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PREPARED BY :- Melsew Tefera Mekonnen (PhD)

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Dessie,

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Chapter One

2. MANAGEMENT INFORMATION SYSTEMS

2.1. DEFINITION:

An Education Management Information System (EMIS) can be defined as a comprehensive system that brings together people, practices, and technology to provide quality education statistics in a timely, cost-effective, and sustainable manner, at every administrative level, and to support selected operational functions.

The acronym EMIS stands for "Educational Management Information System". By definition an EMIS is an organized group of information and documentation services that collects, stores processes analyzes and disseminates information for educational planning and management.

EMIS is a collection of component parts that include inputs processes outputs and feed backs that are integrated to achieve a specific objective. It is a system for managing a large body of data and information that can be readily retrieved, processed, analyzed, and made available for use and dissemination.

Management information system is a system consisting of people, machines, procedures, databases and data models, as its elements. The system gathers data from the internal and external sources of an organization.

Information is a necessary resource, produced by information systems and is a key building block to the management and decision-making in any organization.

2.2. Information:

Information is data that is processed and is presented in a form which assists decision making. it may contain an element of surprise, reduce uncertainty or provoke a manager to initiate an action.

Data usually take the form of historical records. In contrast to information, raw data may not be able to surprise us, may not be organized and may not add anything to our knowledge.

DATA-----→PROCESSING-----→INFORMATION

System:

The term system is the most loosely held term in management literature because of its use in different contexts. However, a system may be defined as a set of elements which are joined together to achieve a common objective. The elements are interrelated and interdependent.

The set of elements for a system may be understood as input, process and output. A system has one or multiple inputs; these inputs are processed through a transformation process to convert these input into outputs. The three elements of a system are

INPUT-----→PROCESS-----→OUTPUT

An Education Management Information System (EMIS) can be defined as a comprehensive system that brings together people, practices, and technology to provide quality education statistics in a timely, cost-effective, and sustainable manner, at every administrative level, and to support selected operational functions.

The key lessons in the next section center on some fundamentals about EMIS, including:

- EMIS data need to be accurate.
- EMIS data need to be timely.
- EMIS data need to be reliable.
- EMIS data need to be understandable.

An EMIS consists of a process of collecting, aggregating, and reporting data to monitor and evaluate the functioning of an education system. It includes data collection forms and a system for the distribution and collection of those forms, and a set of standardized reports using these data that remain consistent over time in order to track the performance of the education system.

To be useful, data must be collected in a consistent, timely and reliable manner with well-defined, policy relevant indicators. It should serve the needs of every level of the education system – individual schools, school districts, and the Ministry of Education – both for budgeting and implementation purposes, but also as an evaluative tool to help in the development of new policies and procedures.

These data are usually collected by means of an annual school census, where schools are requested to provide information on students, teachers, and facilities. For students, data typically includes the number of enrollees, attendees, new entrants, transfers, and dropouts. Students are disaggregated by grade level and gender. The level of detail on students (for example, the reasons for dropping out) varies. These data are often drawn from class lists, but when sending data to the next level, aggregate numbers are typically reported.

Most existing systems are some compromise of the above four factors. Accuracy can require more time than is allowed. Timeliness may require some relaxation of complete accuracy. Reliability is affected by external factors like funding, manpower, and political events. Turning

data into information— creating meaning from “facts”—is a constant challenge of making data, then information, then knowledge useful for decision making.

The repeated lesson is that creating a sustainable, workable EMIS depends on three factors:

1. The right PEOPLE, motivated to perform and skilled in their work
2. The right PROCESSES that reduce duplication and reinforce accuracy and accountability
3. The right TECHNOLOGY, appropriate to the state of the country, and the reliability of its infrastructure

People are frequently the slowest to change and the hardest to affect directly. Both technology and processes can be altered quicker, but people can delay reinstituting new value structures and working methods. People-related issues typically are resolved through:

- Modeling “good behavior” in terms of skills use, work habits, and approaches to learning new skills
- Making appropriate technical assistance available when needed to keep a small problem from “fester” and becoming bigger
 - Training repeatedly and sufficiently until concepts and practices are reinforced

Processes are critical for the effective flow of information in a country. Multiple layers (national, regional, district, and school) need accurate and appropriate information for the responsibilities assigned. For most emerging countries, the process around information transfer is extremely burdensome for schools; most headmasters receive 10 to 15 requests for almost the same information from multiple sources in a given term. This reduces attention to managing a school, reduces accuracy, and creates confusion at higher levels. Information practices need to follow at least the following:

- Processes must ensure that information is available to those who can make use of it quickly.
- Processes should reduce the number of times schools and districts answer the “same question in a slightly different form.”

- People at every level should check the data as they are developed, entered, edited, and distributed; as many eyes as possible should see the final product.
- With the increased focus on quality education, accurate and useful EMIS information at the school level is even more critical—since only the school, ultimately, can engender quality education.
- Processes need to shift as the general knowledge environment shifts.

