.

However, the Heads of Department who did not have funds gave different reasons for not having departmental funds for computer materials that were summarized and presented in Table 6.27.

Table 6.27: Departments’ reasons for not having funds for computing equipment

| Responses | Frequency | % |
|---|-----------|-----|
| Computer education has not been introduced in the school | 20 | 23% |
| No funds available in the school for computer equipment | 16 | 18% |
| The school purchases equipment for departments | 15 | 17% |
| It is not a priority in the department | 10 | 11% |
| The school does not allow departments to handle funds | 8 | 9% |
| The school has not considered integrating computers in subjects | 7 | 8% |

From the above response, it can be seen that some Heads of Department gave two answers. Some of the responses such as “computer education has not been introduced in the school” and “it is not a priority in the department” support the earlier findings regarding five schools that were not implementing computer education policy reported in Section 6.4.2.

6.5.2 Amount of money allocated to departments for computer equipment

In another question, the Heads of Department who responded positively to question one in this section were asked to provide information about the amount of money allocated for purchasing departmental computer equipment and materials per year. In most cases, the amount allocated was very little, and was not sufficient to purchase any computers. For example, one Head of Department indicated that out of the total school budget for computer education, his department was allocated only 10% of the school budget to purchase computer materials. However, given the economic situation in Kenya that affects schools’ financing, the amount set aside was not even adequate to purchase most of the support materials. For example, one Heads of Department reported having Kshs 6000 and spent Kshs 3500.00 for purchasing ink and diskettes. It is hoped that this

position will change for the better once the schools get enough funds to provide resources for computing in schools. There is a need for school management to look for funds to provide adequate departmental resources so as to encourage teachers to plan for computer integration.

6.6 Availability of computers and support materials in schools that participated in the investigation

Each of the 25 Principals in the study were asked to indicate how many computers were currently available in their schools, and to explain their state of operation. This question was asked in connection with the review of literature in Chapter 3 Section 3.2.3. The question was considered important because availability of computers would encourage teachers to integrate and use them in teaching and learning. Table 6.28 presents descriptive information on the number of computers per school for those schools with such equipment.

Table 6.28 Number of computers and other resources available in each school

| School | Computers | Software | Diskettes | Books | Teachers' manuals | Students manuals' | Secondary Computer Syllabi |
|--------|-----------|----------|-----------|-------|-------------------|-------------------|----------------------------|
| A | 20 | 6 | 40 | 15 | 5 | 10 | 1 |
| B | 15 | 4 | 30 | 20 | 2 | 20 | 1 |
| C | 11 | 5 | 50 | 20 | 10 | 20 | 1 |
| | 11 | 5 | 40 | 10 | 2 | 2 | 1 |
| E | 10 | 6 | 50 | 10 | 5 | 18 | 1 |
| F | 10 | 4 | 26 | 4 | 2 | 3 | 1 |
| G | 9 | 4 | 30 | 6 | 3 | 5 | 1 |
| H | 8 | 5 | 70 | 15 | 2 | 0 | 2 |
| I | 8 | 4 | 20 | 3 | 1 | 3 | 1 |
| J | 7 | 6 | 40 | 10 | 0 | 6 | 1 |
| K | 7 | 3 | 60 | 12 | 5 | 10 | 1 |
| L | 6 | 4 | 40 | 20 | 2 | 15 | 1 |
| M | 6 | 4 | 20 | 3 | 2 | 4 | 1 |
| N | 6 | 4 | 10 | 0 | 0 | 0 | 0 |
| O | 5 | 4 | 50 | 5 | 2 | 20 | 1 |
| P | 5 | 4 | 20 | 0 | 0 | 0 | 0 |
| Q | 4 | 4 | 20 | 2 | 2 | 3 | 1 |
| R | 4 | 3 | 20 | 5 | 3 | 6 | 1 |
| S | 4 | 2 | 10 | 6 | 2 | 3 | 1 |
| T | 4 | 2 | 0 | 0 | 0 | 0 | 0 |
| U | 2 | 4 | 25 | 2 | 2 | 3 | 1 |
| V | 2 | 4 | 20 | 2 | 2 | 2 | 1 |
| W | 2 | 4 | 15 | 0 | 0 | 2 | 1 |
| X | 2 | 3 | 5 | 0 | 0 | 0 | 0 |
| Y | 2 | 3 | 5 | 0 | 0 | 0 | 0 |

