THE PRACTICE AND PROBLEMS OF EDUCATION MANAGEMENT INFORMATION SYSTEM IN TIGRAY REGION

BY: BERIHUN G/MEDHIN

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Berihun G/Medhin G/Micheal

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Abbreviations

CSA	Central Statistics Agency
EFA	Education for all
EIS	Education Information System
EMIS	Education Management Information System
ESDP	Education Sector Development Program
ETP	Education and Training Policy
FGD	Focus Group Discussion
ICT	Information Communication Technology
IS	Information System
IT	Information Technology
MDG	Millennium Development Goals
MIS	Management Information System
MoE	Ministry of Education
MoEC	Ministry of Education and Culture
NGO	Non-Governmental Organizations
PTA	Parent-Teacher Association
REST	Relief Society of Tigray
TEB	Tigray Education Bureau
TFEDB	Tigray Finance and Economic Development Bureau
TGE	Transitional Government of Ethiopia
THB	Tigray Health Bureau
TVET	Technical and Vocational Education Training
UNESCO	United Education, Social and Cultural Organization
UPE	Universal Primary Education
WEO	Woreda Education Office
WFEDO	Woreda Finance and Economic Development Office

ABSTRACT

The main purpose of this study was to assess the practice of EMIS at different echelons of Tigray region education system and to identify the problems encountered in EMIS functions and finally to forwarded necessary recommendations. To effectuate this intention, pertinent issues related to design of data collection format, utilization of educational information, data availability, quality of EMIS data/information, educational data users, degree of EMIS functions, organizational development and capacity building and problems encountered were discussed at length. The study was carried out on REB, 15 WEO, 30 primary and 15 secondary schools. The REB and the schools were selected on purposive sampling and simple random sampling method respectively; however, the woredas were selected through stratified via random sampling technique. The subjects of this study were five TEB EMIS staff and one TEB head, 30 WEO statisticians and developmental planning coordinators and ten WEO heads, 90 school principals and Record officers, one TFEDB head, six WFEDO and one REST and one BESO project education coordinators. Questionnaire, interview, FGD and document analysis were employed as data gathering instruments. The data gathered were analyzed and interpreted using percentage and frequency distribution, mean, grand mean, standard deviation, and chi-square test as well as qualitative analysis. Findings from the data analysis showed that EMIS outputs were not fully accessible and there was also a deficiency in collecting qualitative data/information in the region especially at school level. The study also revealed that the questionnaire was not fulfilling the necessary requirements of a format used to collect educational data/information. Regarding to EMIS functions, the finding indicated that educational data/information has not lead to improved educational practice at levels where it matters. The existing study has also shown that education data/information lacks accuracy and timeliness and this leads for the production of low quality data. Moreover, the assignment of personnel in EMIS unit does not consider the subject of specialization; hence, EMIS of the region was suffered primarily from major capacity constraints and there were no adequate human and material resources. Furthermore, the region has experienced fundamental problems related with provision of relevant training, incentive, allocation of adequate resources, and maximum utilization of information technology. The conclusion is thus, EMIS of the region is not effective to serve the functions it intends to serve. To alleviate the problems and improve the practice of EMIS the following recommendations were suggested. Among those organize and give wide-ranging package of capacity building activities and organizational development practices at all levels of the education system in order to have efficient EMIS system, matching educational level and qualification with the task requirement, making users/stakeholders aware of the usefulness of information, applied principles of data quality at all stages of the data management process, and provide various types of data/information by considering the interest of the stakeholders. Moreover, develop clear policies and clear operational guidelines and mechanisms, allocate sufficient financial and material resource, give attention for expansion of ICT infrastructure, and stipulation of incentive structure for EMIS are also important to improve the practice of EMIS.

CHAPTER ONE

1. The Problem and Its Setting

The chapter deals with the problem and its approach. It contains background of the study, statements of the problem, objectives of the study, significance of the study, delimitation of the study, limitation of the study, definitions of key terms, and organization of the study.

1.1. Introduction

An information system is the basis of management, planning and evaluation of an education system. During the education management process, the information system should inform the different actors and partners on the state of the sector; its internal and external efficiency, its pedagogical and institutional operation, its performance, shortcomings and needs, a solid information system should be as complete as possible. It should cover all the needs and areas for information and not only aim to collect, store data and process information but should also help in the formulation of education policies, their management and their evaluation. Ajayi and Fadekemi (2007) corroborated this idea by elucidating that Information System (IS) is basically concerned with the process of collecting, processing, storing and transmitting relevant information to support the management operations in any organizations.

There is a clear synergy between the history of education policy and the development of Education Management Information System (EMIS). Initial attempts at data collection helped support the formulation of the country's national education policy. More recently, attempts have been made to align the policy of decentralization with the collection and analysis of education data at the district level. Within this process EMIS is being used to help construct operational plans and develop budgets for implementation. By providing reliable and accurate data it is anticipated that EMIS will play an important role in the decentralization process by helping to ensure that education provision becomes more efficient and responsive to local needs.

EMIS is a system for the collection, integration, processing, maintenance and dissemination of data and information to support decision making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. It is a system of people, technology, models, methods, processes, 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 (Cassidy, 2005). Furthermore, Tegegn (2003) also define Educational Management Information System (EMIS) as 'a system designed by systematically organizes information related to the management of educational development (p.1).'

A priority in many initiatives to improve the quality and efficiency of education in the Third world is the increased use of information in policy formulation and planning. This view has lead to a considerable amount of attention and resources being devoted to the design and implementation of Education Information System (EIS) as a means of providing decision makers with more accurate, relevant and timely information (Chapman and Mahlck, 1993). This makes people to appreciate the widespread interest in information system as a tool for improving education quality and efficiency.

According to Cassidy (2005), an emphasis on quality, equality, equity, performance and development requires significant changes in how education systems function, how they are managed, and in the kinds of data and information that education leaders and managers need to fulfill their responsibilities. Monitoring system progress against this broadened set of goals and formulating and adjusting education policies to assure successful attainment of goals and objectives requires access to much more and more detailed data and information, integrated data on inputs, outputs and processes, data that permits comparative assessments of performance across levels, schools, and sub-groups of students, collection of much more disaggregated data and information and collecting and gathering data from multiple sources and from multiple levels, both from within the education system and from external sources.

Within the framework of the 1994 Education and Training Policy (ETP) the Government of Ethiopia launched the twenty-year Education sector indicative plan which has been translated into a serious of national ESDPs. The main trust of the plans (ESDPs) was to improve educational quality, equity, efficiency, relevance, and expand access to education with special weight on achieving UPE by 2015, which is one of the MDGs and EFA. In this regard, the success of the government's effort to implement the ETP, its strategies and ESDPs depends on the active support of all members of the society from central and regional governments down to the community level. Thus, detailed information is needed for day-to-day management on utilization of resources, implementation of planned activities according to schedule and production of planned outputs. Generally speaking, adequate, relevant, accurate, timely, and useful data/information is the most important management tools for monitoring, review, and evaluation of the programs (MoE, 1999; MoE, 2002; and MoE, 2005).

Moreover, an education system need to have well developed and organized EMIS unit that is responsible and dedicated for collecting, processing, analyzing and disseminating of information to users, and this sound EMIS unit help to maintain quality data that support the achievement of MDG's and EFA goals. Nevertheless, it is difficult to realize the UPE and other goals of education system without qualitative data. Supporting this idea, MoE (2002) state that it is difficult to realized fully the MDG's and EFA goals without provide appropriate technical system for timely flow of information. Moreover, the bottlenecks in providing and assisting timely and accurate financial information flow on the program result in the delay to take remedial action and speed up the implementation process of education system.

In this case, effective education plans and decision making demand accurate, timely and relevant information. As Aminu (1986) has noted, information is one of the major issues and indices of planning. Where the relevant information required for planning are not available at the appropriate time, there is bound to be poor planning, inappropriate decision making, poor priority of needs, defective programming or scheduling of activities. Hence, the education system will not be efficient and effective in its operation. Therefore, throughout the phases of the plan, and the way the policies and programs are being implemented require the availability of reliable and objective information to detect possible pitfalls and obstructions, and consequently to rectify and reorient strategies.

Moreover, planning the quality of education through informed decision making requires the availability of accurate and timely information that links resource inputs to education, teaching-learning conditions and processes, and appropriate indicators of the knowledge, skills, and values acquired by students (Ross & Mahlck, 1990).

However, many education leaders and decision makers at all levels, in most developing countries, still complain that much of the data and information that they need is not available; not available when needed; not available in formats that are useful; or, when data is available, it is of questionable reliability. Many observers continue to report that demand for data to support decision making continues to be limited, that capacity for data use is weak, and that significant examples of data-driven decision-making are rare (Cassidy, 2005).

Generally speaking, poor education management information system has been identified as a bottleneck in the success of an education system.

Tigray Region is one of the federal state of Ethiopia and it lies in the northern part of the country extending from $12^0 15'$ to $39^0 39'$ E. It bordered by Eritrea to the north, Sudan to the west, Amhara region to the south and Afar region to the East. The region is estimated to cover a total area of 50,078.64 sq. kilometers with population of about 4,646,197 of which 51 percent are female (2010 G.C.). More than 83 percent of the region population estimated to reside in the rural areas highly depended on agriculture for their subsistence, employment, and income source. The region characterized by rapid population growth, traditional farming practices, natural resource degradation, recurrent drought and low agricultural production and productivity. Currently the region is divided under seven zones and 46 woredas. The community has positive attitude towards education, however, there are serious social problems such as scarcity of resources and low capacity of implementation (THB, 2010).

Hence, Tigray region Education Bureau is structured based on decentralized administration system and has 46 Education Offices. According to Tigray Education Bureau Annual Abstract (2008), in 2000 E.C. there were 1710 primary and 71 secondary schools. In the region, the number of enrolled students in primary, and secondary schools were 990895, and 115707 respectively and the number of teachers were 23762. The gross enrollment rate of primary education in the region has reached 105.9%.

In regional level, though Tigray's Education Sector is given emphasis to Education Management Information System, the EMIS unit in the sector faced different problems. Problems were created due to inadequate and ineffective data collection instrument (conventional instrument), lack of awareness on EMIS, request and collect the same data from the same source (that is school), lack of capacity, both in terms of skilled personnel and equipment etc. (information from personal communication through telephone, October 19, 2010 with TEB EMIS staff member).

Therefore, assessing the practices and problems of EMIS and suggesting some possible recommendations for the problems through research seems to be timely and valuable for reliable EMIS practices in the education sector of the country in general and Tigray education bureau in particular.

1.2. Statement of the Problem

The more complex an organization's structure is, the greater the need for coordination within and between sections and departments. However, central to the needed coordination is information.

Behind this view Murdick and Ross (1971) explained that information is absolutely essential to the survival of an organization. As organizations grow, the pressure of scale, complexity and an increased rate of change make adequate information processing capacity inevitable, if effective control, consequent upon coordination of individual activities is to be achieved. Therefore, despite the good intention of government it is difficult to establish accurate quantitative targets for future plans due to the lack of adequate, accurate, relevant and timely base-line information.

With regard to the importance of information, the definition of objectives, the choice of strategies and policy decisions should be based on objective data, which do not only give an idea of the functioning of the education system, but also help in planning, management, and evaluation. If the quality and reliability of the collected data are not always perfect, their relevance and their usefulness for the definition of policies are always indisputable. Thus, the objective of an education management information system (EMIS) is not only to collect, store and process information but also to help in education policy-making, by providing relevant and accessible information (Carrizo, Sauvageot and Bella, 2003).

It is pertinent to note that the existence of alternatives, based on relevant information, is a necessary condition for making a decision. This view was supported by Ajayi and Fadekemi (2007), when he pointed out that the success of education decision-making, which is the heart of administrative process, is highly dependent on sound and well available information, rather than those that are weak and baseless. For effective decisions to evolve in any organization, therefore, receiving information from, and supplying information to, people within the system are a necessity. The information so communicated must be accurate and up-to-date to cope with uncertainty.

Conversely, there are a range of difficulties in planning and managing the collection, analysis and production of data, information supply and low value on having good statistical information to support planning/policy, information demand. Therefore, evidences suggest that it is very difficult to overcome the information supply issue where there is a lack of information demand, because the resources, emphasis and effort required to tackle them cannot be sustained. Behind this, Tegegn (2003) also identified lack of adequate budget allocation, low level of users' awareness, lack of self initiated learning, personnel shortage, overrating the capacity of EMIS, and need for continuous training are problems that hampered the practice of EMIS. Accordingly, these paradigms are changing the goals and objectives of education, world declaration of EFA and MDG commitments.

scarce resources, and initiative of civil society; which are challenging the practice of EMIS in different ways (Graca, 2006 and Cassidy, 2005).

In relation to this, most education planning efforts in developing countries have little impact and do not always guide the fulfillment of their objectives in an efficient way. Some of the reasons often put forward are the absence of a link between the established diagnostic and the defined strategic plans/policies and choices and the inadequacy, indeed in the lack of relevant information for planners and decision-makers (Jeilu, 2009).

As well, a consistent finding of studies conducted across a variety of developing countries in 1980s, identified the lack of timely, accurate information on the number and distribution of students, teachers, schools, and instructional materials as a major impediment to more effective allocation of recurrent resources (Chapman and Mahlck, 1993).

Besides the problems revealed in association with the EMIS, different authors were also ascertained the existence of these and other problems of EMIS in their studies. Trucano (2006) made a research entitled Education Management Information System: A Short Case Study of Ghana. The research shows that EMIS data were incomplete census coverage and the consequent interpolation of missing data to facilitate analysis is queried in some quarters, reducing confidence in EMIS products. A parallel school mapping system also poses challenges for EMIS and a lack of resources for Information Technology maintenance continues to be a major constraint. Dissemination of information remains limited, central government being the main user. Moreover, information is available for other stakeholders but not in readily utilized formats.

Tiye (2006) was conducted a study on Education Management Information System under Decentralization: Its practices and problems in Oromia Region. The study revealed that EMIS generated information was lack of data in analyzed form especially at lower level and lacks alternative ideas for decision makers. Moreover, EMIS level personnel did not have training related to the job and most of EMIS functions were performed its activities poorly at all levels of the education hierarchies. Similarly, Ayallew (2009) in the study he made on the planning and management of EMIS in Addis Ababa City Administration conclude that information disseminated through annual abstract lacks accuracy and reliability. In addition to this, there is lack of awareness about the importance of information and untimely information dissemination.

Furthermore, Mokonnen (2010) in his study of the practice and problems of EIS management in Oromia, implicitly stated the EMIS output of the region lack quality in terms of accuracy, presentation and timeliness. Besides, the study revealed that in EMIS unit there were no human and material resources in sufficient number and quality. The problems suggested by the different authors, thus, implicitly or explicitly disclose the existence of serious problems with regard to the practice of EMIS at the lower tiers of the education structure.

The student researcher also observed the above problems when he worked at different positions of Tigray region education system. So, the study needs to undertaken for different reasons. On one hand, the existing problems in the EMIS of the region require more detailed systematic and scientific examination and on the other hand, there is a clear need to see whether there is a fully functional and efficient EMIS practice in the region. Moreover, in the region there was no comprehensive study made so far on EMIS.

With this strong conviction, the researcher motivated to assess the practices and problems of Education Management Information System in the region. The study will attempt to answer the following basic questions.

1. What type of data/information available to users?
2. To what extent do EMIS functions apply at all levels of education system?
3. What type of data/information is supplied to users in terms of quality?
4. To what extent do EMIS outputs needed/utilized?
5. What are the major problems that impede the practice of EMIS and possible solutions?

1.3. Objectives of the Study

The study has the following general and specific Objectives.

1.3.1. General Objective

The general objective of the study is to assess the practice and problems of Education Management Information System in Tigray Regional State.

1.3.2. Specific Objectives

The specific objectives of the study are the following.

- To identify educational data/information available at all levels to users.

- To scrutinize the design of data collection questionnaire
- To spot the major EMIS functions performed at schools, WEO, and region.
- To assess the type of data/information demanded.
- To assess the type of data/information supplied to users in terms of quality.
- To assess the extent to which EMIS output is needed.
- To identify the problems that affects the practice of EMIS and to suggest ways to improve the region's EMIS.

1.4. Significance of the Study

According to Chapman and Mahlck (1993), information can be used to improve educational quality by providing data that are used directly to secure or allocate resources, constraining 'bad' decisions, detecting inefficient resources use, and supporting mechanisms that offset the impact of resources loss. For that reason, using relevant and reliable information is important for making rational decisions, enhancing planning and programming, supporting monitoring and evaluation, and helping policy and strategy reviews within education system. Therefore, the findings of this study may have the following significance:-

- It may aware stakeholders on the major problems encountered in the practice of education management information system and suggests how the process will be more effectively implemented.
- It may inform decision makers to take action on the quality of the practices of EMIS.
- It may produce possible solutions that enable for EMIS personnel to provide accurate, timely, and relevant information that may satisfy education sector stakeholders.
- It serves as a springboard for other researchers to take in-depth study for further investigation in the field.

1.5. Delimitations of the Study

In order to carry out any research, it is important to delimit the scope of the study to manageable size. Accordingly, the scope of the study was delimited to 15 woredas, 30 primary and 15 secondary government schools of Tigray region. The reason behind this was to maintain the study manageable to the available human and material resources. As well, assessing the practice of EMIS is a broad issue; which is difficult to be dealt with in such time-bounded study. In relation to the delimitation of the study at primary and secondary schools; primary schools are focal places to achieve UPE by 2015; that is why, relevant, accurate, reliable and timely information is important to attain the

desired goals. Besides, secondary education information management system is a base for planning TVET institutions, colleges and universities which are again the timely and prior concern of the education system of the country. In addition, the study was also delimited to only governmental schools.

1.6. Limitations of the study

This study is not totally free of limitations. There were some unforeseen problems that limited the findings of the study to talk in absolute terms. Some of these problems were discussed as follows.

- The most significant one is inadequacy of the indigenous literature works on the subject. Due to this, much of the literature of this study had built on foreign-based experiences. To overcome the problems, the researcher used different experiences from African countries which have similar background with our country Ethiopia.
- Due to several meetings, most of the time the educational officers of WEO and REB were not available for necessary information in their offices. The researcher overcomes this kind of limitation with continuous follow up and negotiation.

1.7. Definition of Key Terms

Data- collection of facts and figures that are not processed

Information- is processed or meaningful data to the users.

Information System- is all components that work together to process data and produce information (OZ, 2002).

MIS- is a data processing exercise based on the identification of organization information requirement (Adeyemi, 1995).

Woreda- is an area marked off and developed for administrative purpose with defined authority and responsibility representing a population of up to 100,000 people (TGE, 1992).

1.8 Organization of the study

The study consists of five chapters. The first chapter deals with the problem and its approach, the second chapter deals with the review of related literature, the third chapter is about the research design and methodology, the fourth chapter deals with the presentation, analysis and interpretation of data. Finally, summary, conclusions and recommendation forwarded on the basis of the analysis was treated on the fifth chapter. Besides, bibliography and necessary documents were attached at the end of the chapter.

CHAPTER TWO

2. Review of Related Literature

This chapter mainly deals with reviewing literary works of various scholars on the practice and problems of Education Management Information System (EMIS), primarily data and information, information system in education, management information system, definition of EMIS, objectives of EMIS, key measures of EMIS success, data/information quality, EMIS process (starting from planning of information system to monitoring and evaluation of EMIS), good practices and problems of EMIS and EMIS in Ethiopia.

2.1. An Overview of Information System and Management Information System in Education

2.1.1. Data and Information

The setting up or the strengthening of an information system is based on a simple premise: all systems, all organizations whatever they might be, have to produce information to inform on their condition (and their characteristics), their functioning and their results. Without data/information, no system can function rationally, and consequently no operational decision can be taken (Carrizo and others, 2003). Therefore, decisions are impossible without information and managers are constantly seeking more and better information to support their decision making.

Some writers used data and information as synonyms words by overlapping them, and sometimes simply being substituted for each other without distinction. However, both data and information are not synonyms; they are interrelated to each other. According to Doyle (2001), data is defined as raw facts and figures. Facts and figures often have little meaning until they are stored or until calculated something from them, whereas, information is the meaning attach to the data or data which is processed. Similarly, Stair & Reynolds (2003) explained data as consists of raw facts and information as a collection of facts organized in such a way that they have additional value beyond the value of facts themselves. Hence, the definitions given by the authors' shown that data is unprocessed facts or figures which needs further processing to give full meaning, and information is data that have been processed and communicated in such a way as to be useful to the recipients.

Tegegn (2003) has stated that information is additional knowledge the user's desire about the functions under responsibilities. It is this additional knowledge that users utilize to enhance planning, programming, monitoring, evaluation, reviewing, research for overall management, and decision making. While, information is only of value when there is a use for it. Moreover, Wilson

(1996) has declared that information is data that have been converted into a meaningful and useful context for specific end users. Information is processed data placed in a context that gives it value for specific end- users. Therefore, information is famous from data by the fact that it has been structured and so has a context of some sort, which determines its meaning or its relevance or its accuracy. Unless specified otherwise, this paper will use data interchangeably with information.

2.1.2. Information System in Education

To survive, every organization must have an information system. All organizations must be able to collect information, communicate it internally and process it so that manager can make decisions quickly and effectively in pursuit of organizational objectives in a changing, competitive environment. In this case, as already noted earlier data became information when they are transformed to communicate meaning or knowledge, ideas or conclusion. And the system that deals with data input, data processing and output formation is information system which is the nervous system that allows an organization to respond to opportunities and avoid threats.

Adman and Warren (1996) have make cleared that information system is a set of interrelated components, which work together to produce information in a form usable for the purpose of; strategy formulation and operational planning, controlling operational activities and facilitating decision-making. Therefore, Information system is functional systems of any organization that deals with data /information.

Similarly, it is clear that for educational information system to contribute to an improvement in the quality of education there needs to be a great deal of thought put into deciding: (a) what information should be collected, and (b) how this information should be communicated to the various decision-making levels of an education system (Aziz and others, 1990).

To sum up, information system plays a considerable role in collecting, processing, storing and distributing information to assist decision-making, policy formulation, managing modern organizations and also providing accurate, complete, economical, flexible, reliable, relevant, and timely information to the users.

2.1.3. Management Information System

The processing of data into information and communicating the resulting information to the user are the very essence of a management information system. Data is the term for collection of facts and

figures. These basic facts are stored, analyzed, compared, calculated and generally worked on to produce message in the form required by the user, which is then information. Members of management use the information produced together with the information already within their heads, called knowledge, to plan, control, and make decisions or to modify the produced information so as to share the new knowledge with others in the organization (Lucey, 2005).

Management Information System, according to Ajayi and Fadekemi (2007), is basically concerned with the process of collecting, processing, storing and transmitting relevant information to support the management operations in any organizations. It is useful in making decisions to solve many of the problems facing educational institutions. Such problems include poor program scheduling, poor estimate of staff requirements, lack of accurate information on students, personnel and facilities, piling-up of administrative matters, wastage of spaces, lack of feasible budget estimates among others. Moreover, adequate use of MIS will enhance accurate and timely information which are needed for effective decisions on issues related to staff promotion, staff training and development, appointment of staff to duty posts, allocation of resources among others.

Generally speaking, management information system is a system to convert data from internal and external sources into information and to communicate that information, in appropriate form, to managers at all levels in all functions to enable them to make timely and effective decision for planning, directing and controlling the activities for which they are responsible.

2.2. Development of EMIS

2.2.1. Definition of EMIS

As Cassidy (2005) cited, there is no universally-accepted definition and scope of EMIS in popular use throughout the world. It varies from country to country. Some associated EMIS with the annual school census conducted in all countries. For some people any effort to improve the quality of data and information is associated with EMIS. For some an EMIS is simply an updated, computerized statistical information system. Others refer to any administrative, function-specific database system as an EMIS. For some EMIS is all about computers and computerization. Therefore, people's understandings of what an EMIS is and the vision of what EMIS could be can be quite different from one country and one person to the next.

However, it is important to develop a clear working definition among clients, consultants and donors as to what EMIS will actually include given their policy priorities. This will optimize the deployment of resources and clarify downstream monitoring and evaluation. Accordingly, Hua & Herstein (2003) defines EMIS as an institutional service unit producing, managing, and disseminating educational data and information. The management functions of EMIS include collecting, storing, integrating, processing, organizing, outputting, and marketing educational data and statistics in a timely and reliable fashion. These specific tasks serve the needs of educational management, resource allocation, and policy formulation, such as planning and budgeting, policy research and analysis, monitoring and evaluation, allocating school supplies, and domestic and global communication and collaboration.

Moreover, the above view is supported by Cassidy (2005), Tegegn (2003) and Carrizo and others (2003) when they pointed out that an EMIS is a system of the collection, integration, processing, maintenance and dissemination of data/information to support decision making, policy analysis and formulation, planning and management at all levels of an education system.

From the above definitions we can conclude that EMIS is confronted to harmoniously integrate all the sources of information indispensable to the tasks of management, to research and planning of education and, to provide them in a synthesized manner to the users. Thus, an EMIS is a support service that provides information services for different educational management activities.

2.2.2. Objectives and Functions of EMIS

Successful management of education systems today require effective use of the ICT tools for providing smooth operations to enhance policy-making, teaching and learning research and monitoring and evaluations through data and information. To this end, countries around the world have invested significant resources in collecting, processing, and managing more and better data through EMIS (MoEC, 2004).

Authorities in this area, for example, Curt and others (2006) clearly have put that the functions of information have categorized broadly into two: facilitating communication between different stakeholders and providing basis for informed decision-making at all levels of organizations. The main objective of an EMIS is to integrate information related to the management of educational activities, and to make it available in comprehensive yet succinct ways to variety of users. The most

direct operational application of EMIS is to support ongoing management, planning, and monitoring and Evaluation activities of the education system. On the other hand, as Carrizo and others (2003) explained, the objective of an education management information system is not only to collect, store and process information but also to help in education policy-making, by providing relevant and accessible information. It was originally designed to be a management tool but is gradually being perceived as an indispensable tool and support system for the formulation of education policies, their management, and their evaluation.

Furthermore, EMIS also substantially aid effort made to assess the performance of an education system. It also closely monitors the equitable distribution of resources, and plays an active role in providing information to top management about the deployment of teachers, student performance assessment, and internal efficiency of education system, resource allocation, and the distribution of didactic materials to schools. It must also give technical support to the research unit (Tegegn, 2003). However, all the above major functions of education management information system described by the different educational authors have similar essence.

In view of that, the main functions of EMIS has identified as management and administration of the education system, research and planning of education system, providing relevant information to all decision making levels of education system and monitoring and evaluation of the education system (Carrizo and others, 2003; Tegegn, 2003; Ross and Mahlck, 1990; and Windham, 1996).

2.2.2.1. Management and Administration of Education System

The first purpose of an EMIS is to help manager and administer of the education system by basing itself on modern management tools. Bearing in mind, Carrizo and others (2003) pinpointed that the development and the growing complexity of education systems and the needs for regulation and coordination which they require, make information one of the main elements of the administration, management and planning of education, providing in this way the foundation for decision-making at every level of the system.

Management refers to all the work we do in organizing and systematizing the procedure we follow, the equipment we use the people involved in building EMIS, and the relationship between EMIS as a center of information and its users. Conscious communication between EMIS staff and the users is essential to achieving total quality of outputs and services for the development education (Tegegn,

2003). According to Teshome (2007), the effectiveness of any organization depends largely on the effectiveness of its management and the governance arrangement.

In line with this, information-based decision making in the management of the education system has as its goal increased access, efficiency, effectiveness, equity, and quality of education through effective systems of monitoring and evaluation, budgeting and planning, policy research and analysis. EMIS enable these informed decisions to be made by providing necessary data and by fostering an environment in which the demand for this information drives its use. Integrated data/information systems are at the very core of EMIS development in their support of the educational management functions throughout the education system (Hue and Herstein, 2003).