Technology is often the most noticeable aspect of EMIS, but it is only a part of the education information solution.

1.2. MAJOR FEATURES of EMIS

1. Objectives

The main purpose 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 a variety of users. These include teachers, principals, curriculum planners, inspectorate officials, financial controllers, **planners, policy advisers and political leaders, as well as parents and students.** **In this way, the combined information resources of the EMIS are at the service of the entire community.** The overall concept of an EMIS has given to the following objectives:

- To improve capacities in data processing, storage, analysis and supply of educational management information so that education planners and administrators can avail themselves of reliable and timely data
- To co-ordinate and further improve dispersed efforts in the acquisition, processing, storage, transmission, analysis, repackaging, dissemination and use of educational management information

- c. To facilitate and promote the use of relevant information by various agencies and individuals at all levels for more effective educational planning implementation and management
- d. To streamline the flow of information for decision-making by reducing and eliminating duplications as well as filling information gaps
- e. To provide information for policy dialogue and scenarios for development of the education system

2. Integration Synergy and integration , underlying principles of an EMIS, can be understood in terms of eight main aspects or dimensions:

- needs of producers and users
- data
- information handling
- storage of data
- retrieval of data
- data analysis
- computer and manual procedures
- networking among EMIS centers

3. Institutional Framework

Every country has some kind of functioning "EMIS" no matter how limited and rudimentary the data collected may be. In some poorer countries, the EMIS is highly manual. An annual statistical report may be the principal manifestation for general public consumption.

4. EMIS Centers and Specializations

The EMIS network is built around the concept of the "EMIS centre". An EMIS comprises one or more EMIS "centers" that are information services located mainly at the national, regional and local levels.

Thus, an EMIS centre could include any of the following:

- a. An existing unit of the:

D Ministry of Education D Ministries of Finance, Planning, Labour, and others

D regional/provincial/state education department

D district administration (if any) • city or village administration with responsibility for education

b. School and other educational institutions supervised by the Ministry of Education.

c. Other schools and educational institutions in the country (private, religious, community-based) regardless of their linkage (if any) to the Ministry of Education.

5. Information Flow in the EMIS

The flow of information is crucial in an EMIS network. In many existing linkages, information is transmitted mainly in one direction, owing to outdated management practices.

B. Information Needs

It is necessary to communicate information in ways that are relevant and understandable to the recipient group. The nature of the information and the ways in which it is provided should therefore be tailor-made for each level in the education system.

1. Parents : Parents comprise the majority of the group of citizens often referred to collectively as the "community" in discussions on strengthening "community participation" in education.

2. Teachers : At this level also, there is a need for information that is clearly related to the teaching-learning process.

3. Principals/Head Masters The school principal needs several points of comparison to know the dimensions and at which grade levels his/her school is progressing in comparison with similar schools.

4. Oblast Education Officers Some of these officials may be school inspectors or supervisors.

5. Regional, Provincial and State-Level Officials These educational managers and planners are mainly interested in the efficient deployment of resources under their jurisdiction

6. Inspectors and Supervisors Personnel of curriculum departments also require information on the academic progress of students in subject areas

7. National Officials The national official's task is to address issues concerning the key indicators to be used to judge the performance of the education system as a whole

1.3. **FRAMEWORK: THE "EDUCATION PRODUCTION FUNCTION"**

The education system can be viewed as a form of "production." The system has four components: **Inputs:** real resources used in education, e.g., the characteristics of students, teachers and other personnel, also curriculum, textbooks, facilities and equipment financial resources, and the foregone earnings of students.

Processes: the interactions between students and inputs and among in teaching/learning processes and contexts (in the classroom or library. Attendance and absenteeism by students and teachers and such factors as administrative characteristics (e.g., autonomy) are other examples.

Outputs: the direct and more immediate results or effects of education such a students graduated and increments to test scores.

Outcomes: ultimate or eventual effects of education such as increased earnings employment contribution to productivity improved health, decreased crime and other non-monetary outcomes of education. Indicators are usually classified as belonging to one or other of these four categories. (Inputs and processes are sometimes jointly described as resources or determinants. Similarly, outputs and outcomes are termed results or effects)

Chapter Two

2. Indicators

2.1. Type of Indicators

The following types of indicators serve as measures of whatever change or improvement or progress the programme has brought to an area or system.

Input Indicators are measures for the effectiveness of resources used in the education production activity. The determinants are characteristics of students, schools, teachers, facilities, instructional materials and equipment. In each case the term "characteristics" refers to the availability of a resource its nature and quality an its manner and rate of use.

Process indicators are measures that determine the interaction taking place among inputs. Normally, they require the collection of data through the observation of behaviour.

Output indicators are measures to determine the immediate effects of the educational activity, e.g., attainment effects, achievement effects, attitudinal / behaviour effects and equity effects.

Qualitative indicators are intended to measure the quality of the outcome of the system and also the quality of schooling inputs. They measure performance relative to some given standards and norms.