Two important points emerged from the figures displayed in Table 6.28 and Table 6.29. Firstly, there is considerable differences in the number of computers available in various institutions. This is true even when the size of institutions is taken into account. Some of the schools investigated had only 2 computers for over 600 students. This poses a problem during computer education period, when a teacher uses two computers for example, with a class of 45 students as shown in Table 6.29

Table 6.29: Schools with computers and number of students per computer

| School | No of students | No of computers | Number of students per computer |
|--------|----------------|-----------------|---------------------------------|
| A | 800 | 20 | 40 |
| B | 600 | 15 | 40 |
| C | 800 | 11 | 72 |
| D | 600 | 11 | 55 |
| E | 800 | 10 | 80 |
| F | 400 | 10 | 100 |
| G | 400 | 9 | 44 |
| H | 1000 | 8 | 133 |
| I | 500 | 8 | 63 |
| J | 600 | 7 | 85 |
| K | 600 | 7 | 85 |
| L | 600 | 6 | 100 |
| M | 400 | 6 | 99 |
| N | 500 | 6 | 83 |
| O | 500 | 5 | 100 |
| P | 500 | 5 | 100 |
| Q | 450 | 4 | 112 |
| R | 400 | 4 | 100 |
| S | Over 1000 | 4 | 250 |
| T | 100 | 4 | 25 |
| U | 500 | 2 | 250 |
| V | 300 | 2 | 150 |
| W | 450 | 2 | 225 |
| X | 500 | 2 | 250 |
| Y | 400 | 2 | 200 |

Table 6.29 displays the number of students per school and the computers available for students to use. However, the ratio of students indicated in the Table is for the whole students population in a school. From my experience, the number of students per class is supposed to be 35 or 40. So in a computer education class the ratio of students per computer, for example would be 20 students per computer for a school with 2 computers. Nevertheless, the overall findings from the Principals revealed that all schools

investigated had computers, software and diskettes to use in administration and in teaching and learning.

Similarly, the Heads of Department were also asked to indicate the number of computers and other related materials in their departments. This question was asked to elicit more information about CIE because Heads of Department are the academic leaders in their departments and could have obtained some CDs for teaching traditional subjects. However, the results showed that HODs did not have departmental computers but used the same computers used by the students. The predominant item available in the department was the Secondary Computer Syllabus (SCS) mentioned by 42% of Heads of Department, but 48% did not have this syllabus. The Secondary Computer Syllabus is an important document because it contains all computer application software topics that students must learn in computer education from Form One to Form Four classes.

In addition, further analysis indicated that 35% percent of the HODs had four software packages, and 30% had only two, while 20% had 6 respectively. As a result of these responses, the researcher concluded that some schools had not installed the software. For example in one of the schools, I found that three of the computers that were donated did not have all the components. Secondly, it could have been due to lack of funds to purchase all the required software. Therefore, lack of adequate software for effective use of computers could be due to the fact that most of the schools in Nyanza Province have not fully implemented the use of computers in teaching and learning.

Table 6.29 further shows that very few schools had support materials for effective use of computers. Only 19 of 25 (76%) of the Principals responded to this question and indicated that teachers' manuals were very important in the effective use of computers in teaching and learning. But when the Heads of Department were asked a similar question, the findings showed that 33 Heads of Department had teachers' guide notes. However, the problem of support materials was experienced in all schools investigated. The extent to which teachers can use computers in teaching and learning depends mostly upon availability of support materials. These could be teachers' guide notes, students' manuals,

computer textbooks, the Secondary Computer Syllabus and handouts on the use of programs in the classroom. However, the differences in responses could also be attributed to lack of awareness of the availability of computer support materials in schools due to lack of proper management of teaching and learning resources, because they are not centrally stored for easy access by the whole school. Availability of support materials like the Secondary Computer Syllabus was examined here because its absence affects the use of computers as recommended by the Ministry of Education.

In another related question, the Heads of Department were asked to provide information on how they obtained the computers for their departments. About 33% of the Heads of Department reported that the departments used the computers that were purchased by the school, and about 35% reported that they used computers that were donated to the school. But 32% of the HODs did not respond to this question.

6.6.1 The Present conditions of the computers available in study schools

In another question, the Principals were required to provide information about the working conditions of the computer in their schools. This question was asked to provide more information about the computers in schools that could be used as a base for the semi-structured interviews with computer teachers reported in Chapter 7. The Principals were provided with a rating scale and the responses are shown in Table 6.30

Table 6.30: Conditions of computers in the study schools

| Rating | Frequency | Percentages |
|-------------------|-----------|-------------|
| Very satisfactory | 19 | 76% |
| Satisfactory | 5 | 20% |
| Unsatisfactory | 1 | 4% |
| Total | 25 | 100% |

From Table 6.30 it can be seen that the majority of the Principals reported that the computers were in good condition. In general the computers that were regarded as not in good condition were those that had been donated to the schools. During my discussion

with one of the Principals at the time of the research, it was revealed that some of the donated computers had missing components, such as a mouse, and could not be used.

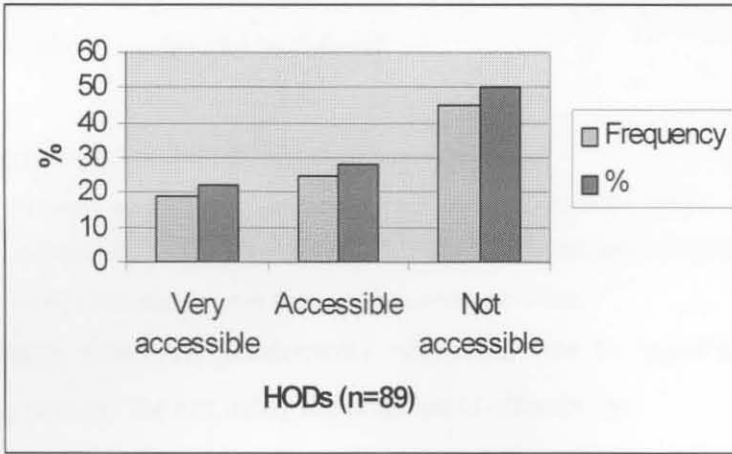
6.6.2 Number of computers used by the staff in schools that participated in the investigation

The participants in the study were asked a closed question “How many computers are available for use by the administration, teachers and the students in your school?” The findings indicated that 80% of the Principals had computers that teachers and students use for teaching and learning. While 52% of the Principals had computers for administrative work but 28% of them did not have specific computers for administration. They reported that they did not have computers in their offices but used the ones for teaching students for administrative work as needs arose. However, the Principals who did not respond to this question (20%) had a number of reasons, for example lack of funds to purchase computers, or most of the computers available are incomplete or need upgrading and others reported that their computers were not yet installed.

6.6.3 Accessibility of computer equipment to teachers

In connection to the above response from Principals about computers available for use by members of the school community, Heads of Department were asked to rate how accessible the computer equipment was to teachers in their departments to use in teaching and learning. This question was asked in connection with a review of literature in Chapter 3 section 3.5. Effective utilization of computers in teaching depends on how accessible computer equipment is to the teachers at the right time when they wanted to use it for teaching and learning. The findings are illustrated in Figure 6.4

Figure 6.4: Accessibility of computer equipment to teachers who participated in the investigation



The overall findings of this investigation revealed that 19 of 89 (22%) of the Heads of Department indicated that computers were very accessible to their teachers, and 25 of 89 (28%) said computers were accessible. But 45 of 89 (50%) of them had problems of access and gave various reasons. Some of them said they were not able use the computers even if they were available because of the crowded timetable. They also argued that they were not able to use computers due to lack of sufficient computers. Other Heads of Department related problem of access to lack of programs to integrate into their subjects. Carol (1997), Millar (1997) and Struddler (1996) report similar research findings.

6.6.4 Principals' general comments on the use of computers in their schools

One of the objectives of this study as set out in Chapter 1 Section 1.4 was to investigate the use of computers in secondary schools. After the findings of the role played by the Principals and Heads of Department to provide computer equipment it was necessary to determine whether and how the computer equipment were used in the schools that participated in the investigation. The question was asked to provide data to establish if computers were used in teaching and learning according to the government policy discussed in Chapter 5 Sections 5.3. Therefore the Principals in this study were asked a closed question "Are the computers being utilized to their full capacity in your school?" The findings are displayed in Table 6.31

Table 6.31: Level of computer usage in study schools

| Responses | Girls school | Boys school | Total | Percentage |
|-----------|--------------|-------------|-------|------------|
| Yes | 8 | 9 | 17 | 68% |
| No | 4 | 4 | 8 | 32% |
| Total | 12 | 13 | 25 | 100% |

As indicated in Table 6.31 the majority of the Principals reported that computers were utilized to their full capacity, and reported that the computers were used in teaching and administrative work. But some Principals reported that the computers were under utilized in their schools and gave various reasons such as “They are used only by the computer club and also for processing examination results” and another one said “ Some computers are old types which lack spare parts.” However, the positive response can be interpreted to mean that the Principals in the study schools agreed to implement the Ministry of Education policy that “computers can be used in schools.” The Principals with positive responses were asked to explain how the computers were used in their schools and the responses were summarized as follows:

- Teachers and students have regular computer lessons;
- Computers are used for data analysis and storage of students’ marks;
- Computers are used by the computer teacher to teach students computer literacy;
- Teachers and students use them to learn computer skills;

At the same time, the participants whose answer to question 7 was ‘no’ gave the following reasons for not using the computers effectively:

- Lack of trained teachers to teach use computers in teaching;
- Lack of printers to so teachers and students cannot print their work;
- Teachers are not yet ready to integrate computers into teaching traditional subjects;
- The computer programme is not fully operational since it’s one year now;
- Some computers are old type and lacks certain components;

Other researchers Bitner and Bitner (2002) and Zhao and Cziko (2001) also reported similar findings especially that of “Teachers not ready to integrate computers into teaching.”

6.7 Principals’ responses on teachers use of computers in teaching and learning

The use of computers requires accountability on the part of the administration. This includes care, security of the equipment and other resources, and academic leadership. This requires also the Principals to “portray a passionate commitment to providing appropriate computer professional development for their staff members” (Yee 2000). In this connection, the Principals were asked a closed question with multiple choice answers to state who is in charge of computer education in the school. The findings revealed that various people were assigned to take care of the computers in the study schools. About 5% of Principals reported that the deputy principal was in charge of the computer center and 24% indicated that this task has been allocated to the curriculum coordinators, while 33% said Senior teacher, and 5% assigned technicians to be in charge and take care of computers. However 33% had not delegated the responsibility to any particular person. The result of this question suggests that there could be a serious threat of access to computers for teaching and learning, for example, if the Principal is away and failed to delegate the responsibility to the computer teacher. Secondly, it would be time wasting for a teacher to keep on looking for whoever is in charge of the computer room each time he wants to use computers for teaching or when he wants the students to do some remedial work. An ideal situation would be for a computer teacher or a technician to be in charge of the computer room. Nisan-Nelson (2001:93-95) reports similar findings in which the computer teacher was frustrated because the computer lab was located in the library and the librarian had limited access to the equipment, and was not present and successfully acting as a controlling person.

6.7.1 Current use of computers by teachers in schools that participated in the investigation

To gain further information about how computers were used in the teaching and learning process, Principals were asked to respond to the following question: “Are teachers

currently using computers in teaching and learning?” This question was asked to provide evidence on how many schools use computers to teach students computer literacy skills according to the Ministry of Education policy requirement discussed in Chapter 5, Section 5.3 and Principals’ positive response that the computer policy was being implemented in their schools as reported in Section 6.4.2 in this chapter. The data obtained indicated that according to the Principals 80% of secondary schools in the study were currently using computers in teaching and learning, while 16% reported using computers for administrative work but 4% of the schools had not started using computers.

Heads of Department were also asked to respond to a similar question: “Are teachers in your departments using computers?” In response, 37% of the HODs reported that their teachers used computers, but 63% of them said their teachers were not using computers. However, the overall findings indicated that the Principals and HODs gave different answers. This was due to the fact that the 20 Principals reported the computers were used to teach computer literacy in their schools, but in some departments teachers were not using computers since they had not integrated computers into their subjects. Table 6.32 gives a clear picture of the responses from Principals and Heads of Departments.

Table 6.32: Principals’ and HODs report on the use of computers in teaching and learning

| Responses | Principals | Percentages | HODs | Percentages |
|-----------|------------|-------------|------|-------------|
| Yes | 20 | 80% | 33 | 37% |
| No | 5 | 20% | 56 | 63% |
| Total | 25 | 100% | 89 | 100% |

Table 6.32 displays the above information concerning the schools using computers in teaching and learning, and the departments that integrated computers into teaching and learning.

Further, the Heads of Department who indicated that their teachers were using computers were also required to state when the teachers in their departments started to use

computers. About 42% of them reported that their teachers started using computers this year (2001), but 44% of them stated that their teachers started to use computers last year (2000). While 13% of Heads of Department said their teachers started using computers in 1999. The responses from HODs are similar to the findings reported in Section 6.3.5. This suggests that most of the schools that participated in the investigation started to use computers in the year 2000. The Heads of Department also gave various reasons for using computers in their department as shown in the following Table 6.33

Table 6.33: Departmental reasons for using computers in departmental teaching

| Responses | Frequency | % |
|---|-----------|-----|
| No response | 15 | 17% |
| To improve students' communication skills | 14 | 16% |
| To teach students computer literacy as in the syllabus | 12 | 14% |
| To improve the quality of teaching and learning of subjects | 10 | 11% |
| To save and retrieve students' records and marks | 10 | 11% |
| Used for administrative work | 10 | 11% |
| For faster analysis of students examination results | 8 | 9% |
| Computers facilitate easy and faster acquisition of knowledge | 7 | 8% |
| To access new information | 6 | 7% |
| To enhance mathematical and science learning | 5 | 6% |
| For computation, demonstration of difficult topics | 4 | 4% |

The data in the above Table 6.33 indicates that some of the HOD's gave more than one response so the total is greater than 89 and the % total is greater than 100%. Some of the above findings such as teaching students computer literacy, to enhance mathematical skills, to improve quality of teaching, and communication skills also concur with other research findings by Abas (1995), Azita (199) and Rudd (2001), reviewed in Chapter 2 Section 2.9.5.5.1.

6.7.2 Kinds of computer programs used in schools that participated in the investigation

The type of computer application used in schools was another area of investigation. Principals who provided positive responses to question two of section F were asked another question to elicit more information about the kinds of program teachers' use in teaching and learning. In response, some of the Principals gave more than one answer, but the majority of the Principals (72%) reported that computers were used for teaching and

learning computer literacy skills. About 16% of the Principals indicated that computers were used for teaching traditional subjects such as Science, Accounts and Mathematics, and 28% of the Principals did not respond to this question. So the Principals who declined to comment on this were asked to state the reasons why the teachers were not using computers programs. In response, the Principals reported lack of enough computers and relevant software, teachers are not computer literate and cannot handle computer programs effectively, lack of computer support materials such as syllabus, computer textbooks, and teachers' guide notes.

However, when the Heads of Department were asked a similar question "Which type of computer software program do teachers use in the department?" The findings were: Ms word, MS Excel, spreadsheet, MS Doss, Database, Power point, Publisher, Computer Aided Design (CAD) and Programming. The results from HODs and Principals were different because HODs are the academic leaders in their departments and had more exposure to the programs used by teachers and students. Millar's (1997) studies reported similar findings in South Africa.

In order to get more information on the use of computers in schools, the Heads of Department were also asked to explain how the teachers use computers. This question was asked to provide information regarding one of the objectives of this study stating "to establish how teachers use computers in teaching and learning in secondary schools in Nyanza Province" reported in Chapter 1 Section 1.4. Their responses were summarized and are contained in the following Table 6.34

Table 6.34: Heads' of Department comment on how teachers use computers

| Response | Frequency % | |
|--|-------------|------|
| As a tool for teaching computer programs like word processor | 32 | 35% |
| For storing and processing students and staff records | 10 | 14% |
| Typing and printing examination questions | 9 | 10 % |
| To store notes for students to study at their own time | 7 | 8% |
| To prepare lesson plans and other documents | 6 | 7% |
| To study materials and facts from the Internet and Web | 5 | 6% |
| To use computers in teaching/learning traditional subjects | 5 | 6% |

The above report from Heads of Department indicated that teachers used computers for teaching and learning and secondly to keep students' examination records. However, there was no response from 16% of Heads of Department.

The Heads of Department were then asked another related question "Which of the following computer software tools are useful for your students?" They were provided with multiple-choice answers. The findings were summarized and displayed in Table 6.35

Table 6.35: HODs comments on useful software for students in study schools

| Responses | Frequency | Percentages |
|-----------------|-----------|-------------|
| Word processing | 74 | 84% |
| Spreadsheet | 42 | 47% |
| Database | 36 | 40% |
| Programming | 27 | 31% |
| Games | 25 | 28% |

The data in Table 6.35 indicate that the majority of Heads of Department (84%) thought that it was useful for students to learn word processing before learning other computer applications. The other programs mentioned by the participants included Database, Programming and games. Karsten and Roth (1998) studies also noted similar findings. These results can be interpreted to mean that teachers considered that word processing was a very useful tool for most of students in lower forms who used it to learn various literacy skills such as writing skills, composition and languages (Zhang 2000), Heinich et al. 1996 and 2002).

6.7.3. Computer skills learnt by students

One of the objectives of introducing computers into public secondary schools in Kenya was to teach students computer literacy skills. In this connection the Heads of Department were asked to list the skills the students in the study schools in Nyanza Province learn. They were provided with a list of multiple-choice answer to choose from. The results are shown in Table 6.36

Table 6.36 Computer programs that students learn during computer lessons

| Skills learnt by students | Frequency | Percentage |
|---------------------------|-----------|------------|
| Word processing | 42 | 47% |
| Spreadsheet | 35 | 39% |
| Database | 27 | 30% |
| Programming | 26 | 29% |
| Others | 9 | 10% |

From Table 6.36 it can be seen that majority of students learnt word processing skills, and some students were taught how to use spreadsheets especially in mathematics, business education and accounts subjects. In some schools students were taught how to use databases and programming was currently taught in a few higher Forms 3 and 4 classes as an elective course. The studies of Crook (1994), Heinich et al (1996 and 2002) and Zhang (2000) reviewed in Chapter 2.9 Section 2.9 report similar usage. However, it is worth noting that the data in Table 6.37 and 6.38 look alike, but in Table 6.37 HODs were asked to state the computer programs they thought would be useful for students to learn. While in Table 6.39 they were required to list the computer programs the students were actually learning in their schools.

6.7.4 The role of computers in departmental teaching and learning

Heinich et al. (1996, and 2002) and Anderson (1991) reviewed in Chapter 2 Section 2.3 listed a number of roles of computers in teaching and learning. Some of these roles included that of an object of instruction, a tool for composing and data retrieval, a tool for classroom instruction, to help students learn specific skills and a catalyst for learning. The same roles of the computer were investigated in the present study. The Heads of Department were asked to describe briefly the role of computers in their departmental teaching and learning. Their responses were summarized and presented in the Table 6.37

Table 6.37: The roles of computers in teaching and learning in schools that participated in the investigation

| Responses | Frequencies | % |
|---|-------------|-----|
| To teach students the application of computer programs | 30 | 34% |
| For computing and analyzing data of students' marks | 15 | 16% |
| A tool for teaching/learning to improve students' learning | 8 | 9% |
| For storage and retrieval of students' records | 7 | 8% |
| It is an aid in guiding and updating knowledge to the users | 6 | 7% |
| For preparing teaching notes and in setting examinations | 5 | 6% |

From the data in the above list, there were similarities in the findings with those reported by Heinich et al. (2002) reviewed in Chapter 2 Sections 2.9. The data obtained from this study can be interpreted to mean that the respondents have also recognized the important roles that the computers can play in teaching and learning as well as in school administration. However, there were no responses from 20% of Heads of Department. Nevertheless, when looking at the responses from the participants in Table 6.13, 6.15, 6.21 and 6.33, there are three common themes regarding computers as tools for educational use in schools. The first one concerns teaching students computer literacy skills. The second one is for teaching traditional subjects and thirdly, for administrative work such as keeping records. These contributions from Principals and HODs support the literature reviewed in Chapter 2 Section 2.3 on the functions and roles of computers in schools.

In addition to the roles of the computer in the departmental teaching, the other information sought from the Heads of Department was about the impact of computers on students' learning. According to Berson (1996: 486) computer-based learning has the potential to facilitate development of students' decision-making and problem solving skills, data processing skills, and communication capabilities. In this connection, Heads of Department were asked an open-ended question to "Describe briefly the impact of the computer program you use on students learning?" The general response was quite positive. The Heads of Department reported the use of computers as shown in Table 6.38

Table 6.38: The impact of computer programs in departmental teaching and learning

| Responses | Frequencies | % |
|---|-------------|-----|
| Increase attention in learning various skills among students | 22 | 25% |
| It has helped students to improve their communication skills | 22 | 25% |
| Knowledge of programs prepares students for job opportunities | 11 | 12% |
| Students can access databases and acquire relevant information | 8 | 9% |
| Students recall what they have learnt, and passed their examination | 5 | 6% |

The above data is supported by the contribution of Berson (1996), (Brush and Saye (2000), Klein and Doran (1999) and Woodrow (1998) reviewed in Chapter 2 Section 2.9 indicating that by using computers, students can gain access to expansive knowledge links. This helps to broaden their exposure to various learning resources and diverse people and perspectives. However, twenty-one (23%) HODs did not respond to this question.

6.7.5 Advantages of using computers during facilitation of learning in the classroom

In order to continue using computers, teachers need to be convinced of the benefits they derive from it in the mediation of learning. It is important that computers offer clear pedagogic benefits that are relevant to departmental programs and needs in teaching various subjects. The Heads of Department were therefore asked to list all the advantages of using computers in classroom teaching. The findings are summarized and included in of the following in Table 6.39

Table 6.39: Advantages of using computers in teaching and learning in schools

| Responses | Frequency | % |
|---|-----------|-----|
| It motivates students as a tool to learn with | 10 | 11% |
| It extends the scope of knowledge of scientific discovery | 10 | 11% |
| It arouses learners' curiosity and creative thinking | 9 | 10% |
| It involves learning by doing-student-centered, is interesting | 9 | 10% |
| To provide stimulus variation | 8 | 9% |
| To reinforce the understanding of concepts | 7 | 8% |
| Promotes efficiency and accuracy in calculation of mathematics | 6 | 7% |
| It is convenient for storing, retrieving and updating information | 6 | 7% |
| It is convenient, can be used in place of the teacher | 5 | 6% |
| It enables the sharing of ideas through e-mail or Internet | 5 | 6% |

From the above Table 6.39 it can be seen that the Heads of Department identified sufficient benefits of computers to consider integrating them into the subjects they taught. The research findings contained in the list are also similar to the findings of Bitter (1989), Dexter et al. (1998), Heinich et al. (1996 and 2002) and Slabbert (1999) reviewed in Chapter 2 Section 2.9. Thus, the benefits of computers in classroom instruction reported by HODs make the use of computers more compelling and suggest that they are really to promote effective CIE in schools. Moreover, Heads of Department also reported that the use of computers contributes to students' learning as indicated in Table 6.40

Table 6.40: How the use of computer contributes to students learning

| Responses | Frequency | % |
|--|-----------|-----|
| Providing valuable practical approach to learning by doing | 22 | 25% |
| It improves their communication skills and prepares them for further studies | 11 | 12% |
| It keeps learners abreast with modern information technology | 10 | 11% |
| It increases students' thinking skills | 10 | 11% |
| It improves reasoning ability of students, makes them serious learners | 8 | 9% |
| Prompt attention, interest and development of ambition to learn more | 5 | 6% |

The identified contribution of computers to students learning in Table 6.40 are similar to previous research findings reported by Ertmer et al. (1999) and Rice Wilson and Bagley (2001).

6.7.6 Availability of the computer education timetable in schools investigated

Given the importance of good planning, organization, management and school administration, there should be in place a workable school programme of activities. This also applies for the daily teaching and learning activities. So there should be a proper school timetable for all the subjects indicating time, teachers, place, classes, classrooms for all academic subjects and extra curricular activities to guide teachers and students when to attend to teaching and learning. Therefore, Principals were asked a closed question "Does the school have a timetable for computer lessons?" Table 6.41 displays the responses.