Moreover, Davis and Olsan (1985) have also stated that management information is required by managers to measure performance, decide on control actions formulae new decision rules to be applied by operational personnel, and allocate resources. Therefore, implementation of EMIS will ensure the availability and reliability of data and information and hence allowing an effective management of education system.

To sum up, there is close relationship between EMIS and the management and administration system of education on which it relies. Thus, if EMIS helps to manage the education system better, the management system of education inputs whose tools it uses, feeds it in turn with necessary information for the planning and improvement of the latter (Carrizo and others, 2003).

2.2.2.2. Research and Planning of Education System

The other major function of EMIS is to provide important information for research and planning of education system. According to Carrizo and others (2003), the need to gather data, to undertake sector research and thematic studies, to assess and evaluate the efficiency of current program, to explore the future in order to facilitate a wider debate on these issues is more than ever a determining factor in guiding decision-making and elaborating education policies.

Chapman and Mahlck (1993) stated that research is broadly understood here to be systematic inquiry aimed at improving data quality and information use. One of the most critical factors that contribute to the success of the EMIS development is an institutional culture of making policy decisions based on data and information. This culture is a user-demand-enabling environment under

which the policy research and analysis capacity can be built, strengthened, and further developed (Hue and Herstein, 2003).

To give emphasis the importance of research, Tegegn (2003) piercing that the basic statistics we are collect regularly every year do not provide all of the information needed for decision-making and planning purposes. Additional information needs be collected through pilot studies and research undertakings.

Moreover, EMIS, by virtue of the facilities and skills available, has the responsibilities of assisting other experts and analysts in research data processing and of training experts in the software skills required for data analysis and research. Engagement in research is one of the methods used for strengthening EMIS and learning more about not only the work process in EMIS but also of policy-anchored information services (Tegegn, 2003).

On the other hand, planners in various fields' especially educational planners are recognized the need for inclusive planning in a systematic manner to provide solutions that considers the social, physical and economic aspects of any problem in a situation. Thus, planning, in particular educational planning is the application of rational, systematic analysis to the process of educational development with the aim of making education more effective and efficient in responding to the needs and goals of its students and society (Coombs, 1970).

The preparation of an education plan is an exercise, which requires not only specific skills, but also the availability of reliable and relevant information, which reflects the exact situation of education. In this way, EMIS can feed reliable data to different simulation models allowing reflection on objectives defined for the medium and long term plan (Carrizo and others, 2003). Supporting this idea, Trucano (2006) has noted that as planning need to be based on adequate information, EMIS should have a well-defined role in both operational and strategic planning. It plays an essential function in supporting the education planning process, including the identification of problems and areas for strategic intervention; monitoring, evaluation and planning of strategies, policies and reforms in the education sector; and supporting governments in tracking progress towards pre-defined goals and quantifiable target values, including the MDGs, and planning interventions accordingly.

However, because of a weak information system, most education planning efforts still have little impact and do not always guide the fulfillment of their objectives in an efficient way. One of the reasons often put forward is the absence of a link between the established diagnostic and the defined strategic policies and choices but more frequently the explanation could be found in the inadequacy, indeed in the lack of relevant data and information on which decision-makers can base their policies. Therefore, EMIS is to facilitate the detailed analysis and synthesis of data in order to draw the most salient and relevant information to help in educational planning and policy decision-making (Carrizo and others, 2003).

In general, both planning and EMIS are in each other's pocket, EMIS should be able to produce much of the information necessary to support plans and planning the flow of information throughout the organization can minimize labor, data redundancy, and inconsistency, in addition to increasing the quality and accuracy of the information.

2.2.2.3. Monitoring and Evolution of the Education System

Monitoring is a tool to investigate into, see, and learn not only what has been done but also what problems were encountered on the way. More specifically, it allows seeing how these problems were tackled and paves the way for future enhancement of the implementation program, thus monitoring demands a regular and systematic gathering and analysis of information on the implementation of EMIS activities (Tegegn, 2003). In a similar manner, Cassidy (2005) has clearly stated that monitoring system progress against the broadened set of goals and objectives requires access to much more disaggregate and detailed data and information from multiple sources and levels. It also requires integrated data on inputs, outputs and processes and requires data that permits comparative assessments of performance across levels, schools, and sub-groups of students.

The outputs from EMIS play an important role in the annual planning cycles and monitoring. It also used to generate base-line data that are used to play a more important role in the monitoring process. Therefore, the rationale behind this is that through using EMIS stakeholders will be able to monitor progress of policies towards defined targets and to take appropriate action, if required, to ensure that polices are successfully implemented. Consequently, the process of monitoring forms the basis for evaluation.

Evaluation is a data gathering process to determine the worth of instruction, and its strengths and weaknesses. Evaluation involves making judgment about the worth of an activity through

systematically, openly collecting, analyzing information about it, and relating this to explicit goals, objectives, criteria, and value. Accordingly, the value of the evaluation lies in the actual use of the provided information through evaluation work for making or changing strategic decision(s) that result in added benefits and values for systems, institutions, and individuals who are in them.

The information produced by EMIS should make it possible to judge. An efficient information system is indispensable in evaluating the progress and impact of these policies. In fact the information system should have a global vision of the education system and integrate, in this manner and in a coherent way, the data coming from different sources, pertaining as much to formal and non-formal education as to social, economic, demographic, and even political contexts (Carrizo and others, 2003). For this reason, Hue & Herstein (2003) have concluded that to conduct a system evaluation, we depend on data. In an education system, a routine system evaluation must be put in place, requiring routine data collection and analysis and it is essential that evaluation provide informative results that make the uncertainties more certain, the imperfect information more perfect, and the predicted values more accurate.

In summary system evaluators must design sufficient indicators that can be collected, monitored, and evaluated and they must do the job of converting the field data on individuals or schools to the aggregated and relevant system indicators. Hence, EMIS is a prerequisite for monitoring and evaluating activities.

2.2.2.4. Providing Relevant Information to all Decision Making Levels of Education System

The preceding points have highlighted another essential function of EMIS, that of the use and presentation of information. An EMIS is a set of formalized and integrated operational processes, procedures, and cooperative agreements by which data and information about schools and schooling, such as facilities, teachers, students, learning activities, and evaluative outputs, are regularly shared, integrated, analyzed, and disseminated for educational decision use at each level of the educational hierarchy (Hue & Herstein, 2003). It is also aimed to strengthen capacities in management, planning and dissemination of information at all levels of the education system for all areas of reflection and decision-making.

However, information needs are different according to the level at which information users are operating (national or sub-national) and the type of decision they take (planning and strategic,

management and supervision, operational, recipients of programmes etc). It is with this idea in mind that Pearce and Robinson (1989) has said information requirement and the supporting data requirement are different for different levels of managerial activities. Trying to satisfy all information requirements, which one type of system considered as misleading. In this case, to be efficient, the use and presentation of information should be adapted to every decision-making level.

Managers need and use information differently at different levels because information users are situated at the macro level (policy, planning, strategy development), intermediate level (management and control), and micro level (operations and recipients of programmes).

As Carrizo and others, (2003) clearly illustrate the three decision levels in the education system:

> *The people belonging to the macro level are responsible for strategic decisions concerning the planning of the whole of the education system. The category of decisions at this level concerns the general policy and attainable medium or long-term objectives. The intermediate level comprises decision-makers who are in charge of management and control of the allocation of resources, for an efficient and equitable distribution. This level translates the general objectives into more technical, operational decisions. It therefore requires more specific data to detect eventual malfunctions and to optimize the use of resources. The micro level corresponds to operational tasks, and to more daily activities, closer to the school. The decision here has local and immediate reach and hence will require more detailed information (P.23).*

Likewise, Lucey (2005) in his book stated that the function of information obviously the emphasis given to each area varies from manager to manager and is especially dependent upon the level of the manager in an organization. According to his clarification, there are three levels of management observed in all organizations: top or strategic management, middle or tactical management and junior or operational management. Thus, there are clear difference in information requirement between a manager at the operational level and manager at the strategic or top level.

Therefore, EMIS must be more tightly linked to the articulated data needs of specific manager and decision-makers, or to the work of a specific unit, and to complementary initiatives to build analysis, interpretation, planning and management skills.

2.2.3. Key Measures of EMIS Success

Different authors identified the major factors that can and do affect the success or failure of EMIS in different ways according to their own perspective. For instance, Moses (2001) listed several

things that make EMIS successful. These are set standards for information, set timing, define the level of accuracy, report should be the result of daily activities not special purpose efforts, define how information is presented, ensure that the provision of information quickly see the result of their work, and measure the producing information. On the other hand, Tegegn (2003) mentioned three major factors that can affect the success of EMIS as political commitment, good governance and having strong management.

Hua & Herstein (2003) also identified an EMIS's success depends upon three factors, namely: timely and Reliable Production of Data and Information, Data Integration and Data Sharing among Departments and Effective Use of Data and Information for Educational Policy Decisions. Therefore, the researcher gives more emphasis on these points for further clarification.

2.2.3.1. Timely and Reliable Production of Data and Information

The maturation of the EMIS permits moving from collecting and analyzing readily available data on inputs, processes, outputs, and outcomes to collecting and analyzing more complex data with accuracy, clarity and timeliness. Timely data is data that is available when, or preferably before, it is needed.

According to Hua & Herstein (2003), timely production of data and information requires that there be a shared understanding of the following by all potential data and information producers, users, or clients: EMIS data produced regularly must meet the needs of overall educational planning and budgeting cycle, the needs of educational services, the needs of educational monitoring and evaluation, and policy research and guidance in a timely fashion and the needs of international collaboration and communication. The timeliness of meeting these needs is critically important for the success of EMIS. In line with this, Plunkeet and Attner (1989) have noted that a MIS is a formal method of providing management with accurate and timely information so that managers can take decisions and carryout the managerial function effectively.

The level of data reliability is an important issue on EMIS. Reliable data is data that users can trust as being accurate. According to Hua & Herstein (2003) the reliable production of data suggested that EMIS data, once produced, must reliably report a "current reality or status" or "trend of change" of educational development of the country, district, or school. It means that policy makers, planners, budget makers, field educational officers, principals, teachers, parents, and students can

trust the data and data sources. To win such a trust, data collection must be treated as a scientific process of fact finding.

In general, information to be useful, to support educational reform efforts and to guide decision making at all levels should be relevant, timely, complete and accurate.

2.2.3.2. Data Integration and Data Sharing among Users

Data integration is one of the most important EMIS development strategies. As to Cassidy (2005), integration refers to the importance of compatibility of data from one source with data from other sources; i.e., that data elements of one type from one source can be easily linked with data of other types from other sources. Hua & Herstein (2003) also have stated that data integration means data from multiple sources (payroll, achievement, and school census), multiple years, and multiple levels (student, teacher, or school level) can be linked, integrated, or merged.

Integration of information has provides flexible information system, create easy and quick reporting, provides reliable information system, locally produced information will be available, and good opportunity for research activity and intellectual exercises will be created. It is intended to add value to the data that are already collected and available in variously scattered places within the same system. Therefore, data integration is a prerequisite before an educational policy analyst or planner can conduct a high-quality policy analysis or planning exercise.

The key to data integration is the process of standardizing data structures, types, formats, and coding schemes, as well as creating institutional agreements to share and mine data for policy-making purposes, including monitoring the present, evaluating the past, and projecting the future needs of the education system (Hua & Herstein, 2003). Supporting this idea, Cassidy (2005) has argued that high degree of data integration not only helps to manage data in a more effective and consistent manner, it also contributes to a readiness for more useful policy-oriented analysis, planning, budgeting, and monitoring.

Obviously, we must integrate the data from multiple sources so that we can conduct the right data analysis to answer the right policy questions. Multi-level data from multiple sources and years, once centrally integrated and organized, could have a tremendous value for policy-relevant research and analysis and improvement in education management.

Generally, the future development of EMIS will depend largely on the successful integration of multiple kinds of data, from multiple sources within and external to the education system, and from multiple levels in the education system. Integration will only be possible if there is compatibility across multiple subsystems.

2.2.3.3. Effective Use of Data and Information for Policy Decisions

One of the most critical factors that contribute to the success of the EMIS development is an institutional culture of making policy decisions based on data and information. This culture is a user-demand-enabling environment under which the policy research and analysis capacity can be built, strengthened, and further developed. Policy makers, planners, policy analysts, and other high stakeholders are the users of the data and information. The demand for using data and information should stimulate and nurture the healthy development of an information-based decision-making culture and the EMIS system (Hua & Herstein, 2003).

Effective decision making demands accurate, timely and relevant information. Ajayi and Fadekemi (2007) have illustrated this point by saying that education decision must be based upon sound and well informed evidence that are highly intelligent, rather than those that are weak and baseless. For effective decisions to evolve in any organization, therefore, receiving information from, and supplying information to, people within the system are a necessity. The information so communicated must be accurate and up-to-date to cope with uncertainty. Uncertainty is the condition in which the manager has little information relevant to a decision and there is no way to predict the outcome of the decision.

EMIS development should concentrate on data and information use and institutional behavior change for modern management. Even without IT, there should be a system or culture of data and information use for management. And IT development should be designed to provide a technical enhancement to facilitate the capacity of data and information production and use.

In relation to EMIS success, Cassidy (2005) has concluded that to build an EMIS that meets the real needs of users, one must clearly understand the needs of intended users; one must carefully listen to them. To assure the smooth collection of reliable data and information from schools and regional one must involve these staff in development of the tools and processes of data collection, verification, and maintenance. To assure the timely gathering of data from other ministry divisions and from sources outside the ministry, one must know what is available, where and when. To be

able to merge and integrate data from multiple sources one must have access to data definitions and database structures used by external providers. Moreover, broad-based involvement in system design and development helps to assure the development of EMIS that meets the real needs of users and delivers data and information in a timelier manner.

2.2.4. Data/ Information Quality Dimensions in Education

Managers should be aware of the nature of the information they receive in order to balance its importance and relevance to a specific situation. Without such kind of awareness a manager might give excessive weight to inaccurate or irrelevant information. Thus, by understanding its nature, there is a need to consider what feature might be desirable in that information, and the data on which it is based.

To be functional, information must have essential characteristics both as individual items and as set of information. People want information of high quality that is information products whose characteristic attributes or qualities make the information more important to them.

Quality as applied to data has various definitions but in the geographic world, according to Chapman (2005), one definition is now largely accepted – that of "fitness for use" or "potential use". Data quality depends, among other things, on the motivation and determination of both the producers and users. In this case, data are of high quality if they are fit for their intended uses in operational decision making and planning. Hence, data quality is related to use and cannot be assessed independently of the user.

Understanding the key data quality dimensions is the first step to data quality improvement. Being able to segregate data flaws by dimension allows analysts and developers to apply improvement techniques using data quality tools to improve both the information and the processes that create and manipulate that information. However, it's vital to understand the end use of the data when establishing data quality dimensions.

Studies have confirmed that data quality is a multi-dimensional concept and involves data management, modeling and analysis, quality control and assurance, storage and presentation (Chapman, 2005). As a result a significant amount of data quality research involves investigating and describing various categories of desirable features of data/information.

Redman (2001) has suggested that for data to be fit for use they must be accessible, accurate, timely, complete, consistent with other sources, relevant, comprehensive, provide a proper level of detail, be easy to read and easy to interpret. Vannan (2001) has also acknowledged that quality data don't have to be perfect, just accurate, complete, consistent, timely, and flexible enough to meet organization needs. In a similar manner, Loshin (2009) has clearly listed completeness, timeliness, consistency, accuracy, duplication and integrity. Moreover, Davis (1994) has talked about data/information quality characteristics as accessibility, timeliness, accuracy and precision; relevance and validity; and completeness.

It is an important fact to note that accuracy, completeness, timelines, consistency, and relevance are common attributes of data/information quality according to majority of the authors' clarification and it is valuable to understand these common data quality dimensions.

Accuracy is defined as the closeness to the true value seen as the degree of agreement of readings or of calculated values of one same conceived entity, measured or calculated by different methods, in the context of maximum possible disagreement (Chapman, 2005). To show the problem of accuracy, as Kemmerer (1994) described, the quality of the data is seriously compromised by poor definition of what is to be reported, reports from inappropriate or uninformed personnel, poor instrumentation, mathematical error in aggregation, unintended incentives for under- or over reporting, and poor understanding of the assumptions of the particular type of analysis.

Organizations should strive for completeness of data so that all eligible records are used in compiling the data. It is better to complete the data for a discrete unit and make that available, than have lots of incomplete data available as analyses carried out on incomplete data will not be comprehensive. It is also important to have a missing data policy that defines missing data thresholds and corresponding responses, along with a policy of documenting the completeness of the data.

Timeliness imply that the data are available when, or preferably before, needed or are available in a form that is useful to decision-makers and relevance shows data and information that leaders, decision makers, and managers need to fulfill their responsibilities. According to Kemmerer (1994) relevance of the data is a function of (a) what data are collected and why (b) whether the data are made accessible to the appropriate personnel in the format required at the time when they are needed, and (c) whether administrators have an incentive to use the data. So far consistency mean

the data satisfy a set of constraints and are maintained in a consistent fashion. Consistency allows users to know what tests have been carried out and how, where to find the information, and how to interpret important pieces of information (Redman, 2001).

Data quality should be addressed at all levels from school to the MOE headquarters, as it greatly affects the outcome of the information used for planning and decision-making. Possible mechanical errors when inputting data, file handling, aggregation etc. need to be attended to carefully at all stages. Efforts can be made by preparing preliminary analysis and making users aware of the dangers of poor data. Above all, addressing the problem of data quality at school level pays off at the end (Makwati and others, 2004).

According to Chapman and Mahlck (1993), there are four primary threats to data quality: (i) errors and omissions in reporting data; (ii) errors in transferring and summarizing data; iii) errors in the treatment of missing data; and (iv) lack of consensus about data definitions. Therefore, organizations should give more attention to the problems that hamper the quality of data/information and principles of data quality need to be applied at all stages of the data management process thus are error prevention and correction.

Moreover, give capacity building that enable individuals and organizations to perform appropriate and sustainable functions as required by the system(s) they happen to be working in. Ability to perform core functions of EMIS, design methods, defining objectives, managing efficiently and understanding challenges of development needs is crucial.

2.3. EMIS Process and Information Flow

Authorities in the field of information system, put the life cycle of information management in different ways. For instance, Stair & Reynolds (2003) have described information system as a set of interrelated components that collect (input), manipulate (process), and disseminate (output) data and information and provide a feedback mechanism to meet an objective. Here the authors gave more emphasis on four procedures of information system. First, information system deals with an input which is the activity of gathering and capturing raw data. Second, processing that is converting or transforming data into useful outputs. Processing can involve making calculations, making comparisons and taking alternative actions and storing data for future use. Thirdly, information system is concerned to the production of useful information, usually in the form of documents and

reports; that is an output. Finally, feedback that is output used to make changes to input or processing activities.

Tegegn (2003) has sat the chain of information system life cycle into seven major stages: data collection, data processing, data analysis, reporting, publication, dissemination, and feedback. He has argued that the procedure followed for EMIS is cyclical and it is chained together in a specific order that must be adhered to if an efficient results to be achieved. Any break in the procedure will affect the final result. Moreover, Windham (1996) also has argued that the operation of MIS involves five major steps: needs identification, data collection, data processing and analysis, information provision, and information utilization. Therefore, even though the clarification of the authors on the life-cycle of information system is differing from one to the other; the activities they included under their respective steps remain the same.

On the other hand, MIS is too often conceptualized as a vertical flow from school to district, region, and eventually central ministry levels. Often overlooked is the importance of horizontal and diagonal information sharing. Within a well-established EMIS, it is imperative that both basic data feedback information flow both ways between EMIS center and other levels. Likewise, information products should be provided to as many other information outlets as possible in order to reach the maximum number of users. With this regard, Curt and others (2006) have make clear that information within an organization has to flow from one place to another horizontally across organizational activities, vertically up and down the hierarchy and diagonally which combines the two. Therefore, each mode of information transmission is necessary for educational management, in different circumstances.

However, duplicate, redundant and sometimes even conflicting information collected and disseminated by different agencies will have to be identified. Streamlined standard formats, instruments and procedures for data collection and storage can then be developed, widely distributed and implemented. At the same time, appropriate data flow mechanisms and channels are needed to promote the exchange of complementary information. Improvements in disseminating data to potential users are also needed. And the mandate of individual information agencies should be clearly defined.

2.3.1. Planning of Information System

Planning is the process of deciding in advance what is to be done and how it is to be done. The planning process results in plans which are predetermined courses of action that reflect organizational objectives and the plans are implemented by decisions and actions. Planning, therefore, plays an important role in proper functioning of any organization setup.

Planning is very important for every activity. In view of that, planning of information system is no exception and it is true that it is not only of the data collection life cycle but also of every functional step of EMIS that take place to assist in achieving the intended goals.

Tegegn (2003) has stated that without proper planning we cannot engage ourselves efficiently in plan implementation, or meet deadlines, or achieve the high performance level desired in all EMIS activities. To achieve the desired goals EMIS must develop an EMIS strategic plan for the year, ensure successful implementation and achieve high performance that sustainable over time. Supporting this idea, Kanter (1992) also has eminent that sound EMIS planning is an essential element in successful information system. The values and the need for planning are well understood. Planning invites for better implementation which likely results in better effect. Therefore, Planning of information systems need to cater to the strategic demands of organizations, i.e., serving the firm goals and creating competitive advantage as well as meeting their data processing and MIS needs. The key point here is that organizations have to plan for information systems not merely as tools for cutting costs but as means to adding value.

Planning information systems, as for any other system, begins with the identification of needs. Thus, planning EMIS should consider the requirement and needs of the policy and decision-makers and other key users of information. In regard to this, UNESCO (2006) has supposed that in planning EMIS, it is important to consider the need of all the groups that will rely on the information, including central ministry planners, officials of other national ministries such as finance, regional and district education officials, donors, and NGOs. Ultimately, for EMIS to be effective as a planning and management tool, national needs, not donor requirements, must be the primary face behind the development of the system. As for EMIS planning, Tegegn (2003) has confirmed that it is demand-responsive, which concerns that it serves the needs of the consumer or users of information. In planning EMIS, accordingly to Villanueva (2003), there is a need to give emphasis

the importance of identifying the data requirements and needs of the policy and decision-makers and other key users through consultations.

Therefore, the design and/or the strengthening of an information system should necessarily build on a preliminary phase of identification and analysis of information needs, taking into account not only the diversity of management tasks, of planning, of monitoring and evaluation, but also the different administrative levels, and the decisions of the actors of the education system, in order to meet the criteria of efficiency and relevance.

It is urged that analyze the situation or set up a diagnostic is a necessary and fundamental step in the planning process of EMIS. With this premises, Kanter (1992) has put in brief the necessary contents of information system plan into categories that answer where are we, where do we want to go, how do we get there, when will it be done, who will do it and how much will it cost. To validate this, Carrzio and others (2003) also has set questions like what type of information is needed and why, who needs this information and knowledge about the education system, how do collect them and where do we get that confronting the education system and to which EMIS should respond accordingly.

Moreover, planning for information systems is much like strategic planning in management which the objectives, priorities, and authorization for information systems projects need to be formalized. The systems development plan should identify specific projects slated for the future, priorities for each project and for resources, general procedures, and constraints for each application area. The plan must be specific enough to enable understanding of each application and to know where it stands in the order of development; and should be flexible so that priorities can be adjusted if necessary.

Generally, the aim of planning here is to improve the performance of EMIS through changes that will make to produce more relevant information to the needs of their clients, more efficient in their use of available resources, and a more effective force for individual and social development.

2.3.2. Data Gathering and Processing

If the system of records management at school level is poor then you cannot expect to get the result you require from the data collection system. The school remains the core source of most of the required data items, which are not often recorded in the desired manner. In this case, Voigts (2006)

has recommended that the consistent collection of data is an essential element of a successful EMIS. Important elements are the completeness of collection, the correctness of the data, comparability of data collected in different years, and timeliness of collection.

Consequently, the way in which the data are collected (data collection process) and the qualities of this collection are of major importance in the reliability of the whole system. The quality of data collections tends to better at the local level. The higher the level of local use of data, the higher the quality generated for general system purposes. Indeed, the improvement of countries' capacities in matters of education planning, management and administration must be conducted firstly through an improvement in data collection concerning the activities of the sector (Carrizo and others, 2003).

Data collection must include all the fields covered in EMIS. In addition to education data, it should gather and assemble other information indispensable to EMIS: in particular the demographic and financial data which are necessary for the calculation of enrolment rates, and financial indicators; and also qualitative and contextual data necessary for the analysis, comprehension, and the interpretation of trends in education.

A number of education data is being collected from schools using various methods such as questionnaires, documentary, interview methods, telephone and fax/e-mail. However, most often data is collected by means of questionnaire which is prepared in a centralized system at the EMIS center or through decentralized regional offices. The data collected through this medium must satisfy the need of the decision maker to increase the relevance of the data. In support of this, Hussein (1977) has explained that well designed forms with instruction that are easy to understand are needed to serve the purpose. He added that at all the design stages; the forms should be tested with a sample group of people in order to minimize error. Furthermore, Tegegn (2003) has also suggested that the questions, the layout, and the syntax should be well formulated and need to pay close attention to whether the receiver will understand the question as they are intended. Data collections instruments should, hence, be clear in terms of the information they seek, retain data disaggregated at an appropriate level.

As general rule errors in data and information accuracy are observed as a result of inadequate human capacity to collect data at school, ward and district levels. Some schools do not keep proper records, which makes difficult for heads of schools to accurately fill in the data forms. In some cases, inaccurate data and information are purposely submitted due to pressures or private concerns

(MoEC, 2004). Besides, Jenkins (1997) has also expected that poor physical layout, lack of question pre-testing and failure to use technology are deficits in data collection instruments. In general, properly designed forms are helpful in making sequence of items logical and decreasing the amount of time and effort required.

Crouch and others (1999) have recommended some strategies for improving data collection as: information should be feedback to the producer in a useful form; encourage openness and transparency – overcome fear by disseminating data gradually; reduce the opportunity/time costs of producing data, especially at the school level; make aggressive, early efforts to avoid duplication; and use existing data sources as much as possible.

In general, an effective management of education system should ensure through a successful implementation of the data and information collection at school levels.

On the other hand, data processing is one of the core functions of EMIS in which data obtained from schools has to be entered into computers for processing. This process involves the use of computer programs or codes used to prepare entry templates or forms and report formats (Makwati and others, 2004). This needs data to be organized in order to be utilized for various purposes by educational planners and managers. It is with this idea in mind that Aspinwall and others (1996) have said once the data has been collected sense has to be made of it if it is to be turned into usable information.

The data processing system comprises various components: computer hardware and software, data entry and verification systems, data processing systems generating the desired outputs of information, and systems giving users access to information. This implies that data processing is a complex activity which needs better technology like computer. In line with this, Davis and Olison (1985) have noted that information processing is a major social activity which spent a significant part on individual's working and personal time - recording, searching for and absorbing information. Computers have become an essential part of organizational information processing because of the power of the technology and volume of data to be processed.

Moreover, EMIS unit has the skills, techniques and tricks, to manage and explore the potential of the available technology and quickly respond to the frequent demands from users, especially decision makers and policy makers.

2.3.3. Data Analysis and Reporting

Data analysis is another core element in the cycle of EMIS activities. This is required at the decision and policy level. Core indicators of the education systems' performance need to be made available. This usually involves identifying data for analysis, joining tables, making graphs, calculating indicators and writing narrations of what the indicators are revealing so that users especially decision and policy makers can understand and use. In this regard the EMIS unit has produced selected indicators for users. These include access, efficiency, quality and gender equity (Makwati and others, 2004).

In the same way as for data processing, it is necessary to take into account the human and material resources available. In line with this, Carrizo and others (2003) have distinguished that it is also a phase where training could be given to the personnel who will be in charge of these analyses, because an excellent mastery of these data processing programmes is indispensable to correctly define the necessary statistical analyses. This data analysis has to be done rapidly to produce brief reports providing results drawn from the newly processed data.

The existence of a good data is demonstrated by the success achieved in meeting the information needs of the users. In view of that, there is need for the planning unit to compile a report on indicators for planners and policy makers as it relates to the existing demand based on available data for primary users of the information within the MOE. It usually involves EMIS, planners and other relevant sections of the ministry to produce such a vital summary indicators report for use. Tegegn (2003) has suggested that it is advisable to prepare a short report of the outcome for top decision-makers, who may not have the time to read a long report.

2.3.4. Publication and Information Dissemination to users

If information is not published it is not done; this is not to undermine the efforts made in collection, processing and analysis, however, to emphasize the importance of the product reaching the user and making an impact on educational development. With this end in mind, the reports of data analysis need to be published in order to reach the users, in this way it can be publicize products and users can study them.

Once published, the document must be distributed widely, and must contribute to the debate about schools. Therefore, it must be available to politicians (ministers, elected representatives, etc.), to

those in charge of the education system, to parents' associations, to teachers' trade unions, to school directors, and to the administrative and technical staff of schools, without forgetting the press and the general public (Carrizo and others, 2003). However, if the users have not seen the product, they cannot use it, and if they cannot use it they cannot do sound planning and decision-making. This retards educational development and it has a negative impact on overall economic and social development.

According to Makwati and others (2004), distribution/dissemination is one of the important functions of EMIS that promotes the use of information for development. When the information is published and not distributed to users, the whole process of data collection and processing it is not only a failed job but also a waste of resources and a retardation of development. Besides, dissemination, according to UNESCO (2006), refers to the action of distributing information using a variety of media, ranging from the traditional annual abstract of statistics to the use of the world-wide-web.

Tegegn (2003) has described the way of dissemination as internal and external. He suggested that internally, information will have to be disseminated to planners, decision makers, decision support systems, experts, and educational administrators at all levels within the MOE as well as provinces, districts, and schools. At the same time information also forwarded for external users like planners, researchers, students, teachers, government and non-government organizations, national and international organizations, civil society, private individuals outside the MOE, and the community as a whole.

2.3.5. Utilization of Information and Feedback

Utilization refers to how data is used in the policy process. The disseminated information is only and only if of value when there is a use for it. Supporting this idea, Tegegn (2003) has noted that the value of information depends on the demand for it. The higher the demand, the more the value it has.

The lack of utilization of education data has for a long time been a source of concern and frustration for the EMIS division. So, it is important to ensure the demand for EMIS outputs are translated into utilization within the education system through different mechanisms. One of the most important mechanisms for translation demand into utilization, according to UNESCO (2006), is to support

institutional development and ensure that neighboring units within the ministries have the capacity to utilize EMIS outputs. Demand can also be translated into utilization lower down the education hierarchy through providing decentralized offices with the capacity to develop operational plans and by linking these plans to the disbursement of funds. Utilization of information will also depend on whether end users have confidence in the data and do not resort to using other information sources to make decisions. In line with this, Vigotes (2006) has acknowledged that the well-known rule that information had to be relevant, reliable and timely seemed to contribute little to an increasing utilization/demand.

Moreover, Makwati and others (2004) have also noted that efforts should be made to make users aware of the existing information and analytical results at their disposal for use in development activities in their areas of operation and accountability. Information services refer to an organized way of providing services to clients demanding information for use. This basically is useful for increasing the level of demand for information use. In addition to this, information demand will be promoted if the commitment to evidence-based policy-making and administration can be increased, and if the capacity to analyze and use education management information for these purposes can be expanded (Ellison, 2004).

Hence, there is a general call to increase data use because increased demand is one of the success factors in efforts made to strengthen EMIS. In this case, a country's development plan ought to articulate the goals and needs that will serve as a guide to determine what data is needed. This objective can be advanced by studying the factors that have led to increased use and consumption of education data.

Generally, the development of EMIS involves nurturing a new management culture more than establishing a data and information system. The process of data collection, integration, analysis, and dissemination is important, but even more critically; it is the culture of data sharing, information use, and organizational management that leads to the effectiveness of the EMIS development (Hua and Herstein, 2003).

Once information produced and distributed, the products will be used or applied and then feedback can be collected. Feedback indicates how well the management information is accomplishing its intended purpose or objective. Like other educational system, an EMIS should provide feedback about its own efficiency and effectiveness.

Feedback is a learning process in which support organizations to learn their achievements and problems and this can leads them to make correction. Feedback also allows them to realize that others know and appreciate what they are doing, that there may be more innovative ideas that could support their effort to produce timely and accurate information for an overall educational development (Tegegn, 2003). Scott (1986) as well has mentioned that feedback entails assessments of how well the management information system has identified trends, monitored the environment, and accomplished its other tasks.

Feedback mechanism should be systematized and made a routine aspect of the management information systems control and management activities. It is possible to use routine feedback mechanisms such as evaluation forms, or group interviews, and create an environment in which users feel their voices are heard and taken into account. Also maintain the lines of communication with the information users so that there is some flexibility incorporating feedback. Additionally, invest in a service area that provides for support, system upgrades, access to user groups, etc.

2.3.6. Monitoring and Evaluation of EMIS

Systems of monitoring and evaluation is part and parcel of EMIS activities which exist to assess what works and what does not work, and to what extent it works or not. Monitoring and evaluation activities usually consist of a good set of well-developed indicators routinely produced by a small group of well-trained educational analysts. The function should be to assist policy makers in adjusting or re-adjusting the course of educational development and reform (Hue & Herstein, 2003). Monitoring, according to Red Cross (2002), is a continuing function that uses the systematic collection of data on specified indicators to inform management and the main stakeholders of the extent of progress and achievement of results in the use of allocated funds; Whereas Evaluation is the systematic and objective assessment of an on-going or completed operation, program or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, as well as efficiency, effectiveness, impact (overall Goal) and sustainability.

2.3.6.1. Monitoring of EMIS

Monitoring is a continuous internal management activity that helps to distinguish the achievement of intended goals and objectives within the given time and budget, provide regular feedback, and identify problems faced during implementation. Turcana (2006) in his study has noted that in practice majority of the monitoring effort is focused on the systematic checking of whether

activities listed in plans have indeed been undertaken or not. Therefore, through the program life time, regular monitoring should be conducted to check how the system is run.

From this point of view, monitoring is a process whereby the progress of activities is regularly and continuously observed and analyzed in order to ensure that the expected result is achieved. It is done by regular collection and analysis of information for checking the performance of the programme activities. It is usually done internally by those who are responsible for the execution of activities (programme managers) in order to assess whether and how inputs (resources) are being used; whether and how well planned activities are being carried out or completed; and whether outputs are being produced as planned.

According to Tegegn (2003), monitoring helps to review the original objectives based upon the checking of activities during implementation. Thus it demands a regular and systematic gathering and analysis of information on the implementation of EMIS activities. Moreover, monitoring is the collection of information in a systematic way which is carried out to know what has been done and in what way, what problems have been encountered during implementation and how we have tackled them, and what lessons or best practices can be learned for the future implementation, with the goal of improving the function of EMIS in today's changing environment.

In general, monitoring in EMIS helps to check the instruments of data collection are designed or reviewed with changes incorporated from last feedback information, pre-testing of instruments is done, instrument is published and the allocation to zones, districts and schools, and a follow up mechanisms is in place to monitor the returns. Furthermore, it checks the overall processes of data collection and the accuracy and validity of processed data. It is also important to delegate this function to district, and free them from all other routines. By doing so, the monitoring of survey instrument can be effectively done and reported to the district, who in turn reports to the province.

2.3.6.2. Evaluation of EMIS

Evaluation is basic for every activity/task, in which EMIS activities are no exception, that can be done internally in the form of self-evaluation, or externally or by professionals from the user community. The internal evaluation basically involves the questions like what to evaluate, for who is the evaluation done, when should evaluation be done, and how do we evaluate. However, the external evaluation done by other Ministries, Government agencies, or the donor community

provides with an outsider's view of EMIS functions in relation to other activities within and outside the MoE (Tegegn, 2003).

The results of any evaluation projects must help make decisions on the basis of available strategic options associated with uncertainties, imperfect information, and predicted values of consequences. It is essential that evaluation provide informative results that make the uncertainties more certain, the imperfect information more perfect, and the predicted values more accurate. An evaluation project that fails to design for such an objective or is unable to deliver the requisite information would be regarded as a project in vein.

The ultimate end of an EMIS is to produce relevant and timely information of good quality. Towards this end, in the words of Villanueva (2003), "an evaluation mechanism should be designed to identify the strengths and shortcomings encountered in the development and operation of the EMIS. The results of the evaluation process are the basis for the strengthening of the system (p.13)." Moreover, it should provide information that is credible and useful, enabling the incorporation of lessons into management decision-making.

2.4. The Practices of EMIS

At the broad policy framework level, it would appear that data/information plays a significant role in helping the government to develop strategies and also establish targets, including monitoring progress towards such targets. The data/information is processed and made ready for utilization by the help of organized EMIS system in education. However, there are problems experienced in different countries that impede the practice of EMIS in producing quality data.

Efforts to improve the quality of the data and information available, to describe education systems and support decision-making have been underway throughout the world, both developed and developing countries. Efforts to develop more comprehensive, integrated computer-based EMIS to support the monitoring and evaluation of education system performance and the crafting of effective education policies began in some countries as early as in the late 1980s and efforts to strengthen and extend all of these systems continued throughout the 1990s and into the new millennium (Cassidy, 2005). For instance, in Ghana, initial attempts at data collection helped support the formulation of the country's national education policy (Turcano, 2006).

More recently, attempts have been made to align the policy of decentralization with the collection, processing, analysis, and dissemination of education data at district level. Decentralization is pushing down of authority to lower level administrative units with full of accountability. In the context of EMIS management, as Tegegn (2003) described, decentralization means sharing authority, responsibility, accountability of data collection, processing, analysis, publication, distribution, reporting, and the dissemination of information to the lower level of administrative units within the MoE.

Decentralization allows to share the workload between the centre, provinces, districts, and schools, or lower down, to work together and solve problems together for common end. With this regard, Derebssa (1998) has confirmed that decentralization is designed to enhance responsibilities to the felt needs of people with a view to creating closer affinity to the client being served and promotes accountability, manageability and division of labor. Furthermore, the work of EMIS in a decentralized system has a lot of advantages like improve quality of data, provide better services for information users, reduce the burden of central EMIS, and others. To justify this, Villanueva (2003) has said that decentralization can speed up and improve the process, much more sensitive to local need, promoting participation by parents, professionals and other members of the community, much more flexible and can encourage local innovation and improve planning. However, for effective decentralization EMIS should need key elements like trained manpower, appropriate administrative structure, communication mechanism, sharing and delegating responsibilities, and basic facilities (infrastructure and equipment).

Carrazio and others (2003) have suggested that there is a slow functioning of the information system due to insufficient human, material and technological capacities in most countries. Sustainability of EMIS will greatly depend on the combined skills and dedication of staff trained under MIS and ICT training whose inputs will also greatly improve the capacity for data collection, dissemination and utilization. The need for material resources is as important as the need for human resources, at all levels. It is necessary to have the fundamental materials that facilitate the overall process of EMIS like computer. Apart from a well computerized, networked and internet connected system, it is also suggested that, other ways to access data should be made available. These include publications, newsletter/information booklets, popular versions on statistics books, as well as resource centers at national and regional levels (Trucano, 2006).

Rational allocation of budget to education at both regional and woreda levels entails the need for availability of reliable and up-to-date information on the education plans and their management. The acquisition of new technology, mailing data collection instruments to schools, and underlying research and survey to supplement statistical results are some aspects of budgetary requirement that are worth mentioning. Hence, finance is one of the biggest resources in education system that plays a significant role to perform the overall activities of EMIS and to train EMIS staff.

On the other hand training is one of the essential components of EMIS. Because the field of technology is changing fast and manpower turnover is high, training must be viewed as a continuous activity, and one that management needs to pay greater attention to. It is also an all rounded activity because the system is powered by each components working with the other in a changing environment to make the vision happen. Without efficient short- and long-term plans, it will difficult to cope with the changing environment and realize the vision and dreams of the EMIS centre and the MoE (Tegegn, 2003).

In this case, there are many countries made excessive efforts to construct, strengthen and administer EMIS and these could be taken as an example for other countries. What needs attention is, however, that the context in which EMIS operates will shape the type of problems experienced and actions taken? However, more important is how countries respond to such problems and what lessons can be gained from the comparative experience of these countries. Accordingly, the researcher tried to present the EMIS of Namibia (Viogts, 2006); Latin America and the Caribbean (Cassidy, 2005); Ghana, Mozambique, Bangladesh, and Nigeria (Trucano, 2006) whose experiences and initiatives could be taken as a good practice for EMIS management and planning in Ethiopia.

2.4.1. Good Practices/Lesson Learned

Despite the emphasis given to ensure the quality of data there are problems with the process of data collection, processing and analysis, dissemination of information, allocation of resource, user need identification, monitoring and evaluation, ICT infrastructure and commitment of stakeholders in Mozambique, Namibia, Latin America and Caribbean countries, Nigeria and Ghana. However, many of the problems could have been tried to give solution through the development and improvement of certain procedures or systems.

In Nigeria EMIS plays a minimal role in supporting planning at either the federal, state or local government levels due to lack of good intention of government and adequate base-line information.

The problem was solved by creating awareness about the importance of data in the planning process at local level, especially with regard to cooperation with local government and civil society. In line with this, structure was developed that would help coordinate planning, research and development as well as data collection, storage, analysis and distribution (Trucano, 2006).

A key element of the success of the Namibian EMIS was the support it received from several key decision-makers. Management support is essential in developing an EMIS. Senior decision-makers must feel a need for an EMIS, and they must be prepared to provide their support to create conducive environment for the development of an EMIS (Voigts, 2006).

Under the data collection process, as Trucano (2006) described, Bangladesh has a long successful history. Head teachers and the chain of school management committees are responsible for ensuring that returns are accurate. Subsequent levels of education system are also expected to check a sample of census forms in order to ensure consistency and validity. Moreover, we can learn from Latin America and the Caribbean how to collect and process data. To assure the smooth collection of reliable data and information from schools and regional and municipal authorities, one must involve these staff in development of the tools and processes of data collection, verification, and maintenance (Cassidy, 2005).

In Mozambique, Ghana, and Nigeria, the majority of technical problems associated with data collection appear to originate from the design of data collection instruments and the process associated with the implementation. Accordingly, the problem related to questionnaire was solved by using common definitions and terminology when designing questions for census and the involvement of district offices and schools in the development of questionnaires and the data collection process (Trucano, 2006). Voigts (2006) has also shown the restructuring process made for the collection and processing of educational information in Namibia. The reform involved how to manage data collection, analysis and dissemination so that demand responsive and user-friendly data/information could be produced.

In terms of planning and design, EMIS in Ghana helped to support the formulation of the country's national education policy and attempts have been made to align the policy of decentralization with the collection and analysis of education data at the district level. Within this process EMIS is being used to help construct their operational plans (Trucano, 2006).

We can easily understand that from the experiences of the countries in which they face multiple of problems in relation to lack of base line information, lack of commitment from those involved in the process, and the management of data collection, processing and analysis. Though, there are lesson learned from those countries. Efforts are paying attention on survey implementation to get sufficient base-line data and made awareness about the importance of data to involve stakeholders in the planning process. In addition, the data collection process should consider the involvement of schools and decentralized offices in which data collected through different approaches. Designing appropriate structure that facilitates data collection, storage, analysis and distribution is also another critical lesson.

An equally important part of managing EMIS concerns how the information is disseminated. Most countries have disseminated EMIS output to stakeholders by the help of central MoE, however, the formats and the media used varies from country to country. In this case, different experiences can be learned in relation to dissemination of information. According to Voigts (2006) in Namibia, for instance, effort made to produce two annual statistical reports and dissemination of information takes place in different forms like, booklet, presentation of posters and a slide show of graphics on computer, holding policy dialogue. Ghana also attempted to produce census data in an electronic format and distribute this to stakeholders. On the other hand, Mozambique designed multiple strategies to produce timely information in an analytical manner and made this available to various stakeholders on the web (Trucano, 2006).

In this point of view, dissemination of education statistics requires better strategy that ensures the needs of users. Statistics are required in different forms of presentation and different levels of aggregation to meet the needs of the users. It is also important to select the better format and media that is easily understandable by most of the users of information. Diverse presentations are thus required to ensure the utilization of statistics.

With regard to EMIS outputs, the Namibian EMIS Division has for a long time been a source of concern and frustration for the lack of utilization of education statistics. Concrete evidence of the utilization of statistics is difficult to obtain. However, educable efforts were made to increase utilization of outputs. Some of them are the consistent collection of education statistics in two annual surveys, the existence of a well-maintained database of educational data, the production of two annual statistical reports, the capacity to respond to ad-hoc requests for statistical information.

development of Geographic Information System and the dissemination of sufficient printed reports in different forms, and the capacity to conduct research and special surveys. These all strategies supplied to an increasing utilization of education data and other outputs of the EMIS at all levels of the education system in Namibia (Trucano, 2006).

In Nigeria also there is a problem of utilizing information. To address this gap, the country developed important operational strategies that are used to ensure better utilization of outputs and under the existing reforms attempts are being made by EMIS at the state level to focus on the operational needs of end-users, such as inspectorate services and personnel management. In Mozambique, EMIS utilization is greatly reduced by the lack of capacity to exploit it fully (Trucano, 2006).

Conversely, in Ghana there is a problem of linkage between data collection and utilization of information. One of the important message to emerge from the experience is the need to ensure close links between data collection and utilization, unless managers at the decentralized level can see the utility of data they are collecting, they are no likely to be committed to this process (Trucano, 2006).

The evidences from the above countries revealed that there is a need to pick up the utilization information by improving data collection instruments, develop the capacity of the EMIS unit to address the needs of the users, using better dissemination mechanisms, and improve the data quality. Moreover, there is a need to ensure close links between data collection and utilization, particularly at decentralized levels in order to see the utility of data they are collecting.

Experiences in the use of ICT infrastructure also varies from country to country. Trucano (2006) briefly explained that in Nigeria, for example, the development of IT networks and infrastructure surrounding EMIS can be viewed as an example of best practice and illustrate what approaches could be used by developing countries who are attempting technical reforms to their EMIS. A number of factors contribute towards the success of these reforms. Before the reform undertaken over the whole country, first, a small scale pilot was undertaken in one state to iron out initial difficulties and ensure that a suitable strategy was adopted for implementation. The strategy took into account the skill level of operators, the needs of stakeholders and the operating environment in which implementation took place. Before implementing the pilot, a needs analysis was undertaken

to identify the most appropriate architecture for the EMIS, resulting in the decision to develop a web-enabled system to collection, collation and reporting of school level data.

Ghana attempted to utilize N-tier based architectural framework in EMIS applications to develop various components. Each district would have the same data entry mechanisms that enable districts to input information and to automatically track progress towards defined targets at the district level. A template developed to facilitate data analysis and all district regional data bases would be connected to a web enabled system at head office. This would create a live system and information available on demand at all levels. Bangladesh, initially, relied on spreadsheets and relational databases for data entry and storage. With the spread of internet service provision, the different layers of education system are turning to web-based solutions for data entry and storage. This ensures that data can become easily accessible at all levels and cost effective. Mozambique as well, adopted a donor-supported minimalist approach to the development of statistical EMIS. The system is based on simple database software, spreadsheets and communication by email. This strategy can help to facilitates timely transfer of data; improve transparency; maintain specialized technical skills to operate hardware, software or communications; and costs to operate the system can be kept to a minimum (Trucano, 2006).

ICT infrastructure is a critical element to be considered in developing all kinds of strategy. As we observed from the experiences, the countries follow different ICT utilization mechanisms for the improvement of EMIS function. The selection of ICT infrastructure depends on the countries existing environment and level of ICT utilization. It is also important to consider financial and human resource to undertake the application of EMIS properly. ICT based EMIS is now almost a rule in planning, data collection, processing, analysis and dissemination for EMIS. Thus, using improved ICT as a key factor for improving EMIS process and outputs at all levels of education system is crucial.

Lack of capacity is a headache in most countries in the functioning of EMIS activities. To see the experiences of countries with regards to capacity building in EMIS some exemplary efforts could be raised. In Ghana, efforts were made to enhance the efficient and effective decision making at all levels of the education system. New institutional structure and a comprehensive package of capacity building activities were developed in the education system by the help of need analysis. After the identification of skill requirement attempts were made to build the capacity of some selected district

and regional offices. The selected cites would expect to receive the appropriate soft-ware and hardware training and various capacity building initiatives that enable them to take responsibility for the data collection and processing. Then, training was prepared on basic and intermediate computer skills training (basic IT skills), as well as how to undertake statistical analysis (Trucano, 2006). These results an improvement in data collection, processing and analysis at all levels of EMIS system. Although, in Namibia staff members mostly trained themselves in the use of software, staff attended courses in, for example, database administration (Voigts, 2006).

The evidence presented in this section shows that capacity building is a core for facilitating data collection and analysis, in general function of EMIS at all levels of the education system. As well the introduction of computerized administration in EMIS can create favorable condition and make to have the personnel better experience with computer systems and software. Thus, a fair amount of capacity building is important to enable the effective utilization of these systems.

2.4.2. Problems Impede the Practice of EMIS

The increasing demand for better data and information is a very promising development for EMIS. The need for data and information is indispensable to support decision making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. However, the use of EMIS to produce policy briefs, and use of EMIS data to support policy decisions remains limited due to different problems.

Authorities in the area, for instance, Tegegn (2003) clearly has put the challenges that impede the practice of EMIS are lack of users awareness, lack of necessary budget allotment, lack of self initiated learning, personnel shortage, overrating the capacity of EMIS, and lack of continuous training. On the other hand, Cassidy (2005) also has classified the problems into a range of organizational, human resource and technical questions and issues. Similarly, Kamar (2006) in his book has identified factors hampering effective management of information as unqualified man power, poor data quality, information illiteracy, poor ICT infrastructure, lack of national information policy, and poor remuneration for EMIS workers. In light of Hare (2007), the challenges that affect the practice of EMIS are lack of user ownership, inadequate or no training and support, lack of resources, unhelpful management attitude, requirements that change often, poorly developed and implemented system, and lack of depth in local IT industry and bureaucracy.

Hence, different authors in their studies identified the problems that affect the practice of EMIS were in different ways. However, many of the challenges listed below are already being addressed, or at least discussed by most of them.

a) Lack of awareness- Enhance the level of user awareness on information among planners, decision-makers, researchers, experts, and administrators is an important issue in EMIS, however, users have still limited knowledge about the importance of information. In this regard, Tegegn (2005) has never covered the problem of awareness on using information. He makes clear that worldwide, governments and international agencies have channeled big investments towards building information systems in government Ministries and departments. Although substantive work has been done, there is a long way to go when it comes to the level of awareness on the use of education statistics in decision making in Sub-Saharan Africa. Thus, having users' inadequate awareness about information hampered education system in general.

b) Lack of budget allotment-To enable and build an effective EMIS system and capacity, and to create a strong demand for using EMIS data and information, organizational capacity must be strengthened, specifically the capacities of budgeting. To justify this, Cassidy (2005) has said that a lot of money, time and other resources have been invested in efforts to improve data quality, to computerize many administrative and management functions, to build EMIS and to encourage more data-driven decision making. In line with this, Tegegn (2003) also has suggested that the willingness to allocate necessary budget for developing EMIS within the MoE is one of the measures or indicators of the level of commitment. Nevertheless, if there is insufficient financial investments to EMIS affect the supply of quality, reliable and timely information for decision making.

c) Unqualified and untrained manpower - According to Kroenke (1994), the key MIS knowledge is not the technology itself but instead knowing how to use technology in creating information systems that satisfy business needs and goals. Thus, considerable knowledge and skills are required to build, maintain and use an EMIS. A lack of available human resource capacity significantly limits EMIS development. According to Cassidy (2005), several categories of knowledge and skills are often referenced as deficient: (i) knowledge and skills to lead and manage EMIS development; (ii) knowledge and skills to use technology; and (iii) knowledge and skills to use data effectively for decision making, policy analysis, planning. So that, building human resource capacity has long been known to a critical factor in the success of EMIS development.

In light of fast-changing technology and the very professional nature of the EMIS work, all EMIS staff has to work in an environment of continuous learning (training), and implement the knowledge gained through time. Thus, capacity building is to enable individuals and organizations to perform appropriate and sustainable functions as required by the system(s) they happen to be working in. Ability to perform core functions of EMIS, design methods, defining objectives, managing efficiently and understanding challenges of development needs is crucial.

d) Lack of national information policy- Ideally the design and establishment of an EMIS should be preceded by appropriate policy development legislation and relevant administrative decisions. Shifts in civil society's expectations in terms of access to information, transparency in data use, accountability standards for public officials, and the protection of the privacy rights of individuals, challenges those responsible for EMIS development in other ways. As the information environment becomes more complex, the development of clear policies and clear operational guidelines and mechanisms governing the collection, management, access, dissemination and use of education data and information that are consistent with existing legal and regulatory statues become critically important in such an environment.

e) Poor ICT infrastructure - ICT infrastructure refers to hard ware, soft ware and network-connectivity. It is used not only to support 'learning about ICT', but also to support 'learning with ICT' and "learning through ICT' (Pelgrum & Law, 2003). Thus, the availability and quality of these infrastructures affect information management. The recent rapid emergence of Information and Communications Technologies (ICT), most notably of the Internet, around the world has given rise, once again, to great expectations for the improvement of education data and information through technology. ICT-based EMIS is now almost the norm in planning for EMIS and most EMIS initiatives include plans to use the ICT for some forms of data collection, dissemination and utilization. The potential of the ICT is undeniably significant. Indeed the utility of the ICT for improving data collection and, more importantly, data and information dissemination have already been demonstrated. However, the technology will not compensate for a lack of adequate user skills and knowledge or ineffective organizational processes.

2.5. EMIS in Ethiopia

Education provides a fundamental base for all further human development and its availability and quality are central to the human resource development of any society. The aim of extending a basic level of education to all children, young people and adults around the world has captured the

nation of all nations. Accordingly, the Ethiopian Government has long recognized that the ızation of basic education is both a necessity and a fundamental human right. Commendable fort has been made to improve the quality, equity and efficiency of the system at all levels. The strength of any educational system and its quality, however, largely depends on the quality of educational statistics. Quality educational statistics is the most important resource in the education system. Therefore, the practice of keeping statistical information in Ethiopia has been traced back as far as the sixteen century.

According to available documents the need for systematic statistical information that could be used for economic management was recognized as a priority in 1957 and in 1960 compiling statistical information became a regular government activity. First the collection of statistics was under the responsibility of Ministry of Commerce, Industry and Tourism and in 1963 the function assigned to CSO, which was an autonomous unit under the Ministry of Planning and Development. In 1972 the CSO was recognized in proclamation 303/1972 and in 1989 restructuring was made. In the restructuring period the name CSO was changed in to Central Statistics Agency (CSA) that was directly responsible to the council of Ministers. The CSA was positioned its function under the Ministry of Economic Development and Cooperation in 1996 and finally placed to its present position, the Ministry of Finance and Economic Development in 2001 (Mengistu, 2010).

Statistical Abstract is expected to serve as a convenient statistical reference and a guide to other statistical publication. Since 1963, the Statistical Abstract published to present a summary of statistical information on the social and economic conditions of the country. Moreover, until 1991, data and information was centrally processed and disseminated.

In September 1994, in its "Education Sector Strategy," the Transitional Government of Ethiopia (TGE) announced a dramatic break from the legacy of centralized education. So, since 1994 Ethiopia has embarked on a decentralization process. Decentralization has opened the way for regional and local governments, and through them, local communities to take greater responsibility for managing their own affairs, including the delivery of social services (TGE, 1992). At the same time, the decentralization system in Ethiopia has created favorable condition for EMIS process at all levels of education system.

One of the major justification for decentralization of data use is to narrow the diversity within the groups for whom educational decisions and plans must be made. In decentralized system, the work

of EMIS attracts more attention and the quality of data collected is improved. Besides, province and woredas will provide better service for information users as well as reduce the burden of central EMIS.

In the federal level, EMIS is working as one of the functions of the ESDP planning and policy analysis department. Here, the EMIS center of the MoE has a responsibility for planning, policy development, develop standard questionnaires, preparing annual statistics, and collecting demand from users of educational statistics (MoE, 1998). According to Tegegn (2003), central EMIS is expected to provide special assistance to EMIS personnel at province, districts and schools. Being the major source of educational information, schools need more input regarding training, the improvement of the records management system, and awareness of the use of such information for planning and decision-making purposes.

Similarly, EMIS is structured as a function under the planning and programming service in the regional education bureaus. In the region, a department was created who responsible for EMIS; that is, the Planning and Education management Information System division. This body is concerned for the preparation of annual abstract in the region. The data collected through statistical format are aggregated by the education management information unit to produce the annual education statistical abstract. The abstract is prepared as a source for educational planners and policy makers. The abstract contains regional data on performance of the educational system relating to pre-primary, primary, secondary, and technical and vocational schools.

CHAPTER THREE

3. Research Design and Methodology

This part of the report presents the research design and methodology employed accordingly the method of research, source of data, sample size and sampling techniques used, data gathering tools, procedures of data collection and method of data analysis are entertained.

3.1. Method of the Study

To assess the practice and problems of EMIS in Tigray Region, the descriptive survey research design was employed. This research method was selected because it helps to gather a large variety of data related to a problem under the study. In relation to this, Seyoum and Ayalew (1989) stated that the descriptive survey method of research is more appropriate to gather several kinds of data of such a broad size rather than case study (which is in-depth study) and comparative study. Moreover, the method also helps to provide adequate information that enables the researcher to suggest some valuable alternatives. Supporting this, Keeves (1990) has pointed out that descriptive method of research is a fact finding study with adequate and accurate interpretation of the findings. It was therefore felt that the appropriate research type to carry out this investigation is descriptive survey, as the major intent of this study is describing and interpreting the existing problems like poor design of data collection format, unorganized data base system, low utilization of educational information, low data availability to users especially qualitative one, absence of clear information policy, insufficient financial investment to EMIS and low technical capacity of EMIS staff, and poor ICT infrastructure at all levels of the education system regarding the practice of EMIS.

3.2. Sources of Data

Both primary and secondary data sources were employed in the study. The primary data were obtained from TEB head, TEB EMIS unit, teachers' development and educational managers' process owner, WEO statistician and developmental planning coordinator, TFEDB, REST, BESO project, primary and secondary schools principals and record officers and PTA representatives. The selection of these people as a source of data was based on the expectation that had better information and experiences in relation to the study topic. Secondary data were gathered from documents like the Education Statistics Annual Abstracts published by Tigray region, annual education census questionnaire, reports, policy documents and other related materials were reviewed to obtain additional information.

3.3 Sample Size and Sampling Techniques

According to Tigray Education Bureau Annual Abstract (2008), there are seven zones and 46 woredas in Tigray region. Within these woredas there are 1710 primary and 71 secondary government schools. Accordingly, the study population was TEB EMIS staff, 46 WEO statisticians, 1781 school principals and 1345 Record officers. In order to collect relevant information from an appropriate source, the sample populations incorporated in the study were five TEB EMIS staff and one TEB head, 30 WEO staff and ten WEO heads, 90 school principals and Record officers. In addition to this, the study was also incorporated one TFEDB head, six WFEDO and REST and BESO project education coordinators working in collaboration with TEB.

The researcher was identified the study woredas from the rest woredas of the region by stratified random sampling method. Initially, the 46 woredas were categorized in to three cluster woredas according to their geographical location; thus, location was used as a base for stratification. Therefore, the three clusters were Southern, Central and Western Tigray. With the intention of selecting samples from town and rural woredas, each cluster was stratified as Town and Rural Woredas according to their administration. For this reason, stratification is an appropriate technique to increase representation of town and rural woredas. After that, Weqro and Mychew from town, Ofla, Enderta and Alemata from rural of southern cluster of Tigray woredas; Adigrat and Axum from town, Hawzen, Ahferom and Weri-leke from rural of central cluster of Tigray woredas; and Shire-Endaslasie and Humera from town, Tselemti, Asgede Tsimbla and Medebay Zana from rural of western cluster of Tigray woredas were selected by using simple random sampling method. In this case, 15 woredas (32.6%) were used as a sample population from the total woredas in the region. From each sampled woredas, two primary schools and one secondary school were selected using simple random sampling technique because it provides equal chance of being selected.

Consequently to select the sample schools, principals and record officers, woreda education experts and regional respondents the following sampling procedures were employed. Out of the 1710 primary and 71 secondary schools, 60 primary and 30 secondary schools (two primaries and one secondary from each sample woredas) were selected from both urban and rural sample woredas by using lottery method. To select school principals and record officers purposive sampling technique was employed; this can allows obtaining information from those who are worried in the information management system.

As well, purposive sampling technique was used to select one head of Region Education Bureau and ten heads of Woreda Education Office, 7 heads of Finance and Economic Development at regional and woreda level, and 5 EMIS staff at regional level and 30 WEO statistician and developmental planning experts because those included in the study must be from those who have understanding of the subject understudy. Ten PTA members of the interviewed woredas were participated in the focus group discussion. The FGD was organized for participate a total number of 7-10 members from PTA representatives, principals and record officers. Availability sampling technique was used to select REST and BESO project from the region NGOs. The distribution of the respondents was shown as follows.

Table1. Sample Woredas, Schools and Respondents

No	*Sample Woredas*	*No. of schools*	*Respondents*										
			Questionnaire			*Interview*						*FGD*	*Total*
			TEB	*WEO*	*SC*	*TEB*	*WEO*	*TFEDB*	*WFEDO*	*NGO*	*SC*		
1	Weqro	3	-	2	4	-	1	-	-	-	-	-	07
2	Mychew	3	-	2	8	-	1	-	-	-	-	-	11
3	Ofla	3	-	2	6	-	-	-	-	-	-	-	08
4	Enderta	3	-	2	4	-	-	-	-	-	-	-	06
5	Alemata	3	-	2	8	-	-	-	-	-	-	-	10
6	Adigrat	3	-	2	8	-	1	-	1	-	1	-	13
7	Axum	3	-	2	6	-	1	-	1	-	1	5	16
8	Hawzen	3	-	2	6	-	-	-	-	-	-	-	08
9	Ahferom	3	-	2	6	-	1	-	1	-	-	-	10
10	Weri-Leke	3	-	2	4	-	1	-	-	-	-	-	07
11	Shire-Endaslasie	3	-	2	6	-	1	-	1	-	1	5	16
12	Humera	3	-	2	4	-	-	-	-	-	-	-	06
13	Medebay Zana	3	-	2	8	-	1	-	1	-	-	-	12
14	Asgede Tsimbla	3	-	2	6	-	1	-	1	-	1	-	11
15	Tselemti	3	-	2	6	-	1	-	-	-	-	-	09
	Total	45	05	30	90	01	10	01	06	02	04	10	159

NB- Total refers to individual respondents including those from TEB

3.4. Data Gathering Tools

In this study different kinds of data collection tools were used to obtain accurate information as much as possible. The main instruments of data collection namely questionnaire, semi-structure interview, and FGD and documents analysis were employed to collect sufficient information for the study.

Questionnaire

A set of close-ended with few open-ended items questionnaire was prepared. This is because questionnaire is not only better to secure factual information about opinions and views but also serve as an appropriate instrument to obtain a variety of opinions within a relatively short period of time. In this regard, Kaul (1996) suggested that questionnaire is widely used in educational research to obtain information about certain conditions and practices and to inquire into opinions and attitudes of individuals or group. The questionnaire was focused on the design of data collection questionnaire, the users and availability of educational data, quality of information, EMIS functions, and utilization of EMIS outputs, problems of EMIS and capacity building and organizational development to improve EMIS. Two types of questionnaires were administered to collect data from principals and record officers at school level and experts and officials at education office level.

Interview

Semi-structured interview was employed as an instrument to gather more detailed and factual information from heads of TEB, TFEDB, WEO, WFEDO and NGO representatives for the study. The semi-structured interview was tried to address key issues like educational information users, EMIS output functions, capacity building and organizational development, data quality and major problems encountered the practice of EMIS. The information obtained using semi-structured interview was used to substantiate the EMIS unit response collected through questionnaire.

Focus Group Discussion

Discussion was arranged with PTA representatives, principal and record officer (7 members) in two schools of central and western cluster to identify some common features and problems they have in common. It was used to collect detail information on the extent of data quality, utilization of information and problems of information system.

Document analysis

To enrich data obtained through questionnaire and interviews, and to solicit additional information published and unpublished documents like annual report, educational annual abstracts, policy documents, etc were analyzed by the researcher. This is because analysis of the content of records, documents and other printed materials constitute the second use of survey to collect facts for a research study (Kamar, 2005).

3.5. Procedures of Data Collection

The following procedures of data collection were used in assessing the practice and problems of EMIS in Tigray Region. First, questionnaire and semi-structure interview were prepared in English. After the preparation of the questionnaire, it was commented by adviser and based on comments related to inappropriateness, irrelevance, vagueness and bias correction was made. Then, the questionnaire was translated into Tigrigna for schools principals and record officers but used as it is for education office respondents. At the same time, the interview questions were also translated into Tigrigna. This helps to avoid communication barrier on one hand, and to make the respondents freely and confidentially react to the questions on the other hand. Following this, letter of permission was obtained from AAU, Tigray region education bureau and sample woredas to get access to all necessary information sources.

However, before administering the instruments of the data collection, it is important to standardize the tools as it gives the chance to comment on and check its clarity. Accordingly, the instruments prepared were pilot tested in Adwa town woreda education office, Queen-Sheba secondary school and Adwa primary school which were not included in the sample study. To do this, the two types of draft instruments were distributed to six WEO statisticians, developmental planning coordinator and other experts in one group and 8 school principals, vice-principals and record officers on the other group by giving orientation about the purpose of the pilot test. The pilot test was conducted to test the validity and reliability of the instruments. In other words, the pre-test was done with the objective of checking whether or not the items contained in the instruments could enable the researcher to gather relevant information. To maintain the reliability of the instruments, the Guttmann Split-half method was employed. Thus, the result of the reliability was 0.895 for questionnaire distributed to WEO statistician, developmental planning coordinator and other experts and 0.943 for questionnaire distributed to principals, vice-principals and record officers. This shows that the instruments were reliable since numbers (reliability test results) near to one are generally considered as more reliable. To this end, though the reliability estimate results vary to some degree, all results confirmed that the instrument were highly reliable.

Finally, orientation was given for the respondents on the questionnaires to make clear the contents of the questionnaire and objectives of the study. The questionnaires were distributed to the final sample respondents of the study; semi-structured interview was conducted with education and other sector personnel, and FGD was made with PTA representatives, principals and vice-principals.

Moreover, necessary documents were analyzed seriously. The researcher hired two assistant data collectors for data gathered through questionnaire because the sample woredas were geographically apart from one another and was not be managed only by the researcher within the time available.

3.6. Methods of Data Analysis

The data gathered through questionnaire, interview, FGD and document analysis were structured, organized, and framed to make easy for analysis and inferences. The majority of the questions in the questionnaire were likert like items measuring attitude based on a scale from "fully available(5)" to "not available(1)", "strongly agree (5)" to "strongly disagree(1)", "very high(5)"to "very low(1), "always (5)" to "never(1)", , "very serous(5)" to "not a problem(1)". The response groups on attitude scales having five levels (5 to 1) were converted to below average (less than 2.5), average (2.5-3.5), and above average (grater than 3.5) which made the analysis and interpretation easier, increase the confidence level of the analyst and avoid unnecessary difficulty. In order to acquire detailed information, the data collected through questionnaire were organized in tables and figures and the data obtained from interview, open-ended questions, and FGD and document analysis were analyzed in narration under each category in the tables that relevant to the issue. Both quantitative and qualitative methods of data analysis were employed.

To analyze and interpret data, relevant statistical tools such as percentage and frequency distribution, mean, grand mean, standard deviation and chi-square test were employed. Percentage and frequency distribution was used to compare the proportion of those groups of respondents on a matter. Mean and grand mean were computed to find out the average values against each item for both groups of respondents to support results of analysis. Chi-square was used to find whether there exists a significance difference between two groups (school and education office) of respondents as per the basic questions which were raised and to reach an acceptable conclusion regarding both the extent of the association's contributions as well as the possible causes of the problems. Finally, on the basis of the analysis conclusion was made and recommendations were forwarded.

CHAPTER FOUR

4. DATA PRESENTATION, ANALYSIS, AND INTERPRETATION

This part of the study deals with the presentation and analysis of data obtained from the sample population through questionnaire, interviews, FGD, and document analysis. Questionnaires were used to obtain data from school record officers, school principals, WEO statisticians and planners, and TEB EMIS staff. About 125 questionnaires were distributed to the respondents, out of which 113 (90.40 percent) were properly filled and returned. From this, 5 (4 percent) were REB respondents, 30 (24 percent) were WEO statisticians and planners, and 78 (62.4 percent) were school respondents.

Interview was held with one TEB process owner, one TFEDB, one REST head and one BESO project education coordinator, five WFEDO heads and ten WEO heads. FGD was conducted with four school principals. Moreover documents were also analyzed. The result obtained from the interview, FGD and document analysis were used to substantiate the data gathered through questionnaire.

The major categories of respondents group involved in this study were two, namely; experts, EMIS staff and officials working at education offices and principals and record officers working at school level. Except few questions specific to their respondents, majority of the questions were common to both types of groups. Most of the data gathered were organized using tables followed by discussions. For the sake of convenience, clarity and comparison related question were treated together. The presentation and analysis of the data begins with background characteristics of the respondents.

4.1. Characteristics of the Respondents

Before, discussing the data related to the major questions, a summary of characteristics of the respondents was presented below. Description of the characteristics of the target population gives some basic information about sex, age, educational qualification, subject of specialization job experience, and training received relevant to their post of the sample population involved in the study. Thus, the following tables contains about the general characteristics of respondents involved in the study.

Table 2: Sex and Age Report of the Respondents

No	Items		Respondents									
			Schools				Education Offices				Total	
			Primary N=48		Secondary N=30		WEO N=30		TEB N=5			
			No	%	No	%	No	%	No	%	No	%
1	Sex	Male	37	77.08	25	83.33	20	66.7	5	100.0	87	76.99
		Female	11	22.92	5	16.67	10	33.3	-	-	26	23.01
		Total	48	100.0	30	100.0	30	100.0	5	100.0	113	100.0
2	Age	25 and less	5	10.42	2	6.67	5	16.67	-	-	12	10.62
		26-35	21	43.75	17	56.66	17	56.66	5	100.0	60	53.10
		36-45	18	37.50	6	20.00	5	16.67	-	-	29	25.66
		Above 45	4	8.33	5	16.67	3	10.00	-	-	12	10.62
		Total	48	100.0	30	100.0	30	100.0	5	100.0	113	100.0

N= Number of Respondents

As depicted in Table 2, from the total 113 respondents, 87 (76.99%) of them were males and 26 (23.01%) were females. This shows that there is greater difference in sexual category between male and female respondents in all groups and this wide gap probably indicated that the participation of females in different leadership and decision making positions of EMIS is under the expected. This discrepancy might have occurred due to several cultural and social impositions levered on them. Hence, considerable attention should be given to bringing up females to higher leadership and decision making positions.

With regard to Age, item 2 of Table 2, 12 (10.62%) of respondents were in the age ranges 25 and below. About 60 (53.1%) of the respondents were in the age ranges between 26 to 35 years. Like wise, 29 (25.66%) and 12 (10.62%) of the respondents were included in age ranges 36 - 45 and above 45 years old respectively. From the above explanation, it is possible to conclude that the greater part of those who are involved in EMIS activities were at the active working age group and have better understanding of EMIS.

Required educational level, subject specialization and experience of personnel are important factors for the successful implementation of EMIS activities at different levels of the education system. Because, EMIS tasks should needs a better knowledge and experience in data completion, data entry and processing, data analysis and interpretation, reporting, publication and dissemination of educational data. Therefore, the personnel assigned to EMIS at different levels of the system should be qualified, competent and well experienced.

Table 3– Distribution of Respondents by Educational Level, Subject of Specialization and Experience

Item			Respondents									
			School				Education Offices				Total	
			Record office N=11		Principals N=67		WEO Experts N=30		TEB Officials N=5			
			f	%	f	%	f	%	f	%	f	%
Educational level	TTI		4	36.36	1	1.49	-	-	-	-	5	4.42
	Diploma		7	63.64	23	34.33	8	26.67	-	-	38	33.63
	1st Degree		-	-	42	62.69	22	73.33	3	60.0	67	59.29
	2nd Degree		-	-	1	1.49	-	-	2	40.0	3	2.66
	Total		11	100.0	67	100.0	30	100.0	5	100.0	113	100.0
Subject of specialization	Computer science		-	-	-	-	3	10.0	-	-	3	2.66
	Inf. technology		-	-	-	-	6	20.0	-	-	6	5.31
	EDPM		3	27.27	16	23.88	11	36.67	1	20.0	31	27.43
	Mathematics and Physics		-	-	9	13.43	4	13.33	-	-	13	11.50
	Others		8	72.73	42	62.69	6	20.0	4	80.0	60	53.10
	Total		11	100.0	67	100.0	30	100.0	5	100.0	113	100.0
Job experience	In current position	< 3 years	6	54.55	30	44.78	21	70.0	4	80.0	61	53.98
		3-5 years	2	18.18	14	20.89	8	26.67	1	20.0	25	22.13
		5 years	3	27.27	23	34.33	1	3.33	-	-	27	23.89
		Total	11	100.0	67	100.0	30	100.0	5	100.0	113	100.0
	Total service	< 6 years	2	18.18	6	8.95	9	30.0	-	-	17	15.05
		6-15 years	7	63.64	31	46.27	9	30.0	-	-	47	41.59
		15 years	2	18.18	30	44.78	12	40.0	5	100.0	49	43.36
		Total	11	100.0	67	100.0	30	100.0	5	100.0	113	100.0

Note: N= number of Respondents F= frequency

Educational level wise, as indicated in item 1 of Table 3, all of the regional EMIS officials earned 1st Degree and above and 22 (73.3%) and 8 (26.7%) of the woreda education office experts hold 1st degree and diploma respectively. Of the principal respondents, 43 (64.18%) of them have completed undergraduate and postgraduate studies, one (1.49%) of them TTI certificate and 23 (34.33%) of them were diploma holders. This implies that in the region there was a better tendency in satisfying the needed educational level for the regional EMIS official, woreda expert and school principal ship positions. In relation to this, 7 (63.64%) of the school record officer respondents hold diploma and 4 (36.34%) of them hold TTI certificate. It is obvious that record officers should have a college diploma to perform their tasks properly. From this one can conclude that the qualification of record officers could be considered sufficient.

As the data clearly depicted, the education level of record officers, school principals and EMIS officials at woreda and region level seems satisfactory. Therefore, the region should further strengthen the assignment of qualified personnel to improve the quality of educational data/information.

With regard to the subject of specialization, the researcher had tried to list down some alternative fields of study related to EMIS activities. Accordingly, out of 11 record officers 3 (27.27%), 67 school principals 25 (37.31%), 30 WEO experts 24 (80%), and 5 TEB EMIS staff 1 (20%) were qualified with fields like Computer Science, Information Technology, EDPM, Mathematics, and Physics that were assumed to be relevant to the requirement of EMIS task. More than 53% of the respondents were qualified with other fields. According to the data, majority of the principals and record officers at school level and EMIS staffs at the regional level were working with out having the necessary knowledge and skill for the held positions. This implies that the assignment of personnel in EMIS position did not consider field of study. This in turn may affect the practice of information management which led to poor quality data/information production. However, as the data described, the majority assigned WEO experts (80%) have relevant field of study that encouraged them to do the tasks of EMIS efficiently.

Therefore, in order to fill the gap there is a need to assign people to where their skill and knowledge is required. Because matching educational level and qualification with the task requirement should be the prior consideration in selection and recruitment of employees.

Work related experience and total years of service has its own constructive contribution to perform any task effectively. This is also true for EMIS activities. According to the response of the respondents, 61 (53.98%) have less than three years of service in their current post, where as, 25 (22.13%) and 27 (23.89%) of all respondents were in the service category of 3-5 years of service and above 5 years of service in their current position respectively. In this case, most of the respondents have minimum work experience and this implies that majority of the personnel working in EMIS activities had no adequate experiences.

Moreover, the result of interview from education bureau reveled that the reason for dominating non-experienced personnel at all levels of the education system was due to the implementation of BPR in the region and transfer and turnover of experienced personnel. However, 96 (84.95%) of the respondents had more than 6 total years of service and this can help them to acquire more experiences.

Therefore, in order to improve the practice of EMIS activities at schools and different levels of the education system and facilitate the development of EMIS, the region education bureau should need up dating the personnel for the post through different capacity building mechanisms.

With regard to training, an open ended question was forwarded to sample respondents to identify areas of training they took. Accordingly, the sample respondents of the school and education office reveled that, except very few principals, WEO experts and regional EMIS staff, most of them did not get the needed training which is relevant to their post. Those who received the training were limited on planning and budgeting, monitoring and evaluation, and reporting for regional EMIS staff, how to fill EMIS and PMIS software for WEO statistician and experts and how to fill the questionnaires and planning for school principals. No respondent had got training on documentation, management of information, how to fill data collection questionnaire, basic computer skill, data analysis and interpretation, publication and dissemination of information.

For each level and for each task, it is fundamental to have qualified and trained staff to rely on. Education managers should be convinced of the qualification requirement for all the people working for EMIS at all levels and should decided to give continuous training. Tegegn (2003) has supported this idea as training is one of the essential components of EMIS. Because the field of technology is changing fast and manpower turnover is high, training must be viewed as a continuous activity, and one that management needs to pay greater attention to.

To sum up, the personnel characteristics analysis confirmed that the respondents have had enough education level for the position they hold, however, they were not equipped with specialization of the subject matter, relevant experience, and training to carry out the over all activities of EMIS. Therefore, in order to improve the practice of EMIS activities at different levels of the education system, there is a need to give different capacity buildings for EMIS personnel to satisfy the necessary skill and knowledge and this enable them to perform their duties properly.

4.2. Analysis of the Data on the Practice and Problems of Education Management Information System (EMIS)

At the broad policy framework level, it would appear that data/information plays a significant role in helping the government to develop strategies and also establish targets, including monitoring progress towards such targets. It is clear that without data/information, no system can function rationally, and consequently no operational decision can be taken. This data/information is processed and made ready for utilization by the help of organized EMIS system in education. So, EMIS has its own immensity share on improving data/information quality. Therefore, the whole

part of the next analysis deals with the practice of EMIS in Tigray region, particularly about availability of data, function, utilization, barriers, capacity building, and problems.

4.2.1. Design of Data Collection Questionnaire

Data collection questionnaire is an instrument or tool used to collect information from different levels of the education system. The questionnaire should fulfill the needed design because the design of its format determines the kind and quality of data, and contributes a lot to the smooth flow of EMIS activities.

Hence, school and education office respondents were requested to rate their opinion about the design of data collection questionnaires and formats. The scales are defined as: strongly agree(5), agree(4), medium(3), disagree(2), and strongly disagree(1). To give final conclusion to the requirements of the questionnaire, responses under 'strongly agree and agree' were used as highly fulfilled, 'medium' as average level of fulfillment and the rest two 'disagree' and 'strongly disagree' as unfulfilled requirement.

Table 4: A Chi-square Test about the Views of Respondents on the Design of Data Collection Questionnaire

Requirements of the questionnaire	Respondents	Response rating scale of Respondents										$\bar{X}$	χ^2
		SA		A		MA		DA		SDA			
		f	%	f	%	f	%	f	%	f	%		
Keep data disaggregated at an appropriate level	Sc	33	42.3	34	43.6	9	11.5	2	2.6	-	-	4.09	9.54
	EO	7	20.0	15	42.9	10	28.6	3	8.6	-	-		
Common definitions and terminologies are used	Sc	2	2.6	8	10.3	26	33.3	20	25.6	22	28.2	2.29	1.642
	EO	-	-	2	5.7	13	37.1	10	28.6	10	28.6		
Provided choices are mutually exclusive	Sc	1	1.3	10	12.8	23	29.5	26	33.3	18	23.1	2.36	1.191
	EO	-	-	5	14.3	12	34.3	9	25.7	9	25.7		
The form has clear physical lay out	Sc	31	39.7	27	34.6	15	19.2	3	3.8	2	2.6	4.04	5.691
	EO	9	25.7	13	37.1	11	31.4	1	2.9	1	2.9		
The design matches with school record keeping	Sc	2	2.6	10	12.8	24	30.8	21	26.9	21	26.9	2.35	1.614
	EO	-	-	3	8.6	13	37.1	10	28.6	9	25.7		
Permit subsequent statistical analysis of data for reliability and validity	Sc	22	28.2	31	39.7	14	17.9	10	12.8	1	1.3	3.86	5.333
	EO	10	28.6	16	45.7	8	22.9	-	-	1	2.9		

Note: Sc= schools, EO= Education Offices

At first glance at Table 4, one could observe that the data collection questionnaire has clear physical lay out, data disaggregated at an appropriate level and permits subsequent statistical analysis of data at all levels of the organizations. The majority of respondents, fairly more than 67 percent of school and 62 percent education office respondents replied that the data collection questionnaire used by

the organizations was highly fulfilled its physical lay out, appropriateness of data and statistical analysis of data requirements. To give emphasis, Jenkins (1997) has noted that poor physical layout, lack of question pre-testing and failure to use technology are deficits in data collection instrument.

The use of common definitions and terminology, providing mutually exclusive choices in data collection questionnaire and matching the design of school record keeping with the questionnaire were felt as negative response in all groups of the respondents. For that reason, in relation to the provision of mutually exclusive choices in data collection questionnaire by 56.4% of school and 51.4% of education office respondents; the use of common definitions and terminology by 53.8% of school and 57.2% of education office respondents; and matching the design of school record keeping with the questionnaire by 53.8% of school and 54.3% of education office respondents were rated below average (M=2.29-2.36). This implies that the questionnaire was not fulfilling the necessary requirements of a format used to collect educational data/information.

A chi-square test result, moreover, shows that there is ground ($p<0.05$) to reject the null hypothesis or existence of statistically significant difference among the levels. This result has an implication that the groups of respondents have similar attitude towards the design of data collection questionnaire, hence the population from which the samples were taken.

On the other hand, an interview was made with developmental planning experts of the woreda education office. According to their response, schools and woreda education offices were only restricted to use the data collection questionnaire send by the REB. They do not have any share to change and redesign the questionnaire according to their situation. However, the result of interview from education bureau revealed that there is a probability to adopt the questionnaire according the context of the region.

Moreover, the respondents of schools, in the open-ended question, were asked to describe any comment on the data collection questionnaire. Thus, they replied that the questionnaire was vulnerable for different problems like mismatch the design of questionnaires send by WEO and TEB, not consider the interest of the clients, lack of sufficient space to explain data qualitatively, consider the format on specific issues only, etc. To support these findings, Hua and Herstein (2003) have pointed out that the questions, lay out, and syntax should be well formulated together with users and producers.

In general, the data collection questionnaire of the region was poor in many of its characteristics in achieving the expected purposes. Hence, there is a need to pay more attention on the design of data collection questionnaires.

4.2.2. The Users and Availability of Educational Information

The main objective of an EMIS is to integrate information related to the management of educational activities, and to make it available in comprehensive yet succinct ways to variety of users. The most direct operational application of EMIS is to support ongoing management, planning, and monitoring and Evaluation activities of the education system. In this case, the different levels of the education system are expected to collect and make available data/information.

According to Chapman and Mahlck (1993), improving the information available to decision-makers was identified as a key element in improving educational management and, in turn the efficiency of education system. Thus, the availability of data/information needs special consideration at all levels of EMIS. With this argument, it is anticipated that there should not exist major difference between EMIS levels in having key education indicators. Therefore, this part looks at educational indicators available at school and education office.

To extract the opinion of respondents about the availability of educational data/information, assumed educational indicators were presented to respondents in a likert type scale to be rated as; fully available (5), mostly available (4), partially available (3), rarely available (2) and not available (1). For simplicity of the analysis the mean scores were interpreted as; less than 2.5= rarely available, 2.5-3.5= partially available, and greater than 3.5= sufficiently available.

According to the response of respondents illustrated in Table 5, educational data/information on teachers' transfer/turnover, teachers guide by grade/subject, and teachers' educational materials and facilities have grand mean ranging from 2.66 – 2.76. This shows that the data identified above were partially available.

Table 5: Respondents Views on the Availability of Data/Information

Data/Information	Score of Respondents				
	School N=78		Education Offices N=35		GM
	$\bar{X}$	SD	$\bar{X}$	SD	
Students enrolment related data	4.34	.763	4.58	.710	4.46
Wastage ratio	4.15	.841	4.12	1.009	4.13
Students promotion/graduation/transition rates	4.33	.892	4.06	.938	4.20
Disabled students	2.33	1.170	2.26	.919	2.30
Teachers number by sex/age/qualification/subject/experience	4.71	.561	4.20	.759	4.46
Teachers' transfer, turnover	2.77	1.237	2.54	1.314	2.66
Administrative workers employment (transfer & turnover)	3.59	1.362	3.71	1.045	3.65
Students text books by grade, subject	4.33	.892	3.89	.867	4.11
Teachers guide by grade, subject	2.62	.957	2.89	1.183	2.76.
Students desk	4.21	.958	2.94	1.162	3.58
Educational materials and school facilities	2.56	.843	2.82	1.094	2.69
Per-student cost and annual revenue and expenditure	2.44	1.077	2.34	.954	2.39

With regard to educational data/information on students' enrolment, wastage ratio, students' promotion/graduation/transition rates, teachers' number by sex/age/qualification/subject/experience, students' text books by grade/subject, and students' desk were sufficiently available. All the items in both groups of respondents had mean scores that fall with in 3.58–4.46 range. To the opposite, information related to disabled students, per-students cost and annual revenue budget by source of income, and school annual expenditure budget had all a mean score of less than 2.5 for both groups. This implies that the above educational data were rarely available at all levels of the education hierarchies. Data like teachers' transfer/turnover, teachers guide by grade/subject and educational materials and school facilities were moderately available (GM= 2.66-2.76).

On the other hand, an interview was made with principals of schools with regard to the availability of qualitative educational data. According to the responses of principals, qualitative data were compiled for their office use only because schools asked to report rare qualitative information and the annual education census questionnaire send by the regional education bureau absence space for explaining qualitative data briefly. So, they did not report to the next level it is filed at schools. This implies that the data/information collected and compiled by the region was incomplete.

As the above result revealed that information on disabled students, per-students cost, annual revenue budget by source of income, and school annual expenditure budget were rarely available in

EMIS of the region. It is clear that all children should have the right to learn. So, there is a need to give more attention for all children equally. However, as the study result shown, there was rare data about disabled students and this indicates that they are not obtaining special treatments or attentions and interests to help them. Besides, any organization calls for detailed and sufficient financial information to plan and manage the budget of the firm. Lack of cost data hampers relating education expenditure to the main economic and financial indicators.

Moreover, there was also a deficiency in collecting qualitative data/information in the region. Concerning qualitative data Chapman and Mahlck (1993) have revealed that, only on rare occasions are schools are asked to generate information on qualitative aspects of teaching learning.

In general speaking, the clarification is that the EMIS data at different educational levels were available inadequately and more emphasized on quantitative data. Therefore, EMIS was lacking necessary data/information to users and stockholders.

4.2.2.1. Education Data/Information Availability at Different Levels

Dissemination is an action of distributing information using a variety of formats. Statistical year book, electronic document, printed and hand written documents are some of the forms of data/information available at different echelon of the education system. Data dissemination formats can be considered as an important part of EMIS by which it markets its products and improve its credibility by informing other government bodies and stakeholders about what data is available. However, the format of the information must suit the requirements and capabilities of decision makers at different levels. This section, therefore, examines the present practice on the formats by which data available at schools and education offices separately. In doing so, a list of possible formats by which information is kept and made available to them was presented to all respondents so that they show their agreement or disagreement on a five likert type scale represented by numbers from five to one.

Table 6: Responses of Respondents on the Format by which Information is Available at Schools

Formats	Respondents' Rating scale										—	
	Always		Usually		Sometimes		Rarely		Never			
	f	%	f	%	f	%	f	%	f	%	X	SD
Statistical year book	2	2.6	10	12.8	17	21.8	27	34.6	22	28.2	2.27	1.089
Electronic document (computer file, floppy, flash, CD-ROM)	7	9.0	10	12.8	13	16.7	9	11.5	39	50.0	2.19	1.406
Printed document	11	14.1	22	28.2	12	15.4	16	20.5	17	21.8	2.92	1.394
Hand written documents	34	43.6	14	17.9	9	11.5	15	19.2	6	7.7	3.71	1.397

As depicted in Table 6, handwritten documents were found to be the main format used in schools for maintaining information. As the data indicated, 61.5 percent of the school respondents replied that handwritten document was either always or usually used to store information in their schools.

On the other hand, both statistical yearbook and electronic documents were unpopular formats by which data/information was available at schools. The majority of the school respondents replied that they statistical yearbook (62.8 percent) and electronic document (61.5) formats were used rarely or never in keeping or upholding data/information. This implies that schools of the region have poor culture of keeping data/information in the form of statistical year book and electronic documents. This may be happened due to financial problem to buy electronic materials like computers, floppy, flash, etc and stationary materials at school level. Moreover, according to school respondents, data/information was availing averagely (M=2.92) in the form of printed materials.

The current study however came up with schools of Tigray region were kept data/information mostly in hand written documents and sometimes in printed materials. This implies that schools were used mostly a single data preservation format which is not safe, because hand written materials may have the probability of easily damaged and faded if it is not properly handled. From this point, therefore, we can conclude that schools were being deficient in using variety of formats like electronic devices (computer, typewriter, floppy, etc) to keep their data/information. Supporting this finding Trucano (2006) has suggested that it is necessary to have the fundamental materials/equipments that facilitate the overall process of EMIS like computer. Apart from a well computerized, networked and internet connected system, it is also suggested that, other ways to access data should be made available. These include publications, information booklets, statistics books, etc. Thus, the implications are the needs for facilitating technological infrastructure and assist schools to use various types of formats especially those improve the efficiency of EMIS.

Table 7: Responses of Respondents on the Format by which Information is Available at Education Offices

Format	Respondents' Rating scale										—	
	Always		Usually		Sometimes		Rarely		Never			
	f	%	f	%	f	%	f	%	f	%	X	SD
Statistical year book	13	37.1	7	20.0	12	34.3	1	2.9	2	5.7	3.80	1.158
Electronic document (computer file, floppy, flash, CD-ROM)	13	37.1	8	22.9	10	28.6	3	8.6	1	2.9	3.83	1.124
Printed document	12	34.3	12	34.3	8	22.9	2	5.7	1	2.9	3.91	1.039
Hand written documents	-	-	1	2.9	10	28.6	18	51.4	6	17.1	2.17	.7469

The figures in Table 7 show that hand written materials were perceived negatively (M=2.17) by the respondents. The majority of education office (68.5 percent) respondents replied that it was used rarely or never in availing data/information in their institution. From this we can see that hand written materials were highly used at schools but not at education offices for maintaining information. However, other formats used for keeping information at education office were rated above average mean ranging from 3.83-3.91. Sixty percent, 57.1 percent, and 68.5 percent of the respondents responded that they were used usually or mostly electronic document, statistical year book, and printed material respectively to maintain data/information. This implies that education offices were used majority of the formats to keep their information.

According to the result of the study, education offices have better opportunity to use new technologies to maintain their information as compared to schools. However, the existence of ICT infrastructure only at education offices makes incomplete the practice of EMIS in the region. Because, schools were lack the necessary electronic materials that facilitate the process of EMIS. More over, there was also a problem of basic skill to manipulate computers in some of the schools they have computers. Therefore, in such conditions it is difficult to exchange information with schools using electronic devices.

Interview results, on the other hand, have shown that even if there was an ICT infrastructure and adequate electronic devices that make easy the tasks of EMIS at woreda education offices and regional education bureau, most of the EMIS personnel were computer illiterate. So, the implication is the need for giving basic computer skills training for EMIS personnel in order to improve EMIS efficiency.

In general, at all levels of the education system in the region the utilization of formats for maintaining information has its own obstruction. More than ever, made available and kept information in the form of electronic was undermined. Literature in this area suggest that the nature of the information and the way in which it is made available and kept should be tailor made for each level (Carrizo and others, 2003). Therefore, it is recommended to use formats that make information easier, faster, and efficient to store, process and communicate.

4.2.2.2 Integration of EMIS

Integration of information has provides flexible and reliable information system, create easy and quick reporting and create good opportunity for research activity and intellectual exercises. It is, as

well, intended to add value to the data that are already collected and available in variously scattered places within the same system. Cassidy (2005) has also argued that high degree of data integration not only helps to manage data in a more effective and consistent manner, it also contributes to a readiness for more useful policy-oriented analysis, planning, budgeting, and monitoring. With this ground, respondents were asked for to respond on whether integration activities were carried out or not in their own organization. The views of the respondents were presented in table 8 as follows.

Table 8: A Chi-square Test about the Views of Respondents on Data/Information Integration

No	Items	Response of category	Response rating scale of Respondents						χ^2	
			Schools		Education offices		Total			
			f	%	f	%	f	%	CV	p-value
i	Is there an Organized data base in your organization	Yes	29	37.2	27	77.1	56	49.6	15.435*	.000
		No	49	62.8	8	22.9	57	50.4		
		Total	78	100	35	100	113	100		
ii	Is integration of EMIS made practical	Yes	56	71.8	30	85.7	86	76.1	2.574	.109
		No	22	28.2	5	14.3	27	23.9		
		Total	78	100	35	100	113	100		
iii	Direction of EMIS flow	Vertical	9	11.5	1	2.9	10	8.8	8.886	.064
		Horizontal	6	7.7	-	-	6	5.3		
		Diagonal	1	1.3	-	-	1	.9%		
		vertical and horizontal	24	30.8	19	54.3	43	38.1		
		Vertical, horizontal and diagonal	38	48.7	15	42.9	53	46.9		
		Total	78	100	35	100	113	100		

Asterisks indicate Significance at P< 0.05

The data in Table 8 shows that the responses of the school and education office respondents were rated for three questions. As illustrated in the table 9 of item 'i', below half (37.2 percent) of school and 77.1 percent of education office respondents replied that there was an organized data base system in their respective organization. This result indicates that there was an organized information base at education office level, whereas, at schools majority of the group respondents believed in the non-existence of organized data base system (62.8 percent) like that of the education office. The chi-square test also shows that there was significance difference between the two groups' responses at alpha level 0.05. This is because the calculated value (CV) 15.435 is above the critical value/table value 3.841 (or the p-value 0.000 is less than 0.05). This shows that there was no commonly agreed response from both group respondents and the existence of organized data base system varies in terms of the level. Therefore, the non-existence of an organized information base at schools, though

there is at education office, make access challenging and hampers the over all functions of EMIS in the region.

Regarding the second item of table 8, most of the school (71.8 percent) and education office (85.7 percent) respondents were agreed positively in the integration of information system. From the total respondents, 76.1 percent of them said 'Yes' for the presence of an integrated EMIS in their respective organizations. This implies that if integrated information systematically in several or one data files, it is possible to share information vertically, horizontally, among multiple sources, and across time at all levels.

The data on item iii of the same table indicates that, 30.8 percent of school and 54.3 percent of education office respondents replied that information flows vertically and horizontally. On the other hand, 48.7 percent of school and 42.9 percent of education office respondents were agreed with vertical, horizontal and diagonal flow of information in their respective organization. In this case, majority of school 79.5 percent and education office 97.2 percent respondents indicated that information flows either vertically and horizontally or vertical, horizontal and diagonal.

Multi-level data collected from multiple sources and years are available at different levels of the education system and it needs organized information system. This system plays pivotal role in integrating and organizing data in a structured fashion and crucial in sharing of EMIS outputs. Yet, it is difficult to make data accessible for policy-relevant research analysis and improvement in education system with out organized information base. Therefore, attention should require in order making practical organized data base system at all levels of Tigray region, especially at school level.

4.2.2.3 Quality of EMIS Data/Information

EMIS plays a significant role in providing data/information for making rational decisions, enhancing planning and programming, supporting monitoring and evaluation, and helping policy and strategy reviews within the education system. However, it does not mean that all data which are simply produced without considering its quality are consumed by users. Data quality depends, among other things, on the motivation and determination of both the producers and users. In this case, data are of high quality if they are fit for their intended uses in operational decision making and planning. Studies have confirmed that data quality have a multi-dimensional attributes. Redman

(2001) has suggested that for data to be fit for use they must be accessible, accurate, timely, complete, consistent with other sources, relevant, comprehensive, provide a proper level of detail, be easy to read and easy to interpret.

Therefore, this part tried to study EMIS out puts quality in terms of common attributes. In doing so, the respondents were supplied seven indicators to rate in a likert type scale involving very high (5), high (4), medium (3), low (2) and very low (1). During analysis, the mean scores were interpreted as follows: less than 2.50 = low quality, 2.5-3.50 = average quality and grater than 3.5 =high quality.

Table 9: Respondents Views on the Quality of EMIS Data/Information

No	Indicators of Quality	Mean of Respondents				GM	SD
		Schools		Education Office			
		$\overline{X}$	SD	$\overline{X}$	SD		
1	Accuracy	2.29	.775	2.14	.879	2.25	.8077
2	Relevance	4.15	.823	4.17	.822	4.16	.8190
3	Completeness	2.91	1.009	2.91	.781	2.91	.9407
4	Clarity	4.12	.756	3.74	.741	4.00	.7677
5	Timeliness	2.17	.844	2.06	.684	2.13	.7963
6	Consistency	2.45	.863	2.83	1.043	2.57	.9342
7	Accessible	3.49	1.078	3.34	1.136	3.44	1.0933

As can be seen in Table 9, it could be possible to categorize the quality indicators into three levels. Thus, the respondents considered relevance and clarity of educational data at high level quality with grand mean ranging from 4.00-4.16. In the second category, respondents put consistency, completeness and accessible of quality indicator having average quality level (GM= 2.57 - 3.44). Timeliness and accuracy was categorized under low level indicator of quality (GM= 2.13 - 2.25). This implies that due emphasis is not given to send accurate data on time to the concerned body.

When we compared both groups, all except one, the responses given by school and education office respondents were match at mean values. However, the response for the quality indicator consistency was different in both groups. The schools were rated the indicator below average quality level, where as, the education offices looked it at average quality level. This different opinion between schools and education offices may be happened due to schools were asked to fill data collection questionnaire send by regional education bureau and woreda education office at different time with different content and this variation force them to say there was inconsistency of data/information.

An interview and FGD were made with different users of data/information at woreda and regional level. The officials revealed that inaccurate education data/information comes to their office and experts working in the same department were reported different data for similar issue. According to their view, the reason for this was the personal interest of the authorities which has a greater share in the inaccuracy of data/information. In the discussion program one participant explained that school principals and homeroom teachers report differently students' enrollment when they asked by woreda or regional supervisors to avoid the risk of students dropout and this makes the data inaccurate. Similarly, this practice has also highly adapted by woreda officials and political administrative.

In relation to timeliness, all discussion members and interviewees agreed that EMIS outputs never served the year it is intended to serve. Most often data/information distributed in the form of abstracts were disseminated at least a year or two years after it is collected. For instance, the last year (2002 E.C) education information (abstract) was not produced and distributed to users until this report prepared. Instead data users were used the 2008/9 (2001 E.C) education abstract as a source of information. From this point of view, it is possible to conclude that the data/information was not produced and delivered on time to users.

More over, the response forwarded by the interviewee indicated that multi level data collected from various sources and years which are available at different echelon of the education system lacks completeness. This finding concurs with that of Tegegn (2003) that has pointed out basic statistics we were collecting regularly every year do not provide all of the information needed for decision-making and planning purposes. Additional information needs be collected through pilot studies and research undertakings.

Therefore, the existing study has shown that education data/information in the region lacks accuracy and timeliness and this leads for the production of low quality data. Thus, users also have the probability of using deficient information. However, instead of using poor quality data, it is by far better to use no data, because low quality data/information may become misinformation or lead to invalid conclusions. Therefore, organizations should give more attention to the problems that hamper the quality of data/information and principles of data quality need to be applied at all stages of the data management process.

4.2.2.4. Educational Data/Information Users

Lack of utilization education data has for a long time been a source of concern and frustration for the EMIS division, because simply supplying information will fail in the absence of efforts to increase demand. So, it is important to ensure the demand for EMIS outputs using different mechanisms. Political decision makers, schools administrators, education officials, governmental sectors, NGOs, researchers, community, students, and teachers etc are information users at different levels in Tigray region even though their utilization varies. Validating this idea, Hue and Herstein (2003) described that policy makers, planners, policy analysts, and other stakeholders are the users of education data/information. Then, various organizations and stakeholders at different levels should utilize education data effectively and efficiently so as to improve the development of EMIS practice. This section is, therefore, intended to assess demand for EMIS outputs at different levels of the region education system.

Hence, school and education office respondents were asked to rate their view about the demand for EMIS outputs as: very high (5), high (4), average (3), low (2) and very low (1). For simplicity of analysis mean scores were interpreted as less than 2.5= low demand, 2.5-3.50=average demand and greater than 3.5= high demand.

Table 10: Mean and Frequency Distribution of Respondents' Opinion on Demand for EMIS Data at Schools Level

Data users	Respondents' Rating scale										$\bar{X}$	SD
	VH		H		AV		L		VL			
	f	%	f	%	f	%	f	%	f	%		
Parents and the community	-	-	11	14.1	24	30.8	21	26.9	22	28.2	2.31	1.036
Students	-	-	10	12.8	26	33.3	23	29.5	19	24.4	2.35	.991
Departments and teachers of the school	-	-	8	10.3	34	43.6	20	25.6	16	20.5	2.44	.934
Researchers	-	-	7	9.0	36	46.2	21	26.9	14	17.9	2.46	.893
Other woreda sectors like finance, health etc	3	3.8	16	20.5	34	43.6	19	24.4	6	7.7	2.88	.953
Political administrative bodies	19	24.4	33	42.3	17	21.8	8	10.3	1	1.3	3.78	.976
Woreda education office	35	44.9	35	44.9	7	9.0	1	1.3	-	-	4.33	.696
School administrators	51	65.4	22	28.2	5	6.4	-	-	-	-	4.59	.612

As it can be seen from Table 10, the demand for EMIS data/information by political administrative bodies, woreda education offices, and school administrators have mean score ranging from 3.78-4.59. This indicates that there was high demand of education information for a variety of functions. Other woreda sectors like finance, health etc (M=2.88) was reported having average level demand for EMIS out puts.

However, the demand for EMIS outputs by parents and the community, students, departments and teachers, and researchers were low. The mean score of the users have fallen in between 2.31-2.46. The implication is that most of the users who have direct relationship with the school have less demand for EMIS data/information. The computed standard deviations for each item also revealed that the difference among the respondents is just about one standard deviation for all items, which can be considered as insignificant difference. The effect leads us that the opinion of respondents towards reflecting the existing stakeholders demand for EMIS was reliable.

An assessment of demand for EMIS data/information in schools clearly showed that EMIS outputs were underutilized by those who have high expectation to use like students, parents and community, departments and teachers. This might be happened due to certain reasons; such as less effort made to convert data into usable information, low or no awareness on local stakeholders to use data for decisions and other purposes, and no culture of data utilization to make decisions.

FGD and interview conducted with principals and officials have validated the result. They replied that lack of demand for EMIS data/information by parents and community, students, and teachers was of course a common problem. The motive behind this was expressed by one of the informants as:

> *The reason for not utilize data by parents and community, students, and teachers was most of the time more dominated on poor culture of data utilization by the users and lack of sufficient knowledge how to use data for different functions.*

Therefore, it is basically useful raising the level of demand for information because the higher the demand the more the value and utilization it has. More over, increasing local stakeholders' participation in using data/information is an inference for improving EMIS practice at school level.

The figures in Table 11 show that the demand for EMIS data/information could be possible to categorize into three levels. According to the majority of education office sample respondents, administrators, experts and EMIS workers within the organization, government sectors like finance, health etc and political decision makers were put as having high level demand for EMIS output with mean score ranging from 3.66-4.17. NGOs (Mean=2.91) and researchers (Mean=2.71) were considered as having average level demand for EMIS information, while teachers association (Mean=2.43) and parents and community (Mean=1.86) had low level demand for EMIS outputs.

Table 11: Mean and Frequency Distribution of Respondents Opinion on Demand for EMIS Data at Education Offices Level

Data users	Respondents' Rating scale										$\bar{X}$	SD
	VH		H		AV		L		VL			
	f	%	f	%	f	%	f	%	f	%		
Administrators and experts within the organization	14	40.0	13	37.1	8	22.9	-	-	-	-	4.17	.785
EMIS workers within the organization	11	31.4	13	37.1	10	28.6	1	2.9	-	-	3.97	.857
Other government sectors like finance, health etc	9	25.7	14	40.0	10	28.6	2	5.7	-	-	3.86	.879
Political decision makers	6	17.1	15	42.9	11	31.4	2	5.7	1	2.9	3.66	.938
NGOs	7	20.0	4	11.4	7	20.0	13	37.1	4	11.4	2.91	1.337
Researchers	-	-	8	22.9	12	34.3	12	34.3	3	8.6	2.71	.926
Parents and teachers	-	-	5	14.3	13	37.1	9	25.7	8	22.9	2.43	1.008
Parents and the community	-	-	2	5.7	6	17.1	12	34.3	15	42.9	1.86	.912

The computed standard deviation result also showed that a rating of the individual respondents was not deviated much. When the deviation result was compared among the whole items, again the difference was not significant. The deviation ranges on average from 0.785 to 1.337. Thus, all respondents have similar view towards demand for EMIS outputs at education offices.

In general, though there was certain problem, the demand for EMIS data/information at education offices was better than at schools. Literatures in this area suggest that neighboring units within the ministries (education offices) have the capacity and interest to utilize EMIS outputs (UNESCO, 2006). Therefore, since less demand indicates less utilization, making data/information available by itself does not guarantee. In turn, less utilization data is not serving to perform the functions of management efficiently. This implies that there is a need to increase demand and utilization of EMIS output at all levels of the education system.

4.2.3. Degree of EMIS Functions at Different Educational Hierarchies

The management functions of EMIS include collecting, storing, integrating, processing, organizing, outputting, and marketing educational data and statistics in a timely and reliable fashion. These tasks are performed at every educational hierarchy; however, the existing practice of EMIS at different educational levels does not go in-line with the real condition. Therefore, this part deals to see into what supposed EMIS functions were practical and what were not in the respective administrative levels. This part looks at EMIS function at school, WEO and regional bureau separately.

4.2.3.1. EMIS Functions at Schools

Educational information is collected from schools and other educational organizations. The schools remain the core source of most of the required data items. So, in the process of collection, analysis and utilization of data/information, various EMIS functions are anticipated. To look into the perception of respondents about EMIS functions performed at school level, nine assumed major functions were provided with the respondents to be rated on a likert type scale having five scales involving very high(5), high(4), medium(3), low(2) and very low(1). For ease of analysis mean scores were interpreted as less than 2.5= poorly done, 2.5-3.50=partly done and greater than 3.5= mostly done.

Table 12: Mean and Frequency Distribution of the Respondents' Outlook on EMIS Functions at Schools

EMIS Functions	Respondents' Rating scale										$\bar{X}$	S
	VH		H		AVE.		L		VL			
	f	%	f	%	f	%	f	%	f	%		
Preparing school specific data collection format	3	3.8	10	12.8	24	30.8	20	25.6	21	26.9	2.41	1.133
Collecting data	38	48.7	27	34.6	11	14.1	2	2.6	-	-	4.29	.808
Documenting and storing data/information	37	47.4	26	33.3	12	15.4	3	3.8	-	-	4.24	.856
Filling annual data collection questionnaire	31	39.7	26	33.3	17	21.8	4	5.1	-	-	4.08	.908
Reporting to Woreda	43	55.1	21	26.9	6	7.7	6	7.7	2	2.6	4.24	1.059
Developing school level indicators	3	3.8	10	12.8	23	29.5	27	34.6	15	19.2	2.47	1.066
Processing and analyzing data	1	1.3	5	6.4	31	39.7	29	37.2	12	15.4	2.41	.874
Verifying data	-	-	3	3.8	34	43.6	26	33.3	15	19.2	2.32	.830
Disseminating to users	9	11.5	16	20.5	31	39.7	14	17.9	8	10.3	3.05	1.127

Table 12 shows the summary responses of school respondents on EMIS functions preformed at school level. As can be observed from the table, collecting data, documenting and storing data/information, filling annual data collection questionnaires, and reporting to woreda were functions mostly done, which had mean scores that fall with in 4.08 – 4.29 range. Dissemination of data/information to users, which has mean value of 3.05, was partly performed.

On the other hand, the respondents believed that preparing specific data collection format, developing school level indicators, processing and analyzing data, and verifying data were poorly done at their institution, which had mean scores that range from 2.32 – 2.47.

The information produced by EMIS required at all levels of the education system in order to meet the needs of the overall educational planning and budgeting cycle, educational services, educational monitoring and evaluation, and policy research. To meet such a need, the process of data collection, data analysis and interpretation, and documenting and storing of data must be treated efficiently at school level. This shows that, as there is planning, monitoring and evaluation, and decision making at schools, EMIS should apply at school with all its component activities. With regard to this, Chapman & Mahlck (1993) have clearly described that a key element in moving decision making closer to lower level administrations, then is providing mangers at those lower levels with the information they need as input to their decision-making. Moreover, Tegegn (2003) briefly has make cleared the concept as, "at each point of administrative channel, they not only receive and pass information, but information is also processed, analyzed and used (p.36)."

From this point of view, the study has revealed that the schools EMIS activities has been restricted on collecting data, filling annual data collection questionnaire, documenting and storing data/information and reporting data to woredas. Where as, preparing data collection format, verifying data, processing and analyzing data, developing school indicators are completely ignored by the schools. This implies schools were filled data collection questionnaires and simply report to the next level with out performing the necessary functions like data verification, analysis and interpretation.

An interview and FGD held with interviewees and discussion members resulted in almost similar to the above. A participant from one school in the focused group discussion explained schools function as follows:

> *Schools in nature were bound themselves in only few functions like collecting and reporting data to the higher level without any verification, processing and analyzing. This makes them to wait for data/information processed and analyzed by woreda education office or regional education bureau.*

In general, the finding indicated that EMIS functions at schools are incomplete and data produced have poor quality. This suggests that schools are now at worse condition in performing all the most important functions of EMIS.

4.2.3.2. EMIS Functions at Woreda Education Office

Woreda education office is an administrative level positioned in between regional education bureau and schools according to the structure of the region education system. This level like schools has its

own duties and responsibilities in performing EMIS functions. Accordingly, this part of the analysis deals on assessing the functions performed by WEO in the production of EMIS outputs. Hence, in order to examine the extent to which EMIS functions are performed at WEO level, the following items were provided to the sample respondents to be rated using a five point likert type scale as very high (5), high (4), medium (3), low (2) and very low (1). For simplicity of analysis, mean values were interpreted as less than 2.5= poorly done, 2.5-3.50=partly done and greater than 3.5= mostly done.

Table 13: Mean and Frequency Distribution of the Respondents' Outlook on EMIS Functions at WEO

EMIS Functions	Respondents' Rating scale										$\bar{X}$	SD
	VH		H		AVE.		L		VL			
	f	%	f	%	f	%	f	%	f	%		
Identification and analysis of information needs	-	-	1	3.3	14	46.7	9	30.0	6	20.0	2.33	.844
Preparing data collection formats	8	26.7	10	33.3	12	40.0	11	36.7	5	16.7	3.87	.819
Receiving data from schools	9	30.0	13	43.3	5	16.7	-	-	3	10.0	3.83	1.177
Verifying of data	6	20.0	9	30.0	13	43.3	1	3.3	1	3.3	3.60	.968
Compiling data/information	7	23.3	9	30.0	13	43.3	-	-	1	3.3	3.70	.952
Processing and analyzing data	5	16.7	9	30.0	13	43.3	2	6.7	1	3.3	3.50	.974
Developing indicators	2	6.7	8	26.7	15	50.0	2	6.7	3	10.0	3.13	1.008
Preparation of abstracts	-	-	-	-	8	26.7	9	30.0	13	43.3	1.83	.834
Providing EMIS related trainings	-	-	-	-	13	43.3	11	36.7	5	16.7	2.33	.802

As Table 13 depicts, preparing data collection formats, receiving data from schools, verifying data, compiling data, and processing and analyzing data were mostly done functions by the WEO. All the items had mean value that ranges from 3.50 – 3.87. However, EMIS functions like identification and analysis of information needs, preparation of abstracts and providing EMIS related trainings were poorly performed, which had mean scores that range from 1.47 – 2.40. The computed standard deviation result also showed that a rating of the individual respondents was not deviated much. When the deviation result was compared among the whole items, again the difference was not significant. The deviation ranges on average from 0.802 to 1.177. Thus, all respondents have similar view towards EMIS functions at WEO level.

In relation to EMIS function, in the open-ended questions, the respondents were also asked to list down strategies that improve EMIS function at their organization. According to the response of the sample respondents, giving training on EMIS is a strategy that upgrades the functions.

Identifying the need of users is an important issue in EMIS functions before producing information. Collecting information without need identification is valueless. If information is not published and disseminated it is not done. With this in mind, the reports of data analysis need to be published in order to reach the users, in this way it can be publicize products in the form of abstracts and other medium of communication and users can study them. Makwati, et al. (2004) in this regard has pointed out that publication and dissemination is one of the important functions of EMIS that promotes the use of information for development. When the information is published and not distributed to users, the whole process of data collection and processing it is not only a failed job but also a waste of resources and a retardation of development.

However, the study has shown that important EMIS functions like identification and analysis of information needs, preparation of abstracts and providing EMIS related trainings are overlooked. Thus, there was no tradition of assessing and identifying the needs and interests of data users. The only activities they were doing were collecting data from the lower level and pass to the next authority in the hierarchy. It is clear that data/information have no value if it is collected without the interest of the users. More over, the absence of preparation abstract may make the collected data as 'a lamp in a pot'. The finding, thus, indicated that educational data/information has not lead to improved educational practice at levels where it matters.

4.2.3.3. EMIS Functions at Tigray Education Bureau

Successful management of education systems require effective application of EMIS functions for providing quality data that enhance planning, policy-making, and monitoring and evaluations of an organization. Thus, regions have invested significant resources in collecting, processing, and managing more and better data through EMIS functions. Hence, regional respondents were requested to rate their opinion about the function of EMIS in their organization. The scales are defined as: very high (5), high (4), medium (3), low (2) and very low (1). For ease of analysis mean scores were interpreted as less than 2.5= poorly done, 2.5-3.50=partly done and greater than 3.5= mostly done.

Table 14: Mean and Frequency Distribution of the Respondents' Outlook on EMIS Functions at TEB

EMIS Functions	Respondents' Rating scale										$\bar{X}$	SD
	VH		H		AVE.		L		VL			
	f	%	f	%	f	%	f	%	f	%		
Identification and analysis of information needs	3	60.0	1	20.0	1	20.0	-	-	-	-	4.40	.894
Preparing and distributing data collection formats and questionnaire	3	60.0	1	20.0	1	20.0	-	-	-	-	4.40	.894
Receiving data from woreda	1	20.0	2	40.0	1	20.0	-	-	-	-	4.20	.837
Encoding and processing data	3	60.0	1	20.0	1	20.0	-	-	-	-	4.40	.894
Analyzing and interpreting data	1	20.0	2	40.0	2	40.0	-	-	-	-	3.80	.837
Storing data/information	1	20.0	2	40.0	2	40.0	-	-	-	-	3.80	.837
Developing indicators	3	60.0	1	20.0	1	20.0	-	-	-	-	4.40	.894
Publication of abstracts and disseminating EMIS outputs	1	20.0	3	60.0	1	20.0	-	-	-	-	4.00	.707
Providing EMIS related trainings	-	-	1	20.0	1	20.0	2	40.0	1	20.0	2.4	1.14

Table 14 depicts that providing EMIS related training was negatively perceived function (M=2.4) by respondents. However, identification and analysis of information needs, preparing and distributing data collection formats and questionnaire, receiving data from woredas, encoding and processing data, analyzing and interpreting data, storing data/information, developing indicators, and publication of abstracts and disseminating EMIS outputs were highly performed functions (greater than 3.80) by the region.

The computed standard deviations for each item also revealed that the difference among the respondents is just about one standard deviation for all items, which can be considered as insignificant difference. The effect leads us that the respondents have an agreement of opinion towards the implementation of EMIS functions. Thus, it could be safe to infer that TEB perform most EMIS functions at higher level. Yet, providing EMIS related trainings remains to be function performed below expectation.

On the subject of EMIS related training, we can learn something from the experience of Ghana. In Ghana, efforts were made to enhance the efficient and effective performance of EMIS activities at all levels of the education system. New institutional structure and a comprehensive package of capacity building activities were developed and training was prepared on basic and intermediate computer skills training (basic IT skills), as well as how to undertake statistical analysis. These results an improvement in data collection, processing and analysis at all levels of EMIS system

(Trucano, 2006). Therefore, the region should give consideration to every function of EMIS in order to improve the quality of EMIS outputs.

4.2.4. Utilization of EMIS Outputs

To achieve the desired goals EMIS must develop a plan that ensure successful implementation, achieve high performance and make sustainable the practice of EMIS over time. At the same time, EMIS also should consider the requirements and needs of the groups that will rely on the information. Because, information has value if and only if, when there is a use for it. So, it is important to ensure the demand for EMIS outputs are translated into utilization within the education system.

This section is, therefore, intended to asses to what extent EMIS outputs are utilized as an input for planning and budgeting, monitoring and evaluation, research, and decision making at different levels of the study region. The respondents were asked to rate the utilization of educational information by their organization as: very high (5), high (4), average (3), low (2) and very low (1). For simplicity of analysis mean scores were interpreted as less than 2.5= low utilization, 2.5-3.50=average utilization and greater than 3.5= high utilization.

Table 15: Responses of Respondents on Utilization of EMIS Outputs

No	EMIS Output Utility Area	Mean of Respondents				
		Schools N=78		Education offices N=35		
		$\overline{X}$	SD	$\overline{X}$	SD	GM
1	Facilitates planning and budgeting	4.28	.719	4.31	.796	4.30
2	Sound decision making	4.21	.779	4.29	.789	4.25
3	Monitor progress towards objectives	4.15	.722	4.26	.701	4.21
4	Evaluating performance	4.05	.851	4.14	.733	4.10
5	Management and administration operations	4.31	.744	4.14	.772	4.23
6	Enrollment projection	4.12	.821	4.20	.719	4.16
7	Conducting studies/research	2.46	.893	2.29	.750	2.38
8	Developing programs and projects	1.96	.797	2.89	1.105	2.41
9	Allocating resources	4.01	.890	4.29	.750	4.15

As it can be seen from Table 15, in general, utilization of data for various management functions of education was higher at education offices than schools. This implies that there is better knowledge and skill at education offices in using data for different educational functions.

At school and education office level, the findings showed that the utilization of educational data/information for planning and budgeting, sound decision making, monitor progress towards

objectives, evaluating performance, management and administration operations, enrollment projection and allocating resources have grand mean ranging from 4.1 to 4.3. This indicates that all levels of the region were highly utilized information for the functions identified above. Moreover, school principals and officials have better capacity and experience to utilize information in order to carry out and exercise the functions. However, conducting research and developing programs and projects were low data utilized functions (GM=below 2.5). This shows that both levels of the education system did not give weight to conduct research and development of programs and projects.

In this regard, the assessment of data use in the region clearly showed that there has been relatively better use of data at all levels of the region in almost majority utility areas. However, EMIS outputs were underutilized in areas where they have vital role in improving the quality of education, for instance conduct research and development of programs and projects. Thus, these functions require due attention by all higher authorities worked at all levels of the education system of the region. This is an implication to Tigray education bureau the need to reconsider its EMIS and promote the appreciation and use of data driven decision making at all levels of the system.

According to the result, education officials have better knowledge and experiences on utilization of information. Consequently, they have greater responsibility to give support on how to use educational data for all concerned personnel found at school level. On the other hand, the uses of data in educational decision are expected to span all layers of the education system from federal to the region, woreda, school and classroom levels.

Besides, information obtained from schools and education offices through interview and open ended questions revealed that the information produced at school or education office level was not satisfy the needs of users or clients. This is because schools did not give attention for producing quality data/information. Most of the time they were filled data collection format carelessly. The interview with TFEDB plan expert also revealed that the less utilization of data was unreliability of education data/information. In this case, the respondents were agreed that improving the quality of educational data is vital issue in order to attract data users/stakeholders. Moreover, creating awareness about the importance of data is critically done so as to improve the attitude of users on the utilization of data/information for different functions. This finding concurs with that of Makwati and others (2004) that has pointed out efforts should be made to make users aware of the existing information

and analytical results at their disposal for use in development activities in their areas of operation and accountability.

In summary, the analysis indicated that the respondents have had necessary practices on utilization of data/information to perform most of the management functions. Nevertheless, they were not familiar with functions like conducting research and project and program development and this is a clear indication of the need for improving data utilization at all levels of the education system.

4.2.5. Problems of EMIS

4.2.5.1. Barriers to Use EMIS Data/Information

Education management information system is essential to manage information in the modern world education. The system is designed to produce quality data/information that support educational functions like planning, decision making, monitoring and evaluation, budgeting, etc. For effective decisions to evolve in any organization receiving information from and supplying information to people within the system are necessary. However, maintaining information by itself is not sufficient because there are barriers need critical consideration by both data suppliers and consumers, which affect the success of EMIS. Consequently, it is important to identify the factors and arrange necessary solutions to make data based decisions.

This section, therefore, designed in order to examine the extent to which the barriers affect EMIS functions at all levels of the education system of the region. The following assumed barriers were provided to the sample respondents in a likert type scale having indicators 5=very serious, 4=serious, 3=moderate, 2=less serious and 1=not a problem. In table 16, the result was presented based on the respondents' reaction. During analysis, the mean scores were interpreted as follows: less than 2.50 = not a problem, 2.5-3.50 = moderate problem and grater than 3.5 =serious problem.

As clearly shown in Table 16, low level of data analysis ($\overline{X}$=3.96), lack of access to extract data (Mean=3.68), organizational culture and leadership ($\overline{X}$=3.58) and low technical capacity of users and EMIS staffs ($\overline{X}$=3.57) were serious problems to data use. Perceived effect of data use ($\overline{X}$=2.89) and low quality of data ($\overline{X}$=2.61) were looked by all groups of respondents as moderate hindrances to data use.

Table 16: Rating Scale Data on Barriers to Use EMIS Output

Barriers	Respondents	Respondents' rating scale										$\bar{X}$	χ^2
		Very serious		serious		Moderate		Less serious		Not a problem			
		f	%	f	%	f	%	f	%	f	%		
Low level of data analysis	SC	28	35.9	26	33.3	23	29.5	1	1.3	-	-	3.96	4.339
	EO	6	17.1	16	45.7	12	34.3	1	2.9	-	-		
Poor data quality	SC	-	-	3	3.8	25	32.1	28	35.9	22	28.2	2.61	58.18*
	EO	7	20.0	17	48.6	7	20.0	2	5.7	2	5.7		
Lack of access to extract data	SC	26	33.3	25	32.1	18	23.1	6	7.7	3	3.8	3.68	7.676
	EO	5	14.3	10	28.6	15	42.9	2	5.7	3	8.6		
Organizational culture and leadership	SC	20	25.6	23	29.5	20	25.6	8	10.3	4	9.0	3.58	5.084
	EO	6	17.1	17	48.6	9	25.7	2	5.7	1	2.9		
Perceived effect of data use	SC	3	8.6	9	25.7	16	45.7	7	20.0	-	-	2.89	7.011
	EO	4	5.1	12	15.4	31	39.7	21	26.9	10	12.8		
Low technical capacity of users and EMIS staff	SC	19	24.4	28	35.9	18	23.1	11	14.1	2	2.6	3.57	5.891
	EO	3	8.6	13	37.1	13	37.1	6	17.1	-	-		

Note: SC=School, EO= Education Office Asterisks indicate Significance at P< 0.05

According to the result of the study, lack of technical skills of users and EMIS staff was felt as very serious problem by 8.6 percents, serious problem by 37.1 percents, moderate problem by 37.1 percents, and less serious by 17.1 percents of education office respondents, while more than 60.3 percent of the school respondents felt that lack of technical skill of users and EMIS staff was either a serious or very serious challenge to data use.

Concerning lack of access to extract data, 65.4 percent of school and 42.9 percent of education office respondents were looked at it as either very serious or serious challenge to use data. Where as, 23.1 percent of schools and 42.9 percent of education office respondents were felt it as moderate problem. Thus, it is possible to say more than 85 percent of both respondents replied that lack of access to extract data was considered as moderate or serious or very serious problem. In this case, lack of accessibility has its own share in reducing users need to use data for various functions in the region.

Poor data quality was reported as moderate challenge to data use even though there is a difference in perception between both group respondents. Majority of the school 64.1 percent respondents considered it not as a problem, however more than 68 percent of the education office respondents' response, poor data quality was either as a very serious or serious problem to data use. A chi-square test of significance further highlighted that there was statistically significant difference among the

groups about the existence of poor data quality. The test at 4 df, and 95 percent confidence level resulted in 58.18 observed value which is greater than the table value of 9.49. The implication is there is a relationship between the extent of data quality and level.

With regarded to low level of data analysis and organizational culture and leadership, 69.2 percent of school and 62.8 percent education office and 55.1 percent of school and 65.7 percent of education office respondents respectively believed that they were either seriously or very seriously affect to data use. So, more than 60 percent of each groups of the respondents looked the above two barriers as a serious problems to data use.

As indicated in the literature part, data users should has the skill, techniques and knowledge to analyze the available data in efficient way however it limits utility. Ellison (2004) has mentioned that information demand will be promoted if the commitment to evidence-based policy-making and administration can be increased, and if the capacity to analyze and use education management information for these purposes can be expanded. Moreover, effective data informed decision-making requires well organized management and leadership. Managers with strong commitments to data driven decision making and norms of openness and collaboration fostered data use. The need for active and enlightened leadership is basic. The degree of data use also affected by the culture of not considering information as valuable matter for informed decision.

4.2.5.2. Problems Impede the Practice of EMIS

The increasing demand for better data and information is a very promising development for EMIS. The need for data and information is indispensable to support decision making, policy-analysis and formulation, planning, monitoring and management at all levels of an education system. However, the use of EMIS to produce policy briefs, and use of EMIS data to support policy decisions remains limited due to different problems.

So, amongst the various problems that might affect the practice of EMIS, respondents were provided with major assumed administrative and institutional, data and resource related problems that could affect the practice of EMIS. The problems were presented in a likert type scale as 5=very serious, 4=serious, 3=moderate, 2=less serious and 1=not a problem. During analysis, the mean scores were interpreted as follows: less than 2.50 = not a problem, 2.5-3.50 = moderate problem and grater than 3.5 =serious problem.

Table 17: Mean Distribution of the Respondents View on Problems that Impede the Practice of EMIS

Problems		Mean of Respondents				GM	SD
		Schools N=78		Education offices N=35			
Major	Minor	$\bar{X}$	SD	$\bar{X}$	SD		
Administrative and institutional	Absence of clear data/information policy	4.12	.822	4.20	.759	4.14	.800
	Poor coordination and leadership	3.35	1.278	3.29	1.178	3.33	1.242
	Unhelpful management attitude	2.05	.771	2.31	.758	2.13	.773
Data related	Poor information culture on the part of users	4.09	.840	4.06	.802	4.08	.825
	Poor design of data collection questionnaire	4.15	.854	2.17	.822	3.54	1.247
	Problems related to data preparation and	2.03	.805	1.89	.796	1.98	.802
	Lack of data/information integration	3.32	1.134	3.40	1.241	3.35	1.163
	Poor data quality	1.96	.747	4.34	.968	2.69	1.375
	Delayed submission of reports	2.10	.831	4.46	.780	2.83	1.362
Resources related (human, material and financial)	Difficulty to keep skilled technical staff	4.09	.825	3.94	.906	4.04	.849
	Low technical capacity of EMIS staff	4.03	.789	4.09	.781	4.04	.784
	Inadequate manpower	4.27	.801	1.83	.707	3.51	1.370
	Insufficient financial investments to EMIS	4.24	.776	4.31	.796	4.27	.779
	Lack of incentives for those involved in EMIS activities	4.14	.751	4.20	.833	4.16	.774
	Poor ICT infrastructure	4.18	.833	4.23	.731	4.19	.800

From Table 17, one could observe that insufficient financial investments to EMIS, absence of clear data/information policy, poor information culture on the part of users, difficulty to keep skilled technical staff, low technical capacity of EMIS staff, lack of incentives for those involved in EMIS activities and poor ICT infrastructure, as perceived by all groups of respondents, were serious problems for the practice of EMIS at all levels of the education system. All of the items have mean scores ranging from 4.04 to 4.26. This implies that majority of the aforementioned challenges in the table were considered as serious problems at all levels of the education echelon.

When closely examined, all the challenges listed above have their own negative pressure in the practice of EMIS. Ideally the design and establishment of an EMIS should be preceded by appropriate policy development legislation and relevant administrative decisions, however, in practice Tigray region have not clear data/information policy that support EMIS development. Thus, the development of clear policies and clear operational guidelines and mechanisms governing the collection, management, access, dissemination and use of education data and information that are consistent with existing legal and regulatory statues become critically important in such an environment.

As the result depicted, financial investment to EMIS and ICT infrastructure were severely affect EMIS system and capacity. Most of the time, the problem of financial investment emanates from lack of administrators' willingness to allocate necessary budget for developing EMIS. The same happened to the EMIS of Tigray. Hence, managers should give attention for the allocation of financial resource like other units of the education system. The potential of the ICT is undeniably significant. Indeed the utility of the ICT for improving data collection and, more importantly, data and information dissemination have grate impact. The non-utilization of ICT infrastructure comes from lack of computers and electronic devices at all levels of the education system in a satisfactory manner. Thus, there is a need to computerize schools and other levels of the education system to have effective EMIS system in the region.

However, the use of technology will not compensate for a lack of adequate user skills and knowledge because absences of skilled manpower rigorously affect EMIS activities. In most cases, EMIS activities like data collecting, processing and analysis requires greater capacity, which again requires equivalent motivations/remunerations. When these do not exist, it is difficulty to keep skilled technical staff for a long period of time in the organizations. This in turn forces the organization to employ less skilled and less experienced personnel in the post. It is also important to provide sufficient utilities and necessary material resources to undertake the EMIS function properly at all levels.

Most of the responses given by school and education office respondents were match at mean values. However, the response for poor design of data collection questionnaire, poor data quality, delayed submission of reports and inadequate manpower were rated controversially by majority of the group respondents as either serious (rated from 4.09 to 4.27 mean) or not a problem (rated from 1.83 to 2.17 mean). When closely examined, most of the school respondents considered poor design of data collection questionnaire and inadequate manpower as serious problem, whereas not a problem for education office respondents. The same is true for the problems poor data quality and delayed submission of reports as serious problem for education office and not a problem for school respondents. This shows that both respondents were given higher value for their own duties and degraded the work of others.

On the other hand, poor coordination and leadership (GM=3.33) and lack of data/information integration (GM=3.35) were commonly perceived as moderate hindrances and the remaining two-

unhelpful management attitude (GM=2.13) and problems related to data preparation and analysis (GM=1.98) were considered as not problems.

The computed standard deviation results showed that the differences for all factors lie on average in the range of 0.77349 -1.37506. This implies that no significant difference existed on all factors and there was an agreement of opinion between respondents of the school and education office on EMIS problems.

In relation to the problems that affect the practice of EMIS, additional information was obtained from the interview and FGD held with regional EMIS unit head, economic and finance heads of region, woreda and regional heads and school principals. The interview and FGD result have shown similarity with that of the quantitative data collected through questionnaire. Most interviewee and discussion members raised the aforementioned problems as critical challenges for EMIS functions at all levels of the education system. As well, regional EMIS unit head and woreda education office developmental planning coordinators mainly affirmed that problems like poor data quality, delayed submission of reports, lack of technical skill, and absence of clear data/information hampered severely the management of EMIS in their respective organization. On the other hand, principals denied the design of data collection questionnaire which lacks so many qualities. More over, low technical capacity and inadequacy of EMIS staff, insufficient financial investments, poor ICT infrastructure and lack of incentive were the most challenging problems to implement EMIS effectively in their institution.

4.2.6. Organizational development and Capacity building to improve EMIS

Lack of capacity and poor organizational structure are headache components in most countries in functioning of EMIS. It is important to made efforts to enhance them because institutional structure and a comprehensive package of capacity building activities are vital issues for facilitating the over all functions of EMIS. This part, therefore, examined how it was practical in EMIS of Tigray region and the following items were provided to the sample respondents to be rated using a five point likert type scale as strongly agree (5), agree (4), undecided (3), disagree (2) and strongly disagree (1). For ease of interpretation scores less than 2.5 were considered as poorly done activities, scores from 2.5-3.49 were considered as average performance and scores grater than or equal to 3.5 were interpreted as highly performed activities.

Table 18: A Chi-square Test of Respondents View on Institutional Development and Capacity Building Activities

Activities to improve EMIS	Mean of Respondents			χ^2	
	Schools N=78	Education offices N=35	GM		
	$\bar{X}$	$\bar{X}$		CV	p-value
Assigned qualified personnel in EMIS positions	3.81	3.97	3.86	7.852	.097
Consistent political commitment and support are in place	3.81	3.77	3.79	2.137	.710
Having clear Job descriptions	3.81	3.74	3.78	4.176	.383
Systems, procedures and structures are in place	3.68	3.46	3.61	4.830	.305
Strong coordination and planning	3.63	3.43	3.57	8.480	.075
Institutional reforms are made	3.57	3.57	3.57	3.517	.475
Availability of Material and financial resources	2.46	3.02	2.64	12.866*	.012
Use of effective ICT infrastructures	2.20	3.11	2.48	20.730*	.000
Relevant trainings are provided/skill upgraded	2.24	2.17	2.22	.784	.676
Incentive structure is available	1.83	2.05	1.90	2.100	.350

Asterisks indicate Significance at P< 0.05

As depicted in table 18, assigning qualified personnel in EMIS positions, consistent political commitment and support, clear Job descriptions, existing systems, procedures and structures, strong coordination and planning and institutional reforms were highly performed activities, according to the majority of the school and education office respondents. All the activities had mean value that ranges from 3.57 – 3.86. On the opposite, as the sample respondents reacted, activities like provision of relevant training and availability of incentive structure were poorly done, which had mean scores below 2.5. This result designated that institutional development activities that facilitate EMIS activities were not significant at schools and education offices.

Activities like availability of Material and financial resources and effective ICT infrastructure utilization were reported variably by respondents. Most school respondents looked at both activities as poorly performed; but majority of education office respondents looked at as averagely done activities. The computed chi-square test of significance at 0.05 levels was calculated. The result showed the existence of statistically significant difference in the proportion of the response of respondents along the response category concerning the availability of material and financial resources and effective ICT infrastructure utilization, because the observed values at the two activities are greater than the tabled value of 9.49. The implication is there are relationships between availability of material and financial resources and effective ICT infrastructure utilization activities and educational level. The examination of the observed mean in each category has revealed that

there was a difference between schools and education offices about availability of material and financial resources and effective ICT infrastructure utilization.

The result from an interview indicated that some of the capacity development activities like provision of relevant training and availability of incentive structure were found to be meager in all levels of the system. Hence, it is difficult to perform activities of EMIS with no adequate knowledge and skill as well without incentive or remuneration. Besides, there is a need to introduce the new information communication technology and allocating sufficient resources at all levels of the education system, however, the problems were rather severe at schools. It is obvious that ICT infrastructure is a critical element to be considered in developing all kinds of EMIS strategies because ICT based EMIS is now almost a rule in planning, data collection, processing, analysis and dissemination for EMIS output. It is also important to consider financial and human resource to undertake the application of EMIS properly.

Institutional development and capacity building activities like provision of relevant training, incentive, allocate adequate resources, and maximum utilization of information technology were dominated problems. The region, therefore, should design wide-ranging package of capacity building activities and organizational development practices at all levels of the education system in order to have efficient EMIS system.

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This part of the study, chapter five, deals with summary, conclusion and recommendation. In this section, first, a brief summary of the research approach and the major results of the study are presented; second, conclusion are made on the results of the study; finally, some of possible recommendations that are considered to be relevant and significant are given based on the conclusion.

5.1. Summary

In Tigray's region, the EMIS unit in the sector faced different problems. Most of the problems were created due to inadequate and ineffective data collection instrument, lack of awareness on EMIS, request and collect the same data from the same source (that is school), lack of skilled personnel and lack of infrastructure. So, the main purpose of this study was to assess the practice of EMIS in Tigray region and point out the existing problems and to propose alternative solutions. In light of this, the study focused on meeting the following specific objectives.

1. To identify educational data/information available at all levels to users
2. To scrutinize the design of data collection questionnaire.
3. To spot the major EMIS functions performed at schools, WEO, and region.
4. To assess the type of data/information demanded and supplied to users.
5. To assess the extent to which EMIS output is needed.
6. To identify the problems that affects the practice of Education Management Information System and to propose ways to improve the region's EMIS.

The study was guided by the following basic questions and attempted to answer them.

1. What type of data/information available to users?
2. To what extent do EMIS functions apply at all levels of education system?
3. What type of data/information is supplied to users in terms of quality?
4. To what extent do EMIS outputs needed/utilized?
5. What are the major problems that impede the practice of EMIS and possible solutions?

In order to address the basic questions of the study relevant and related literature was conducted. Descriptive survey was employed to assess the practice and problems of EMIS. The data for the study was collected from 6 town and 9 rural woreda education offices and 15 secondary and 30

primary schools. The study areas were selected based on stratified and simple random sampling, but the individual respondents were taken on purpose from each institution because all the principals, record officers and EMIS personnel at the respective institutions were samples. The proposed samples were 5 TEB EMIS staff, 30 WEO data analysts and developmental planning coordinators, 90 principals and record officers. One TEB head, 10 WEO heads, one TFEDB, 6 WEFDO heads, two NGO representatives were involved in the study through interview. Focus group discussion was also included in the study.

The data were collected through questionnaire, interview, and data analysis and focused group discussion. Three sets of questionnaires covering all relevant areas were designed to collect the necessary information from school principals, WEO and regional EMIS unit. More over, semi-structured question was prepared for interview and focused group discussion also held. In addition to this, documents available at different levels of the education system were analyzed to support the data collected by other types of instruments. The questionnaires were pre-tested in one secondary and one primary schools and one woreda education office not included in the sample study. Based on the feedbacks, the instruments were revised for the final study. About 125 questionnaires were distributed to the respondents, out of which 113(90.40 percent) were properly filled and returned and the researcher believed that the collected questionnaires were satisfactory to make conclusion. Various statistical tools like mean, grand mean, percentages and frequency distribution, standard deviation, and chi-square test were used to analyze the collected data. Based on the objectives, the major findings of the study are summarized as follows.

5.1.1. Characteristics of Respondents

a) Majority (63.72 percent) of the respondents those who are involved in EMIS activities were at the active working age group.
b) The educational level of the respondents was significantly satisfactory. More than, 65 percent of principals, 73 percent of woreda education statistician and experts, and 100 percent regional EMIS personnel were BA/BSC and above holders and 63.64 percent of record officers have diploma. However, more than 53% of the respondents were qualified with other fields of specialization that is not relevant to the work.
c) Although most of the respondents (84.95 percent) had more than 6 total years of service which was important to acquire more experiences, they (53.98 percent of the respondents) were less experienced in current position.

d) According to response of respondents, in the open ended question, most of them had not received training relevant to their post. Those who received the training were limited only on certain issues which were not relevant to EMIS activities.

5.1.2. The Practice and Problems of EMIS

5.1.2.1 Data Collection Questionnaire Design

The study revealed that most of the requirements of data collection questionnaire were felt as negative response in all groups of the respondents such as the use of common definitions and terminology ($\overline{X}$=2.29), providing mutually exclusive choices in data collection questionnaire ($\overline{X}$=2.36) and matching the design of school record keeping with the questionnaire ($\overline{X}$=2.35). In this case, the questionnaire was not fulfilling the necessary requirements of a format used to collect educational data/information.

5.1.2.2. The Users and Availability of Educational Information

a) The common educational data/information mostly (GM=more than 3.58) available at all levels of the education system were enrolment by grade/age/sex, net and gross enrolment rate by grade/sex, students' dropout rate, students' promotion/graduation/transition rates, teachers' number by sex/age/qualification/subject/experience, students' text books by grade/subject, and students' desk.

b) Information related to disabled students, per-students cost, annual revenue budget by source of income, and school annual expenditure budget were rarely (GM=less than 2.5) available at all levels of the education echelons.

c) Educational data/information on teachers' transfer/turnover, teachers guide by grade/subject, and teachers' educational materials and facilities were partially (GM= 2.66 – 2.76) existed in the system.

5.1.2.2.1 Education Data/Information Formats at Different Levels

a) According to most (61.5 percent) of the school respondents, handwritten documents were found to be the main format used in schools for maintaining information. However, both statistical yearbook and electronic documents were unpopular formats by which data/information was available. Majority of the school respondents replied that statistical yearbook (62.8 percent) and electronic document (61.5) formats were used rarely or never in keeping or upholding data/information.

b) Mostly educational data/information was available in electronic documents and statistical yearbook in education offices. Electronic documents by 60.0 percent and statistical yearbook by 57.1 percent of the education office respondents; data/information was availed usually or mostly.

5.1.2.2.2 Data/Information Integration

a) More than 62 percent of school respondents replied that there was no organized information base. Hence, majority of them believed the non-existence of organized data base system at schools. On the other hand, 77.1 percent of education office respondents replied that there was an organized data base system in their organization. Therefore, organized information base was existed at education office but not at schools.
b) Most of the school (71.8 percent) and education office (85.7 percent) respondents were agreed positively about integration of information system in their respective organization.
c) The overwhelming majority of school 79.5 percent and education office 97.2 percent respondents indicated that information flows either in two directions (vertically and horizontally) or three directions (vertical, horizontal and diagonal).

5.1.2.2.3. Quality of EMIS Data

a) The respondents considered relevance and clarity of educational data at high level quality with grand mean 4.16 and 4.00 respectively.
b) Most of the respondents categorized timeliness (GM= 2.13) and accuracy (GM=2.25) under low level quality. But, consistency (GM=2.57), completeness (GM=2.91) and accessible (GM=3.44) of data quality indicators had average quality level.

5.1.2.2.4. Educational Data/Information Users

a) There was high demand of school education information by political administrative bodies (mean=3.78), woreda education offices (mean=4.33), and school administrators (mean=4.59) for a variety of EMIS functions. More over, other woreda sectors like finance, health etc was reported having average (mean=2.88) level demand for school EMIS out puts.
b) An assessment of demand for EMIS data/information in schools clearly showed that EMIS outputs were underutilized by parents and the community (means=2.31), students (means=2.35), departments and teachers (means=2.44), and researchers (means=2.46). The

implication is that most of the users who have direct relationship with the school had low demand for EMIS data/information.

c) They were administrators, experts and EMIS workers within the organization, other government sectors and political decision maker's whose demand for education office EMIS outputs was higher ($\overline{X}$ =3.5).

d) The study showed that, parents and community ($\overline{X}$=1.86) and teachers association ($\overline{X}$=2.43) had low-level demand for education office level EMIS outputs and NGOs ($\overline{X}$ =2.91) and researcher ($\overline{X}$=2.71) demand for EMIS data/information was little more than low-level demand.

5.1.2.3 Degree of EMIS Functions

a) At school level, functions such as collecting data (mean=4.29), documenting and storing information (mean=4.24), filling annual data collection questionnaires (mean=4.08), and reporting to woreda (mean=4.24) were mostly done, where as dissemination (mean= 3.05) of data/information to users was partly performed.

b) Most of school respondents rated preparing specific data collection format (mean=2.41), developing school level indicators (mean=2.47), processing and analyzing data (mean=2.41), and verifying data (mean=2.32) were poorly done at school level.

c) A considerable number of woreda education office respondents showed that the share of WEO in EMIS had been preparing data collection formats, receiving data from schools, verifying data, compiling data, and processing and analyzing data. However, identification and analysis of information needs, preparation of abstracts and providing EMIS related trainings were poorly performed EMIS functions (mean scores < 2.50).

d) Regarding to EMIS functions, all except provision of EMIS related trainings (mean=2.4) were performed at higher level at TEB.

5.1.2.4 Utilization of EMIS Outputs

a) The findings showed that, according to majority of the respondents, educational data/information was highly utilized (grand mean □3.50) at school and education office levels for planning and budgeting, sound decision making, monitor progress towards objectives, evaluating performance, management and administration operations, enrollment projection and allocating resources.

b) Conducting research and developing programs and projects were low data utilized functions (grand mean < 2.5). This shows that both levels of the education system did not give weight to conduct research and development of programs and projects.

5.1.2.5. Problems of EMIS

5.1.2.5.1. Barriers to Use EMIS Data/Information

a) The overwhelming majority of respondents indicated that low level of data analysis ($\overline{X}$=3.96), lack of access to extract data ($\overline{X}$=3.68), organizational culture and leadership ($\overline{X}$=3.58) and low technical capacity of users and EMIS staffs ($\overline{X}$=3.57) were serious problems to use data at all levels of education system.

b) Both perceived effect of data use ($\overline{X}$=2.89) and low quality of data ($\overline{X}$=2.61) were looked by all groups of respondents as moderate hindrances to use EMIS data/information.

5.1.2.5.2. Problems Impede the Practice of EMIS

a) Insufficient financial investments to EMIS (GM=4.31), absence of clear data/information policy (GM=4.14), poor information culture on the part of users (GM=4.08), difficulty to keep skilled technical staff, low technical capacity of EMIS staff (GM=4.09), lack of incentives for those involved in EMIS activities GM=4.20) and poor ICT infrastructure (GM=4.23), as perceived by all groups of respondents, were serious problems for the practice of EMIS at all levels of the education echelon.

b) The respondents were also commonly perceived poor coordination and leadership (GM=3.33) and lack of data/information integration (GM=3.35) as moderate hindrances and the remaining two- unhelpful management attitude (GM=2.13) and problems related to data preparation and analysis (GM=1.98) were considered as not problems.

5.1.2.6 Capacity Building and Organizational Development to Improve EMIS

a) A considerable number of respondents were looked assigning qualified personnel in EMIS positions, consistent political commitment and support, clear job descriptions, existing systems, procedures and structures, strong coordination and planning and institutional reforms as highly performed activities at all levels of the education hierarchy. All the activities had mean value greater than 3.57.

b) Institutional development activities like provision of relevant training and availability of incentive structure were insignificantly applicable at schools and education offices.

c) According to the sample respondents, activities like availability of material and financial resources and effective ICT infrastructure utilization were reported variably. Most school respondents looked at both activities as poorly performed (grand mean less than 2.5); but majority of education office respondents looked at as averagely ($2.5 \leq$ mean ≤ 3.5) done activities.

5.2. Conclusion

Educational information should be available in adequate amount for users in order to functional a system rationally and operational decisions can be taken. The analysis of educational data/information availability at all levels of the education echelons of Tigray showed that EMIS outputs were not fully accessible. Besides, there was also a deficiency in collecting qualitative data/information in the region especially at school level. The study also revealed that the questionnaire was not fulfilling the necessary requirements of a format used to collect educational data/information in the region. It obvious that the problem for not abundantly available of educational data was the design of the data collection questionnaire.

Regarding to EMIS functions, schools have been restricted on collecting, filling annual data collection questionnaire, documenting and storing and reporting data to next level, whereas, preparing data collection format, verifying data, processing and analyzing data, developing school indicators were completely ignored. At woreda level important EMIS functions like identification and analysis of information needs, preparation of abstracts and providing EMIS related trainings are overlooked. The finding, therefore, indicated that educational data/information has not lead to improved educational practice at levels where it matters. The existing study has also shown that education data/information in the region lacks accuracy and timeliness and this leads for the production of low quality data. Thus, users have the probability of using deficient information. At all levels, the assignment of personnel in EMIS unit does not consider the subject of specialization; hence, EMIS of the region was suffered primarily from major capacity constraints. The study as well revealed that in EMIS unit there were no adequate human and material resources.

The assessment in the region clearly showed that there has been relatively better use of data at all levels of the region in almost majority utility areas; nevertheless, EMIS outputs were underutilized in areas where they have vital role in improving the quality of education, for instance conduct research and development of programs and projects. Furthermore, demand for EMIS

data/information by parents and community, parents and teachers association, students, and teachers was of course a common problem at all of the education system.

Institutional structure and a comprehensive package of capacity building activities are vital issues for facilitating the over all functions of EMIS, however, the study revealed that activities like provision of relevant training, incentive, allocation of adequate resources, and maximum utilization of information technology were found to be scanty at all levels of the system. Moreover, the region has experienced fundamental problems related with administrative and institutional, data and resource.

Therefore, in light of these findings it could be concluded that the EMIS in Tigray region was constrained by educational data availability, data accuracy and timeliness, processing and analyzing data (at school and woreda level), provision of relevant training, incentive, allocation of adequate resources, and maximum utilization of information technology and not well functioning to meet the purpose of the education system of the region.

5.3. Recommendations

Since research is not an end by itself, but rather a means of improving the current situation, it is appropriate to propose necessary recommendations based on the findings of the study.

1) The extent of practice of EMIS demands sufficient knowledge, skill and creativity of personnel working in it since its tasks are many and challenging. In this case training is one way of improving the competency of personnel. Hence, REB and WEO might organize and give intensive training on the concepts related to EMIS at all levels of the education system of the region in the form of seminar, workshop, conference and experience sharing programs to equip them with new technologies and activities of EMIS. Moreover, there is a need to give attention in assigning people to where their skill and knowledge is required. Because matching educational level and qualification with the task requirement should be the prior consideration in selection and requirement of employees.
2) Data collection questionnaire entails the necessary requirements of a format for collecting educational data/information. The design of data collection format will determine the type of data collect. Poor design of data collection questionnaire is deprived in many of its characteristics in achieving the expected purposes. Thus, the researcher advises that the data collection format should be clear in terms of using common definitions and terminology and

mutually exclusive choices. The data collection questionnaire should not show any variation with the design of school record keeping that hampers data quality. Therefore, the regional education bureau should revisit the design of data collection questionnaire.

3) The study revealed that there was no organized data base system at school level. Hence, the non-existence of an organized information base at schools make access challenging and hampers the over all functions of EMIS in the region. So that woreda education office in collaboration with regional education bureau should prepare capacity building session that encourage schools to use organized information base.

4) The findings of the study showed that the utilization of educational data/information for conducting research and developing programs and projects was poor. Here, EMIS outputs were underutilized in areas where they have vital role in improving the quality of education and this emanates from lack of adequate knowledge about importance of data. Therefore, make users/stakeholders aware the worth of information to help them in achieving their objectives and establishing chances for stakeholders to use information through conference, workshops and media.

5) Findings revealed that the practice of EMIS is found to be in lack of some important data quality criteria like accuracy and timeliness that cannot reversed if it continues as it is. Therefore it is recommended that all levels of the education echelon (schools, WEO and REB) should identify the problems that hamper the quality of data/information and principles of data quality need to be applied at all stages of the data management process.

6) One of the expected main purposes of EMIS was availing data/information to users in a satisfactory amount and quality. But, information related to disabled students and financial resources were either rarely or not available. Qualitative data as well found on rare occasions. Hence, the types of information provided for users can be considered as unsatisfactory to carry out the overall activities of EMIS. Therefore, Tigray Education Bureau and other educational levels of the region should provide various types of data/information by considering the interest of the stakeholders. More over, there is a need to provide discussion forum with different clients/stakeholders like researchers, project developers, NGOs, government offices etc in order to collect necessary information that improve data available.

7) EMIS of the region must redesign to the concept that data would be collected, analyzed, processed, summarized, and used at each successive level of administrative hierarchy. In order for EMIS to function properly, data collection, data analysis and management, and data

utilization should be applied at any educational level. To make possible this, the design of EMIS by TEB must therefore, incorporate decisions as to which information must remain at each level and which must pass to another level. This could encourage schools and woredas not to limit themselves to only gathering and reporting than analyzing and using.

8) Lack of access to extract data, low technical capacity, low level of data analysis and organizational culture and leadership were found to be the major barriers to use data at all levels of the education system of the region. The region, therefore, should design wide-ranging package of capacity building activities and organizational development practices at all levels of the education system in order to have efficient EMIS system.

9) The findings revealed that in Tigray region the practice of EMIS faced a variety of problems like absence of clear data/information policy, insufficient financial investments to EMIS, poor information culture on the part of users, difficulty to keep skilled technical staff, low technical capacity of EMIS staff, lack of incentives for those involved in EMIS activities and poor ICT infrastructure at all levels of the education system. In this case, to tackle these problems:

    a) The development of clear policies and clear operational guidelines and mechanisms governing the collection, management, access, dissemination and use of education data and information that are consistent with existing legal and regulatory statues become critically important.

    b) Managers should spend sufficient financial and material resource to EMIS unit at all levels of education system of the region.

    c) The development of information system requires attention for expansion of ICT infrastructure in a satisfactory manner. Hence, new technologies like computer, internet, software development, etc need to be introduced for easy and direct access at all levels. The expansion of ICT motivates schools to use different electronic devices (formats) for data/information availability.

    d) Stipulation of incentive structure for those involved in EMIS activities is important from school up to the regional level because EMIS activities require better competence and the incentive keeps skilled technical staff for a long period of time in the organizations.

BIBLIOGRAPHY

BOOKS

Adeyimi.(1995).**Information system management strategies for Africa.** Paris: UNESCO.

Adman, P. & Warren, L. (1996).**Information Systems Management: Perspectives for Higher Education.** New Market Street: Mimir press.

Aminu, J.M.(1986).**Quality and Stress in Nigerian Education.** Maiduguri: Northern Nigeria Publishing Company.

Aspinwall, K., MacAuley, Simkins, & Wilkson (1996).**Managing evaluation in education: A developmental approach.** London: Rutledge.

Azziz, A. et al. (1990)."Current practices, problems, and issues associated with the collection and use of information." In Boss, K.N. & Mahlck, L. (eds).**Planning the quality of education: the collection and use of data for informed decision-making.** Paris: UNESCO, pp. 34-62.

Carrizo, L., Sauvageot, C. & Bella, N. (2003).**Education Policies and Strategies: Information Tools for the Preparation and Monitoring of Education Plans**. Paris: UNESCO.

Chapman, A. D. (2005).**Principles of Data Quality.** Report for the Global Biodiversity Information Facility, Copenhagen.

Chapman, D.W & Mahlck, L.O.(1993).**From Data to Action: Information System in Educational Planning.** UNESCO; Paris: Pergamon Press Ltd.

Coombs, P.H. (1970).**What is educational planning?** UNESCO, IIEP. Belgium.

Currt, A., Flett, P. & Hollingsworth, I. (2006).**Managing Information System: The Business Perspective.** London: Rutledge Taylor and Francis Group.

Davis, G. B. &. Olsen, M. H. (1985).**Management Information Systems: Conceptual Foundations, Structure and Development (2nd ed)**. New York: McGraw, HOL Book Company.

Davis, R.G.(1994).Educational planning: Models and methods. **In the international encyclopedia of education (2nd ed).** Vol.3, pp. 1825-1831. England: Pergamon.

Derebssa Dufera (1998)."Planning of Education under the Decentralized system in Ethiopia: Its reflection on Quality of Education in Ethiopia." Proceedings of National Conference held in Awassa College of Teacher Education; July 12-18. Institute of Educational Research, AAU.

Doyle, S. (2001).**Information Systems (3rd ed)**. Cheltenham, Nelson Thomas Ltd.

Graca, P.(2006).**Education Management Information System: Advanced training program**. Paris: IIEP/UNESCO.

Hussein, K.M.(1977).Management information system for higher education: Studies in institutional management in higher education. **In the encyclopedia of higher education (3rd ed),** Vol.5, pp.1234. Paris: UNESCO.

International Federation of Red Cross (2002). **Handbook for Monitoring and Evaluation.** Switzerland: Red Cross and Red crescent Societies.

Jenkins, G.(1997).**Information Systems Policies and Procedures Manual.** USA: Prentice- hall, Inc.

Kamar, J.(2005).**Research methodology: A step-by-step guide for beginners.** London: Sage publications, Inc.

Kanter, J. (1992).**Managing with Information (4thed).** New Delhi: prentice hall of India Private Limited.

Kaul, L.(1996).**Methods of educational research.** New Delhi: Hindustan offset printers.

Keeves, J.p.(1990).**Educational research, methodology and measurement: An International Hand Book**. New York: pergamon press plc.

Kemmerer, F. (1994).**Utilizing Education and Human Resources Sector Analysis.** Paris: Imprimerie Gauthier-villars

Kroenke, H. (1994).**Management of Information System.** New York: McGraw-Hill

Loshin, D. (2009).**The Data Quality Business Case: Projecting Return on Investment**. Pitney Bowes Software, Inc.

Makwati, J.T., Malyenkuku, R. & Tegegn Nuresu (2004).**Education Management Information System (EMIS) and related activities external program review report.** Washington, DC. Thomas Jefferson St. NW.

MOE (1999).**Education sector development program I (ESDP I)**: Program action plan. Addis Ababa: Berhanena selam printing enterprises.

_____ (2002).**Education sector development program II (ESDP II)**: Program action plan. Addis Ababa: Berhanena selam printing enterprises.

_____ (2005).**Education sector development program III (ESDP III)**: Program action plan. Addis Ababa: Berhanena selam printing enterprises.

Murdick, R.G. & Ross, J.E.(1971).**Information Systems for Modern Management.** New Jersey: Prentice Hall.

Oz, E.(2002).**Management Information System (3rd ed).** New Delhi: Vikas publishing house.

Pearce, J.A. & Robinson, R.B. (1989).**Management.** New York: McGraw-Hill.

Pelgrum, W.J. & Law, N. (2003).**ICT in Education around the World: Trends, Problems and Prospects.** UNESCO, Macro Grafico, S.L.

Plunkett, W.R. & Attner, R.F. (1989).**Introduction to Management (3rd).** Boston: Pws-kent Publishing Company.

Redman, T.C. (2001).**Data Quality: The Field Guide**. Boston, MA: Digital Press.

Ross, K.N. & Mahlck, L.(eds) (1990).**Planning the Quality of Education: The Collection and Use of Data for Informed Decision-making**. UNESCO/IIEP: Pergamon press.

Seyoum T. and Ayalew S.(1989).**Fundamentals of educational research: For students and beginning researchers.** Addis Ababa University.

Stair, R.M. & Reynolds, G.W. (2003). **Principles of Information System: A Managerial Approach (6th ed).** Canada. Elm street publishing service, Inc

TEB (2008).**Education Statistics Annual Abstract.** 2000 E.C. (2007/8).

Tegegn Nuresu.(2003).**Education Management Information System.** Harare, Nesis/UNESCO.

Teshome Yizengaw (2007).**The Ethiopian Higher Education: Creating space for Reform.** Addis Ababa: St. Mary's UC printing press.

TGE (1992).A proclamation to provide for the establishment of national or regional self government. Negarit Gazeta, 51st year,No.2. Berhanena Selam publisher

Vannan, E. (2001).**Quantity Data: An improbable dream?** Colombia, Canada.

Villanueva, C. (2003). **Education Management Information System (EMIS) and the Formulation of Education For All (EFA): Plan of Action.** UNESCO.

Wilson, A. D. (1996).**Managing Information**. Better worth, Oxford: Heinemann ltd

Windham, D. M. (1996)."Linking information to incentives." In Kemerer and Windham (eds). **Incentive analysis and individual decision-making.** France: UNESCO.

Web Documents

Ajayi, I.A. & Omirin, Fedekemi F.(2007).**The Use of Management Information System (MIS) in Decision Making in the South-West Nigeria University.** Retrieved on September 17, 2010, from http://www.academicjournals.org/ERR

Cassidy, T. (2005).**Education Management Information System Development in Latin America and Caribbean: Lesson and Challenges.** Retrieved on October 03, 2010, from http://www.iado.org/IDBDocs.ofm

Crouch, L., Enache, M. & Supanc, P. (1999).**Education Management Information System (EMIS): Guidelines for Design and Implementation.** Retrieved October 19, 2010 from http://www.TechknowLogia.org; Knowledge Enterprise, Inc.

Ellison, R. (2004). **A Practical Guide to Working with Education Management Information Systems.** Retrieved September 13, 2010 from http://www.paris21.org/documents/2402.pdf

Hare, H. (2007).**Survey of ICT and Education in Africa: Ethiopia Country Report ICT in Education.** Retrieved November 11, 2010 from World face book

Hua, H.& Herstein, J. (2003).**Education Management Information System: Integrated Data and Information Systems and their Implications.** Retrieved on 25 October, 2010, from wwww.infodev.org

Kamar, H.S.(2006).**Education Information System.** Retrieved October 10, 2010, from www.Infodev.org/doc.432/pdf

Lucey, T.(2005).**Management Information System (9th ed).** Retrieved October 15, 2010 from http://wwwthomsonlearning.co.uk; Thomson Learning.

MOEC (2004).**Information and Communication Technology (ICT): EMIS Development Plan of Tanzania (2004-2007).** Retrieved October 25, 2010 from http://www.Infodev.org/doc.582/pdf

Moses, K.D. (2001).**Education Management Information System: What is it and why do we not have more of it?** Retrieved October 19, 2010 from http://www.TechknowLogia.org. Knowledge Enterprise, Inc.

THB (2010).Comprehensive prevention treatment and control of iodine deficiency in Tigray: A project proposal submitted to the Italian Surgeons Medical Team. Retrieved on September 25, 2010, from http://www.progettolaziochrurgiasolidaleonlus, pdf

Trucano,M.(2006). **Education Management Information System: Infodev.** Working papers no. 3, 4, 5, and 6. Retrieved on October29,2010 from http/www.infoDev.org/en/document.

UNESCO (2006). **Data Collection and Education Management Information System (EMIS). IIEP's print shop.** Retrieved September 16, 2010, from www.unesco.org/iiep

Voigts, F.G. (2006).**Development of an EMIS in Namibia.** Retrieved September 18, 2010, from www.infoDev.org

Unpublished materials

Ayalew Jifar.(2009).“The Planning and Management of EMIS in Addis Ababa City Administration”. A.A.U, unpublished M.A Thesis.

Jeilu Oumer.(2009).''Planning and information systems management in education''. Unpublished Teaching material Hand out.

Mengistu Amare.(2010).“An Assessment of the Development of Education Information System Management (EMIS) and its Challenges in Addis Ababa City Administration.” A.A.U, unpublished M.A Thesis.

Mokonnen Kejela.(2010).“The Practice and Problems of Education Information System Management in Oromia.” A.A.U, unpublished M.A Thesis.

Tiye Feyissa.(2006).“Education Management Information System under Decentralization: Its Practice and Problems in Oromia Region”. A.A.U, unpublished M.A Thesis.

Appendix-A

Addis Ababa University

College of Education and Behavioral Studies

Department of educational Planning and Management

Questionnaire to be filled by School Principals

General Direction

I would like to express my heart-felt appreciation and respect for your precious time and sincere cooperation, in advance, to fill this questionnaire. The information gathered will be used for research purpose aimed at improving EMIS practice in Tigray region and its overall performance as the decision support tool. Hence, the success of this study entirely depends upon your earnest and sincere response to the questions. Therefore, you are kindly requested to fill in this questionnaire with full attention in order to know about the major issues related to the study. Strict confidentiality will be observed.

General Instructions

- No need of writing your name;
- Please put 'x' or '✓ ' mark in the box provided where alternatives are given;
- For open ended questions, you are kindly requested to give short and precise answer on the space provided;

Notice

The Acronyms and terms used in the questionnaire stand for

AEC- Annual Education census

EMIS- Education Management Information System

NGO- Non-Government Organization

ICT- Information Communication Technology

Part I- General Information

1. Woreda _____ School _____

2. Sex

A. Male ☐ B. Female ☐

3. Age A. 25 and below ☐ B. 26-35 ☐

C. 36-45 ☐ D. Above 45 ☐

4. School level

A. Grades 1-4 ☐ B. Grades 5-8 ☐ C. Grades 1-8 ☐

D. Grades 9-10 ☐ E. Grades 11-12 ☐ F. Grades 9-12 ☐

If other, please specify _____

5. Work responsibility

A. Record officer ☐ B. School principal ☐

If other, please specify _____

6. Educational qualification

A. TTI certified ☐ B. Diploma Graduate ☐

C. 1st Degree Graduate ☐ D. 2nd Degree Graduate ☐

If other, please specify _____

7. Subject of specialization:

Major _____

Minor _____

8. Job experience (in Years):

Years of service in other position _____

In current position _____

9. List down trainings (short-term) received relevant to your post

_____

_____

_____

_____

_____

Part- II EMIS Process

1. Availability of Educational Information

To what extent the listed below data and information are available in your school? Please rate them by using the numbers to indicate:

5=Fully available, 4=Mostly available, 3=Partially available, 2=Rarely available, 1=Not available

No.	Data /information	Degree of Availability				
		5	4	3	2	1
1.1	**Students**					
	a) Enrolment by grade, age, sex					
	b) Net and Gross enrolment rate by grade, sex					
	c) Student attendance/discipline					
	d) Students wastage by grade/sex					
	e) Students promotion/graduation/Transition rates					
	f) Disabled students					
1.2	**Teachers and Personnel**					
	a) Teachers number by sex, age, qualification, subject, experience					
	b) Teachers' transfer, turnover					
	c) Administrative workers employment (transfer & turnover)					
1.3	**Educational facilities and Materials**					
	a) Students text books by grade, subject					
	b) Teachers guide by grade, subject					
	c) Students desk					
	d) Teachers educational materials and facilities like black board, duster, shelf, table, chair, computer, calculator, etc					
	e) Latrine, sport field, water supply, library, laboratory, radio, plasma etc					
	f) Teaching aids					
1.4	**Financial Resources**					
	a) Per-students cost					
	b) Annual revenue budget by source of income					
	c) School annual expenditure budget					

1.5 If any other, please specify here _____

_____

_____

2. Data collection questionnaire design

The following are requirements related to data collection questionnaire. Indicate your agreement or disagreement for the statement:

5= Strongly agree, 4=Agree, 3= Medium, 2= Disagree, 1= Strongly disagree.

No	requirements	5	4	3	2	1
2.1	Keep data disaggregated at an appropriate level					
2.2	Common definitions and terminologies are used					
2.3	Provided choices are mutually exclusive					
2.4	The form has clear physical lay out					
2.5	The design matches with school record keeping					
2.6	Permit subsequent statistical analysis of data for reliability and validity					

2.7 If you have any comment on the data collection questionnaire, please specify here

_____

_____

_____

3. Degree of EMIS Functions

The following are functions in the production of education information. Which ones are performed in your school? Please rate them to indicate:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

No.	Function of EMIS	5	4	3	2	1
3.1	Preparing school specific data collection format					
3.2	Collecting data					
3.3	Documenting and storing data/information					
3.4	Filling annual data collection questionnaire					
3.5	Reporting to Woreda					
3.6	Developing school level indicators					
3.7	Preparing and analyzing data					
3.8	Verifying data					
3.9	Disseminating to users					

3.10 If others please specify here _____

_____

_____

3.11 What strategies should be taken to improve EMIS functions at school level _____

_____

_____

_____

4. Data/Information Integration

4.1 Is there an organized data base which indicates all the yearly activities of each unit in your school?

a. Yes ☐ b. No ☐

4.2 Do you think that integration of EMIS in one single system is made practical in your school?

a. Yes ☐ b. No ☐

4.3 In which direction data/information flows in your school?

1. Vertically ☐
2. Horizontally ☐
3. Diagonally ☐
4. 1 and 2 ☐
5. All the above three ☐

5. Quality of EMIS Data/Information

To what extent does data/information in your school satisfy the following quality criteria? Please rate them using the numbers indicated:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

Indicators of Quality	**5**	**4**	**3**	**2**	**1**
a) Accuracy					
b) Relevance					
c) Completeness					
d) Clarity					
e) Timeliness					
f) Consistency					
g) Accessible					

6. Utilization of EMIS Outputs

To what extent the following educational information are demanded or used in the school? Indicate the extent by the numbers:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

No	Functions	5	4	3	2	1
6.1	Facilitates school planning and budgeting					
6.2	Sound decision making					
6.3	Monitor progress towards objectives of the school					
6.4	Evaluating performance of the school					
6.5	Management and administration of school operations					
6.6	Enrollment projection					
6.7	Conducting studies/research					
6.8	Developing programs and projects					
6.9	Allocating resources					

6.10 If others, please specify here_____

_____

6.11 Is demand of information satisfactory? If not, please indicate the major problems_____

_____

_____

7. Formats in which Education data/information are available

Listed below are forms in which education information is available. Show the extent of in which the data/information exist in a given form in your school.

5=Always, 4=Usually, 3=Sometimes, 2=Rarely, 1=Never

No	formats	5	4	3	2	1
7.1	Statistical year book					
7.2	Electronic document (computer file, floppy, flash, CD-ROM)					
7.3	Printed document					
7.4	Hand written documents					

8. Data/information users

What is the extent of demand for EMIS outputs (data/information) in your school? Indicate the degree of your clients demand for the statements:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

No.	Clients uses data/information	5	4	3	2	1
8.1	School administrators					
8.2	Different departments and teachers of the school					
8.3	Woreda education office					
8.4	Political administrative bodies					
8.5	Parents and the community					
8.6	Other woreda sectors like finance, health etc					
8.7	Researchers					
8.8	Students					

8.9 If any other, please specify _____

_____

8.10 What aspects of the information generated by school should be improved please, specify

_____

_____

9. Barriers to the use of EMIS data/information

Listed below are assumed barriers to the use for information for decision-making? Please rate them using the numbers:

5=Very serious, 4=Serious, 3= Moderate, 2=Less serious, and 1=Not a problem

No	Proposed Reasons	5	4	3	2	1
9.1	Low level of data analysis					
9.2	Poor quality of data					
9.3	Lack of access to extract data					
9.4	Perceived effect of data use					
9.5	organizational culture and leadership					
9.6	Low technical capacity of users and EMIS staff					

9.7 If others please specify here _____

_____

_____

9.8 If you have any comments on the barriers to the utilization of information, please specify_____

_____

_____

Part III - Capacity Building and Organization Development that improve EMIS

1. Listed below are activities related to organizational development and capacity building. Please rate those using numbers to indicate:

5=Strongly agree, 4= Agree, 3= Undecided 2= Disagree, 1= Strongly disagree

No	Activities	5	4	3	2	1
1.1	Systems, procedures and structures are in place					
1.2	Institutional reforms are made					
1.3	Assigned qualified personnel in EMIS positions					
1.4	Having clear job descriptions					
1.5	Strong coordination and planning					
1.6	Relevant trainings are provided/skill upgraded					
1.7	Availability of Material and financial resources					
1.8	Use of effective ICT infrastructures					
1.9	Consistent political commitment and support					
1.10	Incentive structure is available					

1.11 If others please specify here _____

_____

_____

_____

1.12 If you have any comment on information system unit /section, please specify_____

_____

_____

_____

Part IV - Problems impede the practice of EMIS

1. Listed below are problems encountered the practice of EMIS. Indicate the extent of seriousness as they occur in your school by the numbers:

5=Very serious, 4=Serious, 3= Moderate, 2=Less serious, and 1=Not a problem

No	Problems	5	4	3	2	1
1.1	Absence of clear data/information policy					
1.2	Poor information culture on the part of users/Lack of users awareness					
1.3	Poor design of data collection questionnaire					
1.4	Problems related to data preparation and analysis					
1.5	Lack of data/information integration					
1.6	Poor data quality					
1.7	Delayed submission of reports					
1.8	Difficulty to keep skilled technical staff					
1.9	Low technical capacity of EMIS staff					
1.10	Inadequate manpower					
1.11	Insufficient financial investments to EMISs					
1.12	Lack of incentives for those involved in EMIS activities					
1.13	Poor ICT infrastructure					
1.14	Poor coordination and leadership					
1.15	Unhelpful management attitude					

1.16. If any, please specify here _____

_____

_____

1.17. Please specify areas in which you would require assistance to improve practices of EMIS in Tigray Region Education Bureau _____

_____

_____

_____

Appendix-B

Addis Ababa University

College of Education and Behavioral Studies

Department of educational Planning and Management

Questionnaire to be filled by Woreda Education Office

General Direction

I would like to express my heart-felt appreciation and respect for your precious time and sincere cooperation, in advance, to fill this questionnaire. The information gathered will be used for research purpose aimed at improving EMIS practice in Tigray region and its overall performance as the decision support tool. Hence, the success of this study entirely depends upon your earnest and sincere response to the questions. Therefore, you are kindly requested to fill in this questionnaire with full attention in order to know about the major issues related to the study. Strict confidentiality will be observed.

General Instructions

- No need of writing your name;
- Please put 'x' or '✓' mark in the box provided where alternatives are given;
- For open ended questions, you are kindly requested to give short and precise answer on the space provided

Notice

The Acronyms and terms used in the questionnaire stand for

AEC- Annual Education census

EMIS- Education Management Information System

NGO- Non-Government Organization

ICT- Information Communication Technology

Part I- General Information

1.Woreda _____

2. Number of government schools in your woreda

Primary schools _____

Secondary schools _____

3. Sex

A. Male ☐ B. Female ☐

4. Age A. 25 and below ☐ B. 26-35 ☐

C. 36-45 ☐ D. Above 45 ☐

5. Work responsibility

A. statistician ☐ B. planner ☐

If other, please specify _____

6. Educational qualification

A. Secondary school Graduate ☐ B. TTI certified ☐

C. Diploma Graduate ☐ D. 1st Degree Graduate ☐

E. 2nd Degree Graduate ☐

If other, please specify _____

7. Subject of specialization:

Major _____

Minor _____

8. Job experience (in Years):

Years of service in other position _____

In current position _____

9. List down trainings (short-term) received relevant to your post

_____

_____

_____

_____

_____

Part- II EMIS Process

1. Availability of Educational Information

To what extent the listed below data and information are available in your organization? Please rate them by using the numbers to indicate:

5=Fully available, 4=Mostly available, 3=Partially available, 2=Rarely available, 1=Not available

No.	Data /information	Degree of availability				
		5	4	3	2	1
1.1	**Students**					
	a) Enrolment by grade, age, sex					
	b) Net and Gross enrolment rate by grade, sex					
	c) Student attendance/discipline					
	d) Students wastage by grade/sex					
	e) Students promotion/graduation/Transition rates					
	f) Disabled students					
1.2	**Teachers and Personnel**					
	a) Teachers number by sex, age, qualification, subject, experience					
	b) Teachers' transfer, turnover					
	c) Administrative workers employment (transfer & turnover)					
1.3	**Educational facilities and Materials**					
	a) Students text books by grade, subject					
	b) Teachers guide by grade, subject					
	c) Students desk					
	d) Teachers educational materials and facilities like black board, duster, shelf, table, chair, computer, calculator, etc					
	e) Latrine, sport field, water supply, library, laboratory, radio, plasma etc					
	f) Teaching aids					
1.4	**Financial Resources**					
	a) Per-students cost					
	b) Annual revenue budget by source of income					
	c) School annual expenditure budget					

1.5 If any other, please specify here _____

_____

_____

1.6. In your opinion what is the reason for the unavailability of some educational information in your organization? _____

_____

_____

2. Data collection questionnaire design

The following are requirements related to data collection questionnaire. Indicate your agreement or disagreement for the statement:

5= Strongly agree, 4=Agree, 3= Medium, 2= Disagree, 1= Strongly disagree

No	requirements	5	4	3	2	1
2.1	Keep data disaggregated at an appropriate level					
2.2	Common definitions and terminologies are used					
2.3	Provided choices are mutually exclusive					
2.4	The form has clear physical layout					
2.5	The design matches with school record keeping					
2.6	Permit subsequent statistical analysis of data for reliability and validity					

2.7 If you have any comment on the data collection questionnaire, please spec_____

_____

_____

3. Degree of EMIS Functions

The following are functions in the production of education information. Which ones are performed in your organization? Please rate them to indicate:

5=Very high, 4=High, 3= Average 2= Low, 1=Very low

No.	Function of EMIS	5	4	3	2	1
3.1	Identification and analysis of information needs					
3.2	Preparing and distributing data collection formats and questionnaire					
3.3	Receiving data from immediate lower level					
3.4	Verifying data					
3.5	Compiling data/information					
3.6	Processing and analyzing data/information					
3.7	Developing indicators					
3.8	Preparation/publication of abstracts					
3.9	Providing EMIS related trainings					

3.10 If others please specify here _____

_____

3.11 What strategies should be taken to improve EMIS functions at your organization level _____

_____

_____

_____

4. Data/information integration

4.1 Is there an organized data base which indicates all the yearly activities of each unit in your office?

a. Yes ☐ b. No ☐

4.2 Do you think that integration of EMIS in one single system is made practical in your organization?

a. Yes ☐ b. No ☐

4.3 In which direction data/information flows in your organization?

1. Vertically ☐
2. Horizontally ☐
3. Diagonally ☐
4. 1 and 2 ☐
5. All the above three ☐

5. Quality of EMIS data/information

To what extent does data/information in your organization satisfy the following quality criteria? Please rate them using the numbers indicated:

5= Very high, 4= High, 3= Average, 2= Low, 1=Very low

Indicators of Quality	**5**	**4**	**3**	**2**	**1**
a) Accuracy					
b) Relevance					
c) Completeness					
d) Clarity					
e) Timeliness					
f) Consistency					
g) Accessible					

6. Utilization of EMIS outputs

To what extent the following educational information are demanded or used in the woreda? Indicate the extent by the numbers:

5= Very high, 4= High, 3= Average, 2= Low, 1= Very low.

No	Functions	5	4	3	2	1
6.1	Facilitates planning and budgeting					
6.2	Sound decision making					
6.3	Monitor progress towards objectives					
6.4	Evaluating performance					
6.5	Management and administration operations					
6.6	Enrollment projection					
6.7	Conducting studies/research					
6.8	Developing programs and projects					
6.9	Allocating resources					

6.10 If others, please specify here_____

_____

6.11 Is demand of information satisfactory? If not, please indicate the major problems_____

_____

_____

7. Formats in which Education data/information are available

Listed below are forms in which education information is available. Show the extent of in which the data/information exist in a given form in your organization.

5=Always, 4=Usually, 3=Sometimes, 2=Rarely, 1=Never

No	formats	5	4	3	2	1
7.1	Statistical year book					
7.2	Electronic document (computer file, floppy, flash, CD-ROM)					
7.3	Printed document					
7.4	Hand written documents					

8. Data/information users

What is the extent of demand for EMIS outputs (data/information) in your organization? Indicate the degree of your clients demand for the statements:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

No.	Clients uses data/information	5	4	3	2	1
8.1	Administrators and experts within the organization					
8.2	EMIS workers within the organization					
8.3	Political decision makers					
8.4	Other governmental sectors/bureaus like finance, health etc					
8.5	NGOs					
8.6	Researchers					
8.7	Parents and the community					
8.8	Teachers Association					

8.9 If any other, please specify _____

_____

8.10 What aspects of the information generated by school should be improved, please specify

_____

_____

9. Barriers to the use of EMIS data/information

Listed below are assumed barriers to the use for information for decision-making? Please rate them using the numbers:

5=Very serious, 4=Serious, 3= Moderate, 2=Less serious, and 1=Not a problem.

No	Proposed Reasons	5	4	3	2	1
9.1	Low level of data analysis					
9.2	Poor quality of data					
9.3	Lack of access to extract data					
9.4	Perceived effect of data use					
9.5	Organizational culture and leadership					
9.6	Low technical capacity of users and EMIS staff					

9.7 If others please specify here _____

_____

_____

9.8 If you have any comments on the barriers to the utilization of information, please specify_____

_____

_____

Part III - Capacity Building and Organization Development that improve EMIS

1. Listed below are activities related to organizational development and capacity building. Please rate those using numbers to indicate:

5=Strongly agree, 4= Agree, 3= Undecided 2= Disagree, 1= Strongly disagree

No	Activities	5	4	3	2	1
1.1	Systems, procedures and structures are in place					
1.2	Institutional reforms are made					
1.3	Having clear Job descriptions					
1.4	Assigned qualified personnel in EMIS positions					
1.5	Having strong coordination and planning					
1.6	Incentive structure/Remuneration packages is available					
1.7	Relevant trainings are provided/skill upgraded					
1.8	Availability of Material and financial resources					
1.9	Use of effective ICT infrastructures					
1.10	Consistent political commitment and support are in place					

1.11 If others please specify here _____

_____

_____

1.12 If you have any comment on information system unit /section, please specify_____

_____

_____

_____

Part IV - Problems impede the practice of EMIS

1. Listed below are problems encountered the practice of EMIS. Indicate the extent of seriousness as they occur in your organization by the numbers:

5=Very serious, 4=Serious, 3=Moderate, 2=Less serious, 1=Not a problem

No	Problems	5	4	3	2	1
1.1	Absence of clear data/information policy					
1.2	Poor information culture on the part of users/Lack of users awareness					
1.3	Poor design of data collection questionnaire					
1.4	Problems related to data preparation and analysis					
1.5	Lack of data/information integration					
1.6	Poor data quality					
1.7	Delayed submission of reports					
1.8	Difficulty to keep skilled technical staff					
1.9	Low technical capacity of EMIS staff					
1.10	Inadequate manpower					
1.11	Insufficient financial investments to EMISs					
1.12	Lack of incentives for those involved in EMIS activities					
1.13	Poor ICT infrastructure					
1.14	Poor coordination and leadership					
1.15	Unhelpful management attitude					

1.16. If any, please specify here _____

_____

_____

1.17. Please specify areas in which you would require assistance to improve practices of EMIS in the region _____

_____

_____

_____

_____

Appendix-C

Addis Ababa University

College of Education and Behavioral Studies

Department of educational Planning and Management

Questionnaire to be filled by Tegray Education Bureau

General Direction

I would like to express my heart-felt appreciation and respect for your precious time and sincere cooperation, in advance, to fill this questionnaire. The information gathered will be used for research purpose aimed at improving EMIS practice in Tigray region and its overall performance as the decision support tool. Hence, the success of this study entirely depends upon your earnest and sincere response to the questions. Therefore, you are kindly requested to fill in this questionnaire with full attention in order to know about the major issues related to the study. Strict confidentiality will be observed.

General Instructions

- No need of writing your name;
- Please put 'x' or '✓ ' mark in the box provided where alternatives are given;
- For open ended questions, you are kindly requested to give short and precise answer on the space provided

Notice

The Acronyms and terms used in the questionnaire stand for

AEC- Annual Education census

EMIS- Education Management Information System

NGO- Non-Government Organization

ICT- Information Communication Technology

Part I- General Information

1. Region _____

2. Number of government schools in your region

   Primary schools _____

   Secondary schools _____

3. Sex

   A. Male ☐ B. Female ☐

4. Age A. 25 and below ☐ B. 26-35 ☐

   C. 36-45 ☐ D. Above 45 ☐

5. Work responsibility

   A. EMIS case worker ☐ B. EMIS process owner ☐

   If other, please specify _____

6. Educational qualification

   A. Secondary school Graduate ☐ B.TTI certified ☐

   C. Diploma Graduate ☐ D. 1st Degree Graduate ☐

   E. 2nd Degree Graduate ☐

   If other, please specify _____

7. Subject of specialization:

   Major _____

   Minor _____

8. Job experience (in Years):

   Years of service in other position _____

   In current position _____

9. List down trainings (short-term) received relevant to your post

   _____

   _____

   _____

   _____

   _____

Part- II EMIS Process

1. Availability of Educational Information

To what extent the listed below data and information are available in TEB? Please rate them by using the numbers to indicate:

5=Fully available, 4=Mostly available, 3=Partially available, 2=Rarely available, 1=Not available

No.	Data /information	Degree of availability				
		5	4	3	2	1
1.1	**Students**					
	a) Enrolment by grade, age, sex					
	b) Net and Gross enrolment rate by grade, sex					
	c) Student attendance/discipline					
	d) Students wastage by grade/sex					
	e) Students promotion/graduation/Transition rates					
	f) Disabled students					
1.2	**Teachers and Personnel**					
	a) Teachers number by sex, age, qualification, subject, experience					
	b) Teachers' transfer, turnover					
	c) Administrative workers employment (transfer & turnover)					
1.3	**Educational facilities and Materials**					
	a) Students text books by grade, subject					
	b) Teachers guide by grade, subject					
	c) Students desk					
	d) Teachers educational materials and facilities like black board, duster, shelf, table, chair, computer, calculator, etc					
	e) Latrine, sport field, water supply, library, laboratory, radio, plasma etc					
	f) Teaching aids					
1.4	**Financial Resources**					
	a) Per-students cost					
	b) Annual revenue budget by source of income					
	c) School annual expenditure budget					

1.5 If any other, please specify here _____

_____

_____

1.6. In your opinion what is the reason for the unavailability of some educational information in your region? _____

_____

_____

1. Data collection questionnaire design

The following are requirements related to data collection questionnaire. Indicate your agreement or disagreement for the statement:

5= Strongly agree, 4=Agree, 3= Medium, 2= Disagree, 1= Strongly disagree

No	requirements	5	4	3	2	1
2.1	Keep data disaggregated at an appropriate level					
2.2	Common definitions and terminologies are used					
2.3	Provided choices are mutually exclusive					
2.4	The form has clear physical layout					
2.5	The design matches with school record keeping					
2.6	Permit subsequent statistical analysis of data for reliability and validity					

2.7 If you have any comment on the data collection questionnaire, please spec_____

_____

_____

2. Degree of EMIS Functions

The following are functions in the production of education information. Which ones are performed in your organization? Please rate them to indicate:

5=Very high, 4=High, 3= Average 2= Low, 1=Very low

No.	Function of EMIS	5	4	3	2	1
3.1	Identification and analysis of information needs					
3.2	Preparing and distributing data collection formats and questionnaire					
3.3	Receiving data from immediate lower level					
3.4	Encoding and processing data					
3.5	Analyzing and interpreting data					
3.6	Storing data/information					
3.7	Developing indicators					
3.8	Publication of abstracts and disseminating EMIS outputs					
3.9	Providing EMIS related trainings					

3.10 If others please specify here _____

_____

3.11 What strategies should be taken to improve EMIS functions at your organization level _____

_____

_____

_____

3. Data/information integration

4.1 Is there an organized data base which indicates all the yearly activities of each unit in your organization?

a. Yes ☐ b. No ☐

4.2 Do you think that integration of EMIS in one single system is made practical in your organization?

a. Yes ☐ b. No ☐

4.3 In which direction data/information flows in your organization?

1. Vertically ☐
2. Horizontally ☐
3. Diagonally ☐
4. 1 and 2 ☐
5. All the above three ☐

4. Quality of EMIS data/information

To what extent does data/information in your organization satisfy the following quality criteria? Please rate them using the numbers indicated:

5= Very high, 4= High, 3= Average, 2= Low, 1=Very low

Indicators of Quality	**5**	**4**	**3**	**2**	**1**
a) Accuracy					
b) Relevance					
c) Completeness					
d) Clarity					
e) Timeliness					
f) Consistency					
g) Accessible					

5. Utilization of EMIS outputs

To what extent the following educational information are demanded or used in the region? Indicate the extent by the numbers:

5= Very high, 4= High, 3= Average, 2= Low, 1= Very low.

No	Functions	5	4	3	2	1
6.1	Facilitates planning and budgeting					
6.2	Sound decision making					
6.3	Monitor progress towards objectives					
6.4	Evaluating performance					
6.5	Management and administration operations					
6.6	Enrollment projection					
6.7	Conducting studies/research					
6.8	Developing programs and projects					
6.9	Allocating resources					

6.10 If others, please specify here_____

_____

6.11 Is demand of information satisfactory? If not, please indicate the major problems_____

_____

_____

6. Formats in which Education data/information are available

Listed below are forms in which education information is available. Show the extent of in which the data/information exist in a given form in your organization.

5=Always, 4=Usually, 3=Sometimes, 2=Rarely, 1=Never

No	formats	5	4	3	2	1
7.1	Statistical year book					
7.2	Electronic document (computer file, floppy, flash, CD-ROM)					
7.3	Printed document					
7.4	Hand written documents					

7. Data/information users

What is the extent of demand for EMIS outputs (data/information) in your organization? Indicate the degree of your clients demand for the statements:

5= Very high, 4= High, 3= Average 2= Low, 1= Very low

No.	Clients uses data/information	5	4	3	2	1
8.1	Administrators and experts within the organization					
8.2	EMIS workers within the organization					
8.3	Political decision makers					
8.4	Other governmental sectors/bureaus like finance, health etc					
8.5	NGOs					
8.6	Researchers					
8.7	Parents and the community					
8.8	Teachers Association					

8.9 If any other, please specify _____

_____

8.10 What aspects of the information generated by school should be improved, please specify

_____

_____

8. Barriers to the use of EMIS data/information

Listed below are assumed barriers to the use for information for decision-making? Please rate them using the numbers:

5=Very serious, 4=Serious, 3= Moderate, 2=Less serious, and 1=Not a problem.

No	Proposed Reasons	5	4	3	2	1
9.1	Low level of data analysis					
9.2	Poor quality of data					
9.3	Lack of access to extract data					
9.4	Perceived effect of data use					
9.5	Organizational culture and leadership					
9.6	Low technical capacity of users and EMIS staff					

9.7 If others please specify here _____

_____

_____

9.8 If you have any comments on the barriers to the utilization of information, please specify_____

_____

_____

Part III - Capacity Building and Organization Development that improve EMIS

1. Listed below are activities related to organizational development and capacity building. Please rate those using numbers to indicate:

5=Strongly agree, 4= Agree, 3= Undecided, 2= Disagree, 1= Strongly disagree

No	Activities	5	4	3	2	1
1.1	Systems, procedures and structures are in place					
1.2	Institutional reforms are made					
1.3	Having clear Job descriptions					
1.4	Assigned qualified personnel in EMIS positions					
1.5	Having strong coordination and planning					
1.6	Incentive structure/Remuneration packages is available					
1.7	Relevant trainings are provided/skill upgraded					
1.8	Availability of Material and financial resources					
1.9	Use of effective ICT infrastructures					
1.10	Consistent political commitment and support are in place					

1.11 If others please specify here _____

_____

_____

1.12 If you have any comment on information system unit /section, please specify_____

_____

_____

_____

Part IV - Problems impede the practice of EMIS

1. Listed below are problems encountered the practice of EMIS. Indicate the extent of seriousness as they occur in your organization by the numbers:

5=Very serious, 4=Serious, 3=Moderate, 2=Less serious, 1=Not a problem

No	Problems	5	4	3	2	1
1.1	Absence of clear data/information policy					
1.2	Poor information culture on the part of users/Lack of users awareness					
1.3	Poor design of data collection questionnaire					
1.4	Problems related to data preparation and analysis					
1.5	Lack of data/information integration					
1.6	Poor data quality					
1.7	Delayed submission of reports					
1.8	Difficulty to keep skilled technical staff					
1.9	Low technical capacity of EMIS staff					
1.10	Inadequate manpower					
1.11	Insufficient financial investments to EMISs					
1.12	Lack of incentives for those involved in EMIS activities					
1.13	Poor ICT infrastructure					
1.14	Poor coordination and leadership					
1.15	Unhelpful management attitude					

1.16. If any, please specify here _____

_____

_____

1.17. Please specify areas in which you would require assistance to improve practices of EMIS in Tigray Region Education Bureau _____

_____

_____

_____

Appendix-D

Interview Questions for TEB Head, TFEDB Head, WEO Heads, WFEDO Heads, Regional EMIS and Planning unit, and NGOs.

1. Is EMIS out puts in your organization demand or supply driven?
2. How do you identity the information needs of users, if it is demand driven?
3. Does your organization collect educational information from lower level? If yes, do you have any data collection instrument?
4. How helpful is the EMIS organizational structure and personnel assignment to accomplish EMIS activities effectively?
5. Who demands/uses educational information obtained from EMIS unit?
6. For what purpose do you use the educational information obtained from lower level organizations?
7. What capacity building mechanisms should be taken to promote EMIS capacity and improve data quality?
8. What ICT infrastructures are used to facilitate EMIS activities?
9. How reliable is the EMIS out puts, in terms of accuracy, relevance, completeness, consistency and timeliness?
10. What are the major problems encountered in the practice of EMIS?
    i. Absence of clear data/information policy
    ii. Poor information culture on the part of users (Lack of users awareness)
    iii. Poor design of data collection questionnaire
    iv. Problems related to data preparation and analysis
    v. Lack of data/information integration
    vi. Poor data quality
    vii. Delayed submission of reports
    viii. Low technical capacity of EMIS staff and inadequate manpower
    ix. Insufficient financial investments to EMISs
    x. Poor ICT infrastructure
    xi. Poor coordination and leadership
    xii. Unhelpful management attitude
11. How do you attempt to resolve the problems in order to improve the practice of EMIS?