Establishment of EMIS Infrastructure in Public Secondary Schools in Rarieda Sub-County, Kenya

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Abstract: Educational planning and development has been influenced by the social-economic and political needs of the society since time immemorial. One of the greatest educational challenges in developing countries is to maximize learning in educational systems based on available and reliable data since they have limited resources. Data in this study were collected through primary sources which included questionnaires to 28 and 112 Principals and HoDs respectively who were purposively sampled from 28 public secondary schools in Rarieda Sub-County, Kenya. In addition, the Sub-County Education Officer, 3 Sub-County Quality Assurance Officers and 4 Teachers Service Commission (TSC) officers at the sub-county were subjected to interview schedules. Reliability of the instruments was tested using test-retest method while expert judgments were used to determine their validity. Data were analyzed using descriptive statistics with the aid of Statistical Package for Social Sciences (SPSS). The data were summarized in tables and percentages to present analysed data. The study findings indicated that: the extent of computer literacy among secondary school teachers, presence of computers and other ICT gadgets, Master database in schools, remote access to database and information were below average. In addition, it was established that data storage for students and other resources were rated at 51-100%. However, the mode of storage was manual. This study recommends that schools should promote computer literacy among teachers through trainings and seminars and recognition of the resultant certificates to step up the practice of EMIS at all management levels such as data collection, processing and storage. Dissemination should be computerised to enhance linkage and accessibility to data remotely.

Key words: Management Information Systems, Management, Infrastructure, Database, Processing, Policy and Analysis

BACKGROUND TO THE STUDY

Education Management Information Systems (EMIS) is a system for data collection, integration, processing, maintenance and dissemination of information to support decision making, policy-analysis and formulation, planning, monitoring, and management at all levels of an education system (Cassidy, 2006). As well, EMIS is a system of people, technology, models, methods, processes and procedures, rules and regulations that function together to provide education leaders, decision makers and managers at all levels with a comprehensive, integrated set of relevant, reliable, unambiguous and timely data and information to support them in completion of their responsibilities (ibid). Thus, holds all sorts of data which are credible, verifiable, authoritative and professionally certified by an independent authority and whose professional integrity is accepted by all concerned personalities (Wako, 2003).

The concept of EMIS in education management dates back to the early 1980s in Latin America and the Caribbean (Cassidy 2006). In Africa, studies have shown that EMIS integration has been implemented based on whether the country is Anglophone or Francophone (UNESCO, 2009). For instance, South Africa is utilizing EMIS created by Open School Management Information Systems (OSMIS) software funded by IMFUNDO and Department for International Development (DFID) which began in mid 2003. It is designed to support school administration to including district and national level collection and reporting of education matters (Ellison 2004). Today the department of education in South Africa in conjunction with other governmental departments has a constitutional and legislative responsibility for reporting and accounting to the parliament and the public on education system. These departments are monitoring and evaluating the education systems using EMIS to provide information which is used to improve efficiency and optimization of resource allocation (UNESCO 2009, http://www.eduction.gov.za). This is a positive illustration of how managers can successfully incorporate use of EMIS to their own advantage as well as to increase their outputs.

In Tanzania, the Ministry of Education and Culture (MoEC) thinks that a well-established EMIS makes it possible to know the status of education development and manages it in efficient way at various levels (MoEC, 2004). However a ban on importation and use of ICT gadgets in the 1970s derailed EMIS development. Swarts and Wachinga (2010), report that the state of EMIS in Tanzania improved around 2010 with the provision of computers and printers to regional and district offices and training of officers on statistics and logistics. As a result, there is timely and periodical production, management and dissemination of educational data and information to stakeholders.

In Uganda, the Education Automated Statistical Information Toolkit (ED*ASSIST) software was piloted by USAID in 1999. This EMIS program has features for data gathering, processing, utilization and provision of accurate data to users on time. It also holds comprehensive data, processes them and avails outputs to users. By the year 2001, EMIS data in Uganda could be made available within 6 months (Ellison, 2004).In Kenya, the story is similar to that of Tanzania and Uganda. Sessional Paper No. 1 of 2005 acknowledges that information and communication to and from the headquarters to the Counties, Sub-counties and schools, was normally through letters and circulars sent by
post or by faxes, thus causing delays in decision making and follow up actions. Hence many schools ended up being inconvenienced in their day to day roles (RoK, 2005).

The incorporation of EMIS department in the MoEST in Kenya commenced in April 1999 with the aim of improving teacher management and providing baseline data on teachers, students’ enrolments and schools in general (Ndichu, 2007). The significance of EMIS in education thus compelled MoEST to enact a policy requiring schools to collect, process, store and disseminate adequate, accurate and timely data thrice a year, February, May and September (RoK 2005).

Besides EMIS being a government policy and thus mandatory for implementation, it is also an inevitable practice because with a readily available and accurately analysed data, Kenyan educational planners can alleviate the challenges in educational development such as access, equity, quality, relevance, effectiveness, efficient management of educational resources, cost of financing education, gender and regional parity and teacher quality and utilization (Achoka et al, 2008 and RoK, 2003). Integration of EMIS in education management is thus a significant ingredient in the total endeavour to provision of quality Education For All (EFA), achievement of SDGs and relevant facilitation for vision 2030.

This study therefore, sought to establish the extent of EMIS infrastructure establishment in Public secondary schools in Rarieda Sub-County, Kenya. It is only after the establishment of the EMIS infrastructure that schools can be encouraged to use it to alleviate speed and accuracy in education data management.

THE STUDY AREA

This study was carried out in public secondary schools in Rarieda Sub-County in Siaya County, Kenya. This Sub-county has unique characteristics (Abiero, 2011, Ondhoror, 2011, and Okwako, 2013). First, the Sub-County is endowed with good road networks and electricity accessibility which should enhance EMIS integration. Secondly, the sub-county has numerous social-economic challenges such as high school dropout rates, large number of orphans and rampant truancy due to teenage pregnancies, high HIV/AIDS prevalence rates and many constituents living below poverty line. These characteristics contribute towards low enrolment, retention and completion rates such that EMIS integration is necessary to enhance data capture, dissemination and decision making to curb these challenges. Lastly, previous studies have emphasized on ICT integration, strategic planning and other internal efficiency issues with no study, to the researchers knowledge, on integration of EMIS (Abiero, 2011). This gap prompted this study in Rarieda sub-county.

CONCEPTUAL FRAMEWORK

The conceptual framework below illustrates the relationship between independent, dependent and extraneous variables. The independent variable is one to which different subjects are exposed to in different degrees (Kathure and Pals 1993). The independent variable is expected to bring change in the dependent variable. The independent variables in this conceptual framework are: technology, Human resources and processes. These variables have some influence on the dependent variable which is management of schools through accurate data capturing, timely data submission, formulation of quality policies and decisions and use of the available data.

A better information system is one that enhances management practices. For example, a well-established EMIS ensures accurate data capturing, timely data submission, quality policy and decision making and general proper use of database in preparation of annual statistical reports, planning and budgeting and appropriate responses to ad hoc questions. The extent of integration requires capacity building, monitoring and evaluation, a proper ICT infrastructure and both financial and moral support from school management and education system at large.

The conceptual framework further indicates extraneous variables that decelerate the extent of achieving integration of information systems in management of education in public secondary schools in Rarieda Sub-County, Kenya. Kothari (2003) asserts that extraneous variable is a dependent variable that is not related to the purpose of the study but may affect dependent variables. The extraneous variables include under-investment in training, poor maintenance and upgrading of information systems and rapid change in ICT whereby ICT infrastructure such as computer machines, storage and communication facilities rapidly become obsolete.
METHODOLOGY

The study used descriptive survey design. It is an essential design in this study since it enables the researchers to investigate and get the views of the respondents concerning the current status and nature of the phenomena. The design was employed in this study since it involved asking a large group of respondents about their views on establishment of EMIS infrastructure in public secondary schools in Rarieda sub-county, Kenya. Rarieda Sub-county covers an area of approximately 398km² with 8 locations. The Sub-County has a population of 123,620 people as per 2009 projection and has 34 public secondary schools. It has two divisions namely Rarieda and Madiany. Most of the Rarieda constituents live below the poverty line with direly low income levels due to minimal economic activities within the constituency.

The high HIV/AIDS prevalence rates in the sub-county accounts for the large number of orphans who drop out of school due to financial constraints. School drop-out rates and absenteeism are conspicuous in schools near beaches as boys drop out to join the fisher folk since fishing underpins the local economy while girls are prone to teenage pregnancies and early marriages. Most schools are also understaffed with inadequate learning facilities. These socio-economic challenges explain the low enrolment rates, low retention rates, low completion rates and the generally low education quality in some schools. These challenges make Rarieda a unique set-up for study (Okwako, 2013).

The public secondary schools’ principals and HoDs in this Sub-county were purposively sampled. This is because the subjects are involved in administrative duties in their respective offices and were hence deemed to be information rich and would give reliable responses in relation to the study (Kombo and Tromp, 2004). This sampling technique is suitable because it enabled the researcher to use his own judgment and purpose to decide whom to select into the sampling frame (Peter, 1994). The researcher randomly sampled four HoDs to represent others in schools. Therefore in this study 28 principals of public secondary schools were sampled since the remaining 6 principals were of new schools that did not have the data desired by the researcher. In each school 4 HoDs (total to 112) were randomly sampled, 1 Sub-County Education Officer, 3 Sub-County Quality Assurance and Standards officer and 4 TSC Human Resource officer at the Sub-county a saturated sample was used to form the sample group of the study totalling to 143. The Sub-County Education Officer, Sub-County Quality Assurance and Standards officer and TSC Human Resource officer at the Sub-county were subjected to non-formal interviews to get the in-depth data and information.

This study employed primary sources to collect data. This primary data were collected through administration of 28 questionnaires to the principals and 112 questionnaires to gather information on establishment of EMIS infrastructure in public secondary schools in Rarieda Sub-county, Kenya.

One principal and four HoDs from each school responded to the questionnaires while the Sub-county education management officials were subjected to interview schedules with anonymity, privacy and confidentiality being assured to all respondents. The questionnaires were administered through drop and pick method. Frequency tables and simple percentages were then used to analyse the data.

The sampling frame is as shown in the table 1.1 below.
RESULTS AND DISCUSSIONS

The objective of this study was to establish presence of EMIS infrastructure in public secondary schools in Rarieda Sub-County of Siaya County, Kenya. EMIS infrastructure refers to the basic systems and services comprising of skilled human resources, technology and processes involved.

The findings of the research objective in this study were analysed and interpreted based on views of the respondents on, first, skilled human resources in schools to boost EMIS; thus the extent of computer literacy among the school management who are the principals, HoDs, SCEO, SCQASO and TSC HR. Secondly, the findings were based on the views of respondents on technology which involved presence of computers, ICT gadgets and availability of data on students and other school resources. Lastly, the study dealt with views of respondents on EMIS processes involved in schools. This included mode of data storage, presence of master database, ability of data access remotely and data collection, processing and dissemination.

Skilled Human Resources:

Extent of Computer Literacy among the Principals and Staff Members:

A literate human resource is necessary in implementation of EMIS in a school set up. Computer literacy among the principals and the teachers can enhance collection of students’ data, processing and use of the same. The extent as a variable was measured using a scale of between:0% to 100%.

The findings in table 1.2 reveal that, majority of the HoDs reported that most of the principals and staff members lack computer skills with 53(47.3%) rating them at 0-25% and 38 (33.9%) rating them at 26-50%, while a paltry 16 (14.3%) and 5(4.5%) rating them at 51-75% and 76-100% respectively. This implies that 91(81.2%) out the 112 HoDs believe that most of the teachers in public secondary schools in Rarieda Sub-County are not computer literate.

Similarly, majority of the principals 18 (64.5%) out of the 28 believe that principals and teachers lack computer skills though to various extents as outlined in table 1.2 above. The SCEO rated teachers and principals who are computer literate at 26-50, while 2 (50%) out of 4 of the TSC HR officers rated them at 0-25% and 2(66.7%) of the SCQASO rated them at 26-50%. It is therefore evident that the sub-county officials generally rate the number of teachers and principals who are computer literate in the sub-county to be below average. Similarly, responses from HoDs and principals imply the same outcome.

When asked to comment on this outcome during the interview, one of the SCQASO said, “Most of the HoDs are among senior teachers who graduated before computers became an essential component of curriculum and unless the HoDs undertake personal training, computer literacy remains a challenge.”

However, the general feeling was optimism that in the near future most of the HoDs and Principals will be computer literate due to incorporation of computer skills in college course work.

This outcome concurs with the findings of Singoro (2012) thesis, who found out that 54.3% of the school administrators were not literate in the use of computers, phones and internet. Similarly, the study pointed out that the MoE had not yet fully made the integration of EMIS a ministry priority and directive. In addition, Singoro (2012) quotes Taghioff (2003), emphasizing that in most of the developing countries, the use of computers and internet are
The presence of computers and other ICT gadgets is an imperative ingredient in enhancing technology in EMIS. These tools are significant in enhancing data collection, analysis, storage and dissemination processes. The table 1.3 below indicates the views of the respondents on extent to which computers and other ICT gadgets are available in public secondary schools in Rarieda Sub-County.

Table 1.3: Presence of Computers and other ICT Gadgets

<table>
<thead>
<tr>
<th>Extent %</th>
<th>Principal</th>
<th>HoD</th>
<th>SCEO</th>
<th>SCQASO</th>
<th>TSC HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>8</td>
<td>28.6</td>
<td>6</td>
<td>5.4</td>
<td>0</td>
</tr>
<tr>
<td>26-50</td>
<td>14</td>
<td>50</td>
<td>72</td>
<td>64.3</td>
<td>1</td>
</tr>
<tr>
<td>51-75</td>
<td>3</td>
<td>10.7</td>
<td>25</td>
<td>22.3</td>
<td>0</td>
</tr>
<tr>
<td>76-100</td>
<td>3</td>
<td>10.7</td>
<td>9</td>
<td>8.0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>112</td>
<td>100</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Field Data (2016)

The findings in table 1.3 above, presents a situation in which 14(50%) principals admitted that the presence of computers and other ICT gadgets in their schools were to an average extent of (26-50%) while 6(21.4%) admitted that this gadgets were present in schools to a greater extent of (51-100%) but 8 (28.6%) rated it at 0-25%. Similarly, 72 (64.3%) of the HoDs reported that the gadgets existed in schools to an extent of between 26-50%, implying that they are only a few available if any.

SCEO when interviewed reported the same extent (26-50%) on presence of ICT gadgets while 2(66.7%) of the SCQASO and 4(100%) of the TSC HR officers also reported the same extent on presence of computer and ICT gadgets in public secondary schools in Rarieda Sub-County. This implies that generally presence of computers and ICT gadgets in most schools in the Sub-County could be rated at below average (26-50%) with a few exceptions. This is indeed a great challenge in implementing EMIS in schools because the gadgets are fundamental in collecting, processing and storing of data.

One of the interviewees when asked about the presence of computers in schools reported that most of the teachers having understood the growing significance of technology in data processing, storage and dissemination, are currently purchasing individual laptops. The interviewee also acknowledged that there are some schools that have taken initiative to buy the computers but most of them are second-hand thus could easily be obsolete.

The discrepancy between the response of the principals and the HoDs on presence of computers and other ICT gadgets was explained by the TSC HR officers who revealed that the difference could be due to accessibility to the available few computers because the few available computers especially in Sub-County schools and other small schools are usually found in the Principal’s office or the secretary and the bursar’s office hence making it difficult to be accessed by the HoDs.

Availability of Data on Students and Other School Resources:

Students are the main business in a school and thus it is imperative for school management to have data on students to enhance equality and equity in distribution of scarce resources. Maoulidi (2008) stresses the point that EMIS forms for School data returns are ideal data source for education needs assessment exercises because they contain most of the required data. The information stored include student enrolments, staffing profiles, classroom profiles (number of streams, whether the classroom is open air or non-open air, number of desks and chalkboards among others) and data on orphans and students with disabilities. Other school resources outlined include and not limited to: total number of textbooks purchased, information on school facilities (whether a school has a library, laboratory, computer labs, a kitchen, pit latrines or flush toilets for boys and girls), data on school finances (total amounts of grants received) and expenditure details (expenses on textbooks, classroom construction, water and sanitation facilities, electricity) as well as information on school fees, parental contributions, and exam performance. Table 1.4 below, indicates the views of the respondents on extent to which school management in Rarieda sub-county has collected and stored data on students and other school resources.

Table 1.4: Availability of Data on Students and Other School Resources

<table>
<thead>
<tr>
<th>Extent %</th>
<th>Principal</th>
<th>HoD</th>
<th>SCEO</th>
<th>SCQASO</th>
<th>TSC HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-25</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4.5</td>
<td>0</td>
</tr>
<tr>
<td>26-50</td>
<td>3</td>
<td>10.7</td>
<td>10</td>
<td>8.9</td>
<td>0</td>
</tr>
<tr>
<td>51-75</td>
<td>7</td>
<td>25</td>
<td>13</td>
<td>11.6</td>
<td>0</td>
</tr>
<tr>
<td>76-100</td>
<td>18</td>
<td>64.3</td>
<td>84</td>
<td>75</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>100</td>
<td>112</td>
<td>100</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Field Data (2016)
Table 1.4 indicates that 18(64.3%) of the principals had data on students and other resources to a very large extent of between 76-100%. Similarly, the study established that, 84 (75%) of the Heads of Departments (HoDs) reported the presence of students’ data to the same great extent. It is also observed that the Sub-County Education Officer (SCEO) and the Sub-County Quality Assurance and Standards officer(SCQASO) agree with the principal’s and the HoD’s rating on this aspect. It is therefore evident that the school administration collects and keeps data on their students and other resources to a very large extent. However, what is not clear at this point is how they collect it and how they keep it given that the preceding factor in table 1.2 revealed that most schools have inadequate number of computers and other ICT gadgets to a great extent.

Since these data are normally required by the MoE frequently, that is, thrice yearly, it was within expectation that schools store them carefully; perhaps in cabinets in the principals’ offices or at the departments. However, when asked about data on students and other resources three or four years down the line some of the principals acknowledged that such information is never easily obtained due to constant change of management and tedious storage processes. This becomes a problem especially in setting an EMIS since it requires information not only for the present year but even other years for monitoring and comparison purposes. This problem, thus, appeared vicious in Rarieda Sub-County and this needed a fast remedy in order for it to move in tandem with the robust changes the societies are experiencing technically, economically and socially.

**EMIS PROCESSES**

**Mode of Data Storage:**

The mode of data storage can be manual (use of physical files) or computerized. The mode of data storage can enhance or deter processing, retrieval and dissemination processes. Table 1.5 below indicates the views of the respondents concerning the modes of data storage in public secondary schools in Rarieda Sub-County, Kenya.

<table>
<thead>
<tr>
<th>Respondent</th>
<th>'f' and %</th>
<th>Physical files</th>
<th>Computers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOD</td>
<td>Frequency</td>
<td>90</td>
<td>22</td>
<td>112</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>80.4</td>
<td>19.6</td>
<td>100</td>
</tr>
<tr>
<td>Principal</td>
<td>Frequency</td>
<td>27</td>
<td>1</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>96.4</td>
<td>3.6</td>
<td>100</td>
</tr>
<tr>
<td>SCEO</td>
<td>Frequency</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>SCQASO</td>
<td>Frequency</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>66.7</td>
<td>33.3</td>
<td>100</td>
</tr>
<tr>
<td>TSC HR</td>
<td>Frequency</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Percentage (%)</td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

Responses in table 1.5 above indicate that 90 (80.4%) HoDs reported that data were stored manually in physical files while only 22(19.6%) store data using computers. This response rhymes with the responses from the principals in which 27 (96.4%) reported to store data using physical files rather than computers. Moreover, 2 (66.7%) of the SCQASO and 3(75%) of the TSC HR officers also reported to store their data using physical files as opposed to use of computers. However, the SCEO reported that data at the sub-county education office is majorly stored using computers. Summarily, data in most schools in public secondary schools in Rarieda sub-County is stored manually in physical files with only a few pockets of schools using computers to store data. This could be partly due to inadequate number of computers and other ICT gadgets in some schools as reported in table 1.3 and partly due to lack of necessary computer skills by the individuals to use the computers (if available) as indicated in table 1.2.

**Presence of a Master Database:**

A master database is a central point in a school where all the data should be channelled for storage after collection and analysis so that it can be made available at any time to the consumers who need it. This data should have at least more than four years for the form fours, three years for the form threes and so on up to form one so that the progress of the student can be well traced for remedial purposes. The following table 1.6 indicates the views by respondents on availability of a Master Database in public secondary schools in Rarieda Sub-County.
Table 1.6: Presence of a Master Database in Schools

<table>
<thead>
<tr>
<th>Respondent</th>
<th>YES</th>
<th>NO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOD</td>
<td>11</td>
<td>101</td>
<td>112</td>
</tr>
<tr>
<td>Principal</td>
<td>6</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>SCQASO</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>TSC HR</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field Data (2016)

Table 1.6 indicates that 101 (90.2%) of the HoDs reported absence of this facility (master database) in their schools while 22 (78.6%) of the principals also reported lack of the same facility in their schools. If compared with 90 (80.4%) and 27 (96.4%) of the HoDs and principals respectively who reported manual storage of data, it could be inferred that most schools that stored data manually in physical files also lack a central master database. The small percentage of respondents who reported to have a master database thus: HoDs 11 (9.8%) and Principals 6 (21.4%), rhymes with the small percentage of respondents thus: HoDs 22 (19.6%) and principals 1 (3.6%) who reported to use computers to store data. This perhaps could imply that majority of the respondents interpreted that a master database must be computer based or it could possibly be argued that having manual data in a central place makes data retrieval cumbersome and it is thus avoided and thus departmental data storage is preferred. However, the SCQASO 3 (100%) and the TSC HR 4 (100%) in contrast to the HoDs and principals reported that they have a master database in which all data is stored centrally whether in a data room or in a computer based system.

### Ability to Access Data at the SCEO remotely:

The remote access technology allows one to access the resources of a particular computer from another over the internet. In this context, teachers, parents and other stakeholders should be enabled to remotely access relevant information stored at the SCEO office computers by using individual computers or any other ICT gadget through the internet in order to increase productivity. For example, home users may get access to the internet through remote access to an Internet Service Provider (ISP). Dial up connection through desktop, notebook or handheld computer modem over regular telephone lines is a common method of remote access. Table 1.7 indicates the views of the respondents on ability to access data at the SCEO remotely by the Principals, HoDs, SCEO, SCQASO and TSC HR officers at the sub-county.

Table 1.7: Ability to access Data at the SCEO Remotely

<table>
<thead>
<tr>
<th>Respondent</th>
<th>YES</th>
<th>NO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOD</td>
<td>28</td>
<td>84</td>
<td>112</td>
</tr>
<tr>
<td>Principal</td>
<td>4</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>SCEO</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>SCQASO</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>TSC HR</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>75</td>
<td>25</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field Data (2016)

In table 1.7 above, 84 (75%) of the HoDs and 24 (85.7%) of the principals negate that it is possible to access data at the SCEO remotely. Since the data was reported to be highly manual (not computerized or connected to the internet) it could only mean that access could be by use of messengers or post office. However, a small percentage of HoDs 28 (25%) and principals 4 (14.3%) agreed that data at the SCEO could be accessed remotely which could largely be attributed to use of mobile phones. Surprisingly, the SCEO, SCQASO and TSC HR tend to disagree with the HoDs and principals on this issue as they report that it is possible to access data at the SCEO remotely. This is possibly because data at the SCEO is computerized as reported by SCEO in table 1.5, a master database is also available as reported in table 1.6 and data processing and dissemination at the SCEO are computerized as reported in table 1.8. Therefore, lack of access by HoDs and Principals could only imply that the data is connected by LAN thus not accessible by distant schools or the concerned respondents not having knowledge on the use of internet.

### Data collection, Processing and Dissemination:

The aim of this item was to establish the mode used to ensure fast data collection, processing and dissemination to various destinations so as to reach the intended consumers on time because any obsolete information might not be
The study revealed that in Rarieda Sub-county of Siaya County, Kenya, the education managers (HoDs, Principals, SCEO, SCQASO and TSC HR officers) rated the extent of computer literacy among teachers at below 50% which is noted to be below average.

Similarly, the extent of presence of computer and other ICT gadgets was rated at between 26-50% by majority (91 respondents out of 147) of the education managers in Rarieda Sub-County with only a few exceptions (41 respondents) rating it at slightly above average. However, it was observed that there was a remarkable difference between the principals and the HoDs’ ratings with the HoDs rating the extent of presence of computers and other ICT gadgets much lower compared to principals. This discrepancy was explained by the TSC HR officers to be caused by accessibility to the few available computers commonly located in the principals’, secretary or bursary offices. It was also noted that some computer literate teachers had resorted to purchasing individual laptops.

However, in spite of the large extent of availability of data, the researcher observed that the mode of data storage was majorly manual as opposed to computerized system. Most of the education managers store data in physical files rather than using computers except the SCEO who reported that data at the Sub-County education officer is majorly stored using computers. The mode of data storage employed by the majority of the education managers (manual), could be partly due to inadequate number of computers and other ICT gadgets or lack of the necessary computer skills.

The study also established that, the HoDs and principals as well as the SCEO and the SCQASO rated the extent to which data on students and other school resources is collected and stored at 51-100% thus its evident that school managers collect and keep data on students and school resources to a very large extent.

Table 1.8 above indicates that, 21 (75%) principals and 92(82.1%) HoDs agree that data is mainly processed manually and disseminated manually. Not surprisingly, this large percentage is also in agreement with the large percentage of HoDs and principals who reported absence of computers and other ICT gadgets in schools in table 1.3 as well as manual data storage in table 1.5. The few percentage of HoDs and Principals 20(17.9%) and 7(25%) respectively is also congruent with previous reports on little presence of computers and other ICT gadgets, a few computer literate teachers and large percentage of manual data storage systems among schools. The SCEO maintains that the data at his office is processed and disseminated to a large extent (51-75%) using a computerized system. Similarly, the SCQASO and TSC HR report that their data processing and dissemination systems are computerized. However, it was reported that the poorly computerized systems noted in this study concerning data collection, procession and dissemination could be attributed to insufficient funds hence inhibiting efforts to invest in institutional data management. One of the SCQASO observed that sometimes the EMIS forms supposed to be submitted to the TSC quarterly are occasionally delayed since most principals don’t submit them to the Sub-County office on time and in fact some don’t even submit them at all. This definitely explains some of the problems associated with manual operations on official issues.

**SUMMARY OF THE STUDY FINDINGS**

The study revealed that: in Rarieda Sub-county of Siaya County, Kenya, the education managers (HoDs, Principals, SCEO, SCQASO and TSC HR officers) rated the extent of computer literacy among teachers at below 50% which is noted to be below average.

Similarly, the extent of presence of computer and other ICT gadgets was rated at between 26-50% by majority (91 respondents out of 147) of the education managers in Rarieda Sub-County that the organization should move in tandem with the technology or else it will be left behind. Table 1.8 indicates the views of the respondents on the extent to which data processing and dissemination in Rarieda Sub-County is carried out either manually or through computerized systems.
100% of the SCQASO and TSC HR officers reported to have either central data storage (data room) or a master database (computerized).

Concerning accessibility of data at the SCEO remotely, more than 70% of the HoDs and principals reported inability to do so. However, the SCEO, SCQASO and TSC HR responses disagreed with the responses by the HoDs and principals. This could be explained by the reports indicating that data at their offices are majorly computerized, with a master database in place. Therefore the inability by the HoDs and principals could only be attributed to either inability to use or access internet or lack of interest since most of their data at school level is manual stored.

The study findings also illustrate that a high percentage of HoDs and principals admit manual data processing and dissemination which is attributed to large extent of lack of relevant computer skills among teachers and inadequate supply of computers and other ICT gadgets as reported earlier. On the other hand the SCEO, SCQASO and TSC HR officers maintain that data collection processing and dissemination at their respective offices are computerized.

**CONCLUSIONS**

The study revealed that computer literacy among teachers as well as presence of computers and other ICT gadgets was below average. It was established that most education managers collect and store data on students and other school resources to a very high extent. However, it was noted that most of the data is stored manually except a few that have computerized systems. Similarly, most schools reported lack of a master database and difficult or inability to access data at the Sub-County education office remotely. The researcher also established that most education managers collect process and disseminate data manually. Consequently, the extent of integration of information systems in education management in Rarieda Sub-County could generally be rated at below average since the extent of presence of EMIS infrastructure was clearly established to be below average.

**RECOMMENDATIONS**

In reference to the findings on the presence of EMIS infrastructure in public secondary schools, the researcher recommends that school management should promote computer literacy among teachers to enhance computer skills necessary in data management through schemes such as off time to attend the same and award of recognition certificates.

The researchers also recommend education managers to step up efforts in soliciting funds to purchase ICT gadgets in order to enable practice of EMIS at all management levels. School managers should also encourage data collection, processing, storage and dissemination to be computerized to enhance linkage and accessibility to data remotely.

**REFERENCES**