Quantitative indicators measure statistically the amount or value of inputs or resources available.

Efficiency indicators are used to monitor the attainment of one of the programme's or system's objectives producing quick results at the least possible cost. Cost is basically the expenditures associated with the use of resources such as personnel or equipment. Likewise, cost measures the degree of utilization of the resources that are available to the system.

Equity indicators are used to measure the degree to which expenditures for education are provided for the population regardless of economic status, place of residence and intellectual capability. These also measure quality of access not only to physical facilities such as schools but also to quality education.

2.2. INPUTS Indicators

- Student Characteristics
- Teacher Characteristics
- Facility Characteristics
- Curriculum/Pro gramme Characteristics
- Institutional Characteristics
- School Manager Characteristics

2.3. PROCESS Indicators

- Management Style
- Teacher Time Allocation
- Student Time Allocation

- Educational technology • Instructional supervision
- Monitoring and Evaluation of Learning Outcomes

2.4. OUTPUTS

- Student Achievement Effects • Attitudinal Changes/Enhancement of Desirable Moral Values
- Access and Equity Effects • Quality Improvements • Effective Management

OUTCOMES

- Retention of Minimum Learning Competencies • Admission to Further Education and Training
- Employment • Income Socio-cultural Participation

2.5. . CHARACTERISTICS AND CLASSIFICATIONS

1. General Features

A good indicator, when measured, has the following properties:

- a) focuses on measurable variables b) describes central features of the education system
- c) links to the system's goals by providing a measure of progress or change
- d) relevant to education policy e) problem oriented f) possesses some predictive value
- g) generally accepted as statistically valid and reliable
- h) data scope or elements are collectible in terms of time, expertise and cost
- i) comprehensive and meaningful j) understandable to all major interested users
- k) identifies trends over time l) applicable or useful

2.7. Indicators of quality.

The notion of "quality" refers to the extent of possession of particular desired attribute or characteristic. An underlying positive value is assumed.

Examples of qualitative indicators include:

Inputs:

- number of trained teachers, including of females by level
- shortages of teachers by level, and main teaching subject
- surpluses of teachers by level, and main teaching subject
- pupil/teacher ratio by level, and main teaching subject, and region(urban/rural)
- textbook pupil ratio
- percentage of classrooms in good condition
- pupil classroom ratio
- use of teaching aids
- absenteeism(pupils, teachers)
- percentage of qualified teachers
- hours of study in class

Outputs:

- percentage passing final examination
- employment status of graduates

2.8. . E. INDICATORS OF INTERNAL EFFICIENCY

Internal efficiency deals with the use of resources, and refers to the internal dynamics of the educational system in transforming inputs and processes into outputs (entrants into graduates).

Internal efficiency refers to how well - effectiveness relative to cost - the organization achieves its shorter term objectives - for example, gains, in academic achievement.

Operationally, internal efficiency may be described as the number of students graduating from an educational institution (at a particular level of education) expressed as a percentage of the number of students who entered the institution at the beginning of the particular programme.

Internal efficiency thus emphasizes minimum wastage (drop-out, repetition, failure) in education.

2.9. . INDICATORS OF EXTERNAL EFFICIENCY

The concept of external efficiency refers to the extent to which the education system (or component) "producing" outputs and, ultimately, outcomes that are desired by and meet the wider needs of society.

This includes how well the system of education achieves its long-term objectives - such as contributing to productive employees and good citizens. Also, external efficiency relates inputs cost to outcomes.

External efficiency deals with the effects or results of the educational system.

Important questions are:

- How well are graduates prepared for integration into the labour force?
- To what degree does their work maximize economic growth?
- How much do their qualifications help improve social development?
- To what extent has the education system provided school-leavers with life-skills to contribute to the mainstream?
- What are the patterns of graduates' earnings over time?
- What is the employment experience of graduates?

2.10.. INDICATORS OF EQUITY

Equity is a means of interpreting and monitoring the extent and experience of educational opportunity between different student groups. The concept of equity refers to equality of educational opportunity among pupils in getting into and progressing through the education system and when leaving it.

Equity is concerned with access (distribution) participation (opportunities) and achievements (consequences) in education. The impact of equity is the extent to which education has a neutral negative or positive effect on the initial disadvantage of certain groups. The groups are distinguishable and overlapping and include females in general. In many countries girls are invariably one of the disadvantaged categories through progress is being made. Nevertheless, the gender gap is not just a matter of access.

Equity also refers to the quality of educational opportunity once in the system to benefit from the school's resources and thus in regard to output and outcome thereafter.

Equity relates to the distribution of benefits or costs, and if the distribution is perceived as just or equitable. Equity usually refers to which groups of students, as defined above, succeed in getting a good quality education. But the extent to which the distribution is right or wrong is a value judgment.

2.11. . INDICATORS OF QUALITY AT DIFFERENT LEVELS

For the principal, indicators of quality will likely refer to:

- the availability of textbooks
- adherence by teachers to the specific content of the prescribed curriculum (teaching) in the school
- improvements in specific literacy areas, or in daily attendance rates of both teachers and students

Chapter Three

4. Information system resources

In information system includes four major resources, hardware, software, people and data. Let's briefly discuss some basic concepts and examples of how these resources contributes to the information processing activities of information system.

- Hardware---- it includes all physical devices
- Software-----it includes all set of information processing instructions.
- People -----people are required for the operation of all information systems. These people resources include specialists and end users.
- Data-----data is more than the raw material of information systems. The concepts of data resources have been broadened by managers and information system professionals.

Different types of information

Information could be classified on the basis of the purpose for which it is utilized, into three main categories:

- 📖 Strategic information-----it is required by the managers at the strategic level of management for the formulation of organizational strategies.

📖 Tactical information -----information in this category is used in short term planning and is of use at management control level.

📖 Operational information-----it applies to short periods which may vary from an hour to a few days.

Need for in information system

- Meeting global challenges
- Capturing opportunities in marketplace
- Supporting corporate strategy
- Linking departments whose functions are different
- Enhancing worker productivity
- Increase in quality of goods and services

4.2. The classification of information system

The discipline of MIS is in its evolutionary stage. MIS is a concept, which is a matter of degree rather than an absolute one. The classifications of information system are

- Transaction processing system.
- Management information system.
- Decision support system.
- Executive support system.
- Office automation system.
- Business expert system.

Transaction processing system

It represents the automation of the fundamental, routine process used to support business operations. It does not provide any information to the user for his/her decision making. Previously Transaction processing system was known as MIS. Prior to computers, data processing was performed manually or with simple machines.

(INPUT) DATA-----→PROCESSING-----→DATA (OUTPUT)

Management information system:

MIS is an information system which process data and converts it into information. A MIS uses TPS for its data inputs. The information generated by the information system may be used for control of operations, strategic and long range planning, short range planning, management control and other managerial problem solving.

It has some functional business areas. They are

- Marketing
- Production
- Human resources
- Finance
- Accounting etc...

TPS-----→DATA-----→INPUT-----→PROCESSING-----→OUTPUT-----→INFORMATION

Decision support system:

The Decision support system (DSS) is an information system application that assist decision making. Decision support systems tend to be

designed primarily to serve management control level and strategic planning level managers.

The data in the database typically is a combination of master files (internal corporate data) and from external sources.

Database ←-----→ model base

↘ user interface ↙



User

Executive support system:

Executive support system (ESS) is an extension of the management information system which is a special kind of DSS. An ESS is specially tailored for the use of chief executive of an organization to support his decision making.

An ESS is designed to cater to the information needs of a chief executive keeping in view not only his requirements but also taking into account his personality and style of functioning etc.,

Office automation system:

Office automation refers to the application of computer and communication technology to office functions. Office automation systems are meant to improve the productivity of managers at various level of management by providing secretarial assistance and better communication facilities. Office automation systems are the combination of hardware, software and people in

information systems, that process office transactions and support office activities at all levels of the organization.

These systems include a wide range of support facilities, which include word processing, electronic filing, electronic mail, message switching, data storage, data and voice communication etc...

In the first category, the following is a list of activities.

- Typing
- Mailing
- Scheduling of meetings and conferences
- Calendar keeping and
- Retrieving documents

Business expert system:

Business expert system (BES) is a knowledge based information system that uses its knowledge about a specific, complex application area to act as an expert. This system is one of the knowledge based information system. Expert system provides decision support to managers in the form of advice from an expert in a specific problem area. Expert systems find application in diverse areas, ranging from medical, engineering and business.

Knowledge base ←-----→ inference engine

↘ user interface ↙

Cost benefit analysis

Every legitimate solution will have some advantages is benefits and some disadvantages or costs. These advantages and disadvantages are identified when

each alternative solution is evaluated. This process is typically called cost/benefit analysis. Examples:

↑ in sales or profits.

↓ in operating costs.

↓ in required investment

Selecting the best solution:

Once all alternative solutions have been evaluated the process of selections the best solution can begin. Alternative solutions can be compared to each other because they have been evaluated using the same criteria. It is possible that to decide to select the best solution to the problem.

Implementing a solution:

Once a solution has been selected it must be implemented. An implementation plan may be developed. An implementation plan specifies the activities, resources and timing needed for proper implementation.

Post implementation review:

The final step of the system approach recognized that an implemented solution can fail to solve the problem for which it was developed. The results of implementing a solution should be monitored and evaluated. This is called a post implementation review process.

3.2. Components /resources of information system.

An information system depends on the resources of people, hardware, software, data and networks to perform input, processing, output, storage and control activities that convert data resources into information.

IS consists of 5 major resources:

People resources: People are the essential ingredient for the successful operation of all information systems. This people resource includes:

End users are also called users or clients are people who use an information system or the information it produces. They can be customers, salespersons, engineers etc... Most of us are IS end users.

IS SPECIALISTS are people who develop and operate information system. They include system analysis, software developers, system operators and other managerial, technical and clerical IS personnel.

Hardware resources:

It includes all physical devices and materials used in information processing. Examples of hardware in computer based information system are:

Computer system which consists of central processing units containing microprocessors and a variety of interconnected peripheral devices. Example: handheld, laptop, midrange computer systems and large mainframe computer systems.

Computer peripherals which are devices such as a keyboard or electronic mouse for input of data and commands a video screen or printer for output of information and magnetic or optical disks for storage of data resources.

Software resources:

It includes all set of information processing instructions. It includes not only the set of operating instructions called programs. Examples are

System software such as an operating system program which controls and supports the operations of computer system.

Application software which are programs that direct processing for a particular use of computers by end users. Example sales analysis program, a payroll program and a word processing system.

Data resources:

Data resources of information systems are typically organized, stored and accessed by a variety of data resources mgt technologies into:

- Database that hold processed and organized data.
- Knowledge bases the hold knowledge in variety of forms such as facts, rules, and case.

Network resources:

Telecommunications technologies and networks like the internet, intranets and extranets. The concept of network resources emphasizes that communications technologies and networks are a fundamentals resource component of all information systems. Network resources include:

- Communications media is includes twisted pairs wire, coaxial and fiber optic cables and microwave, cellular and satellite wireless technologies.
- Network infrastructure this generic category emphasizes that many hardware, software and data technologies are needed to support the operation and use of a communication networks.

Fundamentals and dimensions of information system

It shows the 3 major roles of the business applications of information systems. Example: consider a retail store as a good example of how these three fundamental roles can be implemented by a business.

- 📖 Support business processes and operations
- 📖 Support business decision making
- 📖 Support strategies for competitive advantage

Support business processes and operations:

As a consumer you have to deal regularly with the information systems that support the business processes and operations at the many retail stores where you shop. Example: most retail stores now use computer based information systems help them record customer purchase, keep track of inventory, pay employees, buy new merchandise and evaluate sales trends.

Support business decision making:

IS also help store managers and other business professionals make better decisions and attempt to gain a competitive advantage.

Support strategies for competitive advantage:

Gaining a strategic advantage over competitors requires innovative use of information technology.

4.3. DIMENSIONS of information systems

The major dimensions of information systems are:

1. **Organization:** IS are integral parts of organizations. The key elements of an organization are its:

- People Structure
- Business processes
- Politics Culture

2. **Management:** management's job is to make sense out of many situations faced by organizations, make decisions and formulated action plans to solve organizational problems.

3. **Technology:** information technology is one of many tools managers use to cope with change in various resources of technology involved in IS are:

- Computer hardware
- Computer software
- Data management technology
- Networking and telecommunication technology

Human resources information system.

This functional information system supports the functions of human resource management of an organization. The function involves:

Manpower planning: It is about deciding the present and future needs of manpower in the organization.

Staffing: This function includes recruitment, selection and placement of employees. Recruitment refers to attracting qualified and competent people for different jobs.

Training and development: The need to train and develop the employees is felt due to A gap between the job requirements and competence of the employee. The need to develop lower level managers to assume higher level responsibility when required.

Performance evaluation: This task is concerned with evaluating employee performance at work in terms of pre determined standards and norms. Evaluation or performance appraisal includes the formulation of performance appraisal plans, development of appraisal techniques and programmes etc...

Separation activities: The employee employer relations may come to an end due to the resignation of an employee, layoff, death or retirement. HRM besides the above mentioned functions is also responsible for the wages and salary administration, sustaining and maintaining the work force in the organization and maintaining of healthy and peaceful labor management relations. It contains 3 function flow of human resource information system.

- Transaction data-----is a basis for various types of output information or analysis. The data includes employee number, name, qualification, experience, joining data etc... Categories and grades of posting and daily performance etc...
- Environmental data----includes data about the availability of personnel, trends in the labor force, competition, market offering to the employees, government and labor laws etc...
- Organizational plans-----also provide an important input in human resource information system, on the basis of which future planning for recruitment, job assignment, etc...

Chapter Two

The State of Education Management Information Systems

Assessing the state of education in a country demands information **about the inputs, resources, governance, operations and outcomes of its education system**. An education management information system (EMIS) provides **systematic, quality data in a well-structured enabling environment that facilitates utilization of the information produced in planning and policy dialogue**.

Education Quality Defined

The overall goal of an EMIS is to improve educational quality, which is generally defined as including the preparedness of students to learn, the conduciveness of the learning environment, the relevance of learning content, the skill and training of teachers, and the linkage between students' educational outcomes and their positive participation in society. Educational quality is thus concerned not only with inputs (e.g., school attendance), but also with educational processes (e.g., teaching methods) and outputs (e.g., literacy and numeracy).

Quality education as a prerequisite **for achieving equity**, educational quality was highlighted as positively impacting economic and social development.

EMIS policy domain aims to help :

- **countries identify how they can improve data collection,**
- **data and system management, and data use in decision making,**
- **thereby improving different elements of the education system.**

An education management information system is : **responsible for producing and monitoring education statistics within an education system**.

- An EMIS has a multifaceted structure, comprising:
the technological and institutional arrangements for collecting, processing, and disseminating

minating data in an education system. It is crucial for :

- tracking changes,
- ensuring data quality and
- timely reporting of essential information for planning and management, and
- for facilitating the utilization of information in decision making by policy makers.

The system's effectiveness is dependent upon **its sustainability, accountability, and efficiency.**

A successful EMIS is **credible and operational in planning and policy dialogue.**

The policy domain aims: **to eliminate the misconception often held by education stakeholders, namely, that an EMIS is simply a database or an Information Technology (IT) system.**

People are an important component of an EMIS in that they not only:

- guide the collection,
- maintenance, and
- dissemination of data, but they also
- lead the transformation of data into statistics that are used to inform decision making.

EMIS assesses education information systems:

- with the aim of informing the dialogue on policies related to education statistics and indicators, as well as
- to help countries monitor overall progress related to educational inputs, processes, and outcomes.

4.4. Evaluating and benchmarking EMIS

EMIS identifies four core policy areas that are shared by educational data systems and need to be assessed:

1. Enabling environment: Assessment of intended policies in relation to a sustainable infrastructure and human resources that can handle data collection, management, and access.

2.System soundness: Assessment of the degree to which the processes and structure support the components of a comprehensive information management system.

3.Quality data: Assessment of the degree to which an EMIS system accurately collects, securely saves, and produces high-quality, timely information.

4. Utilization for decision making: Assessment of the reality of system implementation and utilization of EMIS information in decision making.

Rationale behind the SABER-EMIS Tool Value-added of an EMIS

An education information management system **provides knowledge to education stakeholders about the status of the education system as a whole and the learning outcomes within a country.** By using an EMIS, governments are able **to analyze and utilize data to improve their education systems.**

An EMIS helps generate the following valued-added components to improve educational quality:

- **Data:** Data and related education statistics are necessary to provide quality education. The achievement of **good-quality education is dependent on the quality of statistics** which inform **the policy for formulation, educational planning, management and monitoring processes**” .The existence of data and a system to collect, maintain, and report it generates knowledge about the state of education in a country. However, **reliable, relevant, and easily accessible information** about specific schools, teachers, enrollments, and educational outcomes is **still lacking** in many countries.
- **Efficient expenditure:** Information systems enable countries to be cost-efficient and effective in their education planning.
- **Institutionalized data systems:** When institutionalized and guided by a clear vision and strategic planning, an EMIS helps policy makers manage an education system to produce quality outputs. Unfortunately, many countries have invested resources in building education

management information systems, but these systems are often not institutionalized, lack a guiding vision, and are not incorporated into strategic planning processes.

- **Data-driven policies:** Education management information systems are intended to help government experts design and implement policies.
- **Smart investments:** One value-added dimension of an EMIS is that it empowers a decision maker to make smart spending decisions, based on data and analytics of investments proven to contribute to learning.

An EMIS is a necessary element of an education system that enables **policy makers to make critical modifications to the system in order to improve the quality of education.** **Benchmarking** can reveal important lessons about the kind of changes needed in educational policies and institutions, such as:

- Learning must be measured and reported regularly;
- Teachers should be well selected, assigned, systematically incentivized, and well paid;
- Schools should have the operational autonomy to make changes that improve efficient use of financial and human resources; and
- Schools and the education system as a whole should be accountable for targets that they are assigned to achieve.

Data-Related Demands to Improve Education

To improve education and increase learning outcomes, there is a clear universal demand **for the right data, data-driven decisions, and a system to manage education statistics.**

1. Demand for the right education data

There is a demand for the right education data. **This means data that is comprehensive, relevant, reliable, and timely.** In education systems overall, “there is a lack of data and information on policies at a more granular level, of the type that policy makers and stakeholders need when they are making concrete choices on how to promote education and learning for all”

2. Demand for data-driven decisions

There is a **demand for education systems to make decisions on the basis of data**. As education systems move toward capturing education statistics at all levels and increasing accountability **for improving educational quality, access to and use of education statistics becomes a necessary part of policy implementation.**

3. Data-driven planning is more effective for an education system.

This type of planning **reduces system costs by more effectively allocating resources**. Given that needed data exists and is timely, the added cost of improving this data is likely much lower than the implicit costs of bad information. Planning with **old data inhibits optimal policy implementation, particularly with respect to resource allocation.**

4. Data-driven decisions also improve efficiency in an education system.

Education data is required **to better understand the internal efficiency** of an education system, as well as the **social and economic variables** that help explain student performance.

5. Data-driven decisions are strengthened by the identification and targeting of various inequities within an education system.

Data can highlight differences between specific groups and **allow decision makers to design policies that ensure equity (e.g., equitable division of resources, gender equity, etc.).**

6. Demand for a system to manage education statistics

Due to the complexity of education data, an institutionalized solution is needed that looks at the whole education system in a comprehensive, structured, and systematic manner via statistics.

Governments suffer from a lack of information about their education systems, yet they need to manage information related to the system, answer policy questions, and respond to changing reforms in the system.

An Effective EMIS

An Education Management Information System is a multifaceted, institutionalized system consisting of technological and institutional arrangements for collecting, processing, and disseminating data in an education system. In short, a successful EMIS cannot exist in a vacuum.

A comprehensive EMIS is described as **“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**

3.5. An information cycle

The collection, maintenance, analysis, dissemination, and utilization of education data in an EMIS occur in a cyclical manner which is referred to in this framework paper as the “EMIS Information Cycle.

NB:

- Between input and School there is Data collection
- Between Data Warehouse and both Decision machining and student learning and other outcomes and policy actions there is Data utilization.
- School refers to Students, Teachers, School management/ administration
- Data utilization is also refers to Research/analysis Reporting
- From Student learning & other outcomes and policy actions there is Feedback to School

An effective EMIS is one that has a fully functioning information cycle.

This cycle demonstrates that an EMIS is **more than a simple annual school census, that the coverage of statistics goes beyond administrative census data.**

An EMIS is a dynamic system that has a defined architecture, the capacity to perform analytics, and the ability to serve its users.

The functioning of this cyclical process results in more effective data sharing and coordination. The functionality of an EMIS is **universal across contexts** because data is the core of its operations.

Three facts are known about the existing education management information systems internationally:

- Efforts are being made to improve education management systems.
- There have been advances in education management information systems, but most education databases simply produce statistics in a manner that is not accessible, complete, nor able to perform data analytics.
- Education management information systems use different approaches to collect, maintain

Chapter Four:

4.What Matters in an EMIS

Guiding Principles Three principles guide an effective EMIS:

- sustainability,
- accountability, and
- efficiency.

Lack of these principles leads to **deficient systems**. Combined, the principles result in an effective EMIS that adds value to an education system, and disseminate data.

Sustainability

Most countries with an EMIS are struggling to sustain their systems, which can negatively impact learning outcomes. Simply stated, “it is obvious that without sustainability there is no long-term use, and without long-term use there cannot be long-term impact on the classroom.” The three key components to successful creation of a sustainable information culture are

- reorientation of the education information system toward clients,
- improved capacity to use information at the local level, and
- increased demand for information

Challenges to Sustainability

- High staff turnover makes sustainability a challenge
- Countries finance the establishment of an EMIS because they understand the value of such a system; however, the required funding commitment is not always sustainable
- The sustainability of an EMIS is correlated with a government’s commitment to the system.
- When there is consistent support for an EMIS at a high level of policy making, the importance of the functionalities are demonstrated to the public

Accountability Because decision makers need to rely on quality data, accountability is increased when these decision makers use the data to improve the education system. Accountability is considered a critical element of service delivery that influences the incentives of both the providers and recipients of information.

Shared access to education statistics is an important lever for accountability. Published information about education performance is the central government’s only tool for informing society about the performance of the education sector. Accountability is improved when accurate and reliable education statistics are made available.

Efficiency

An efficient EMIS is necessary to support overall education management; inefficiency is a symptom of poor performance .

- Efficiency means effective maintenance of education statistics and records so that decision makers can plan effectively.
- Data-driven decision making can result in more efficient spending.
- There has been an increase in the availability and use of ICTs to meet EMIS needs for data gathering and management, which leads to a more effective system.

4.1. Data coverage of EMIS

The data in the EMIS is comprehensive, contains some private data, and covers major types of education data, including :

- administrative,
- financial,
- human resources, and
- learning outcomes.

Administrative data

- ☛ Enrollment rates, including access and drop-out rates
- ☛ Ratios, including student to teacher, school to student
- ☛ Other rates, including completion, progression, and survival rates
- ☛ Behavioral data, including
absenteeism and late arrivals for both teachers and students
- ☛ Special-needs population data
- ☛ Administrative indicators such as efficiency, school development plans, teacher qualifications (e.g., age, agenda, etc.)
- ☛ Financial assistance data such as school-feeding programs
- ☛ School improvement program data
- ☛ Service delivery indicators

Financial data

☛ Budget expenditure

☛ School fees

☛ Supply-side items such as textbooks, teaching materials, desks, paper, and writing instruments

Human resources data

☛ Salaries for teaching and non-teaching staff, including administrative, management, security, janitorial, and transportation staff

☛ Information about who is working at the school and who assists in transporting students to school

☛ Conditional cash transfer data

☛ Professional development data

☛ Number of years of experience for teachers

☛ Development courses, training, certifications, and allowances for teaching and nonteaching staff

☛ Ministry of Finance data regarding human resources (if applicable)

Learning outcomes data

☛ Grades

☛ National assessments

☛ Classroom assessments

Utilization of EMIS for decision making

The EMIS is wholly utilized by different users of the system to make decisions at different levels of the education system. For data utilization the following things are required

Openness. The EMIS is open to education stakeholders in terms of their awareness and capacity to utilize the system.

Operational use. Data produced by the EMIS are used in practice by the main education stakeholders. Operational use could be for:

🏢 Utilization for evaluation:

🏢 Utilization for governance:

🏢 Utilization by schools:

🏢 Utilization by clients:

🏢 Utilization by government

Accessibility. Education statistics are understandable and disseminated widely to education stakeholders via a clear platform for utilization, complemented by user support

4.3. Life cycle of EMIS

1.**Data collection:** usually conducted by **questionnaire**. **Schools** are the very central source of data. Thus the instrument must be **carefully designed**. Once the questionnaire is designed, it has to be **pretested**. The purpose of pretesting is for improvement. This can be done by Selecting some limited number of schools and apply the instrument. This helps in many ways. On the bases of the feedback obtained during pretesting, there must be **redesigning** of the questionnaire. After all improvements, the questionnaire should be **published**. Following publication, it has to be **distributed**. The distribution has to **followed up** to take corrective action for any challenge encountered.

Data processing: Once the data is collected it will proceed to **data processing**. In this stage, **monitoring the instrument** the data collected is very important to identify unfilled question items. At this stage, thus, **data entry which is the main job is to enter the data into the computer using the pre-prepared data entry template.** , **data cleaning**, refers to **checking for errors routinely so that what is on the questionnaire is equivalent to what is entered in the computer and data compilation** will be conducted. Data cleaning is followed by **Data compilation:** Data compilation is obtaining a flat table from a relational database and aggregating it by level and geographic units. This step makes the data set ready for the analyst who may not have a necessary knowledge of the database manipulation to the level of playing around with the database and explore all possible ways of coming up with a flat tables that can easily be aggregated to the other levels wanted.

Data analysis : Data analysis is looking more closely to the data and in various ways **in order to get information useful for planning and decision making**. We don't do data analysis just for the sake of exercises. **We do the analysis to inform planners, decision makers, researchers, policy makers and other users so that they can check what they are doing is right or if they need to adjust the actions they may intend to take in the future. Data analysis should be done with users in mind. There are several types of users: general users, decision makers, planners, researchers, information service providers, students and teachers**

Reporting The above argument suggest that the type of report we need to compile may differ depending on the type of user we are obliged to serve. Therefore, we need to distinguish who the users are. Moreover, it is always advisable to prepare a short report of the outcome for top decision makers. Therefore, the following summary outcomes are envisaged from an EMIS unit of the ministry of education

1. **Annual statistical abstract** – This is a summary of statistical tables and some indicators for the consumption of the general public.
2. **Quick reference:** Quick reference is a short summary of the annual statistical abstract
3. **Indicators report:** This is a report of the analysis of the school systems' performance which NESIS is encouraging countries to produce on regular basis. It

is prepared by the team of experts in the ministry in which planning and EMIS experts are a member.

Publication if you haven't published it, you haven't done anything. The effort you have put to collecting, processing and analyzing is lost. The objective is to reach all users as much as possible. One way to do this is to publish our products and distribute it to users. **Accountability:** we are all accountable for the work we do, for the tasks under our responsibility. If we have not published it, we have not finished our work. Even if we have published it, it is still not the end of the cycle of our work

Dissemination if you haven't distributed it, you have not reached the user fully. In practice dissemination takes a number of forms.

- Distribution of school abstracts, quick references, indicators' reports, to users on regular basis
- Publication and distribution of pamphlets and posters to users
- Reports and briefing to planners and decision makers at different levels of administration.

Dissemination can be seen as both internal and external. **Internally information** will have to be disseminated to planners, decision makers, decision support systems, experts and educational administrators at all levels within the ministry of education including provinces, districts and schools. This is important because

1. Progress towards creating informed decision making environment can be effected.

2. Internal users will be aware of the importance and role of information in educational development.

External users are those planners, researchers, students, teachers, government and non-government organizations, national and international organizations, civil societies and private individuals outside the ministry of education and the community as a whole. This is important in that, the more they use information, the more they are aware of the role of information, the better the planning and decision making work in their respective organizations, sections and units. This also plays a feedback effect to the internal system

7.Application feedback Through feedback we will be able to know what we have done good and where to correct problems. Others will also know what we are doing, and perhaps how easy or difficult it is about what we are doing. In the process we are learning. When we apply the feedback – knowledge and skills - for the betterment of our job, we are contributing to the development of the system we happen to be building – EMIS. At the same time we are enriching our ability and knowledge to tackle more problems. Feedback is collected through:

1. **Have a record book to monitor information** from those visiting your office to keep account of what information they require and for what purpose.
2. **Develop a habit of reading through policy** and research papers and reports to get an idea of what these bodies are interested in.
3. Use **the opportunities you have to attend meetings, individual discussion** to try to read the minds of the professionals and assess the kind of information

4.4. Scope of work and work procedures of EMIS

The role of EMIS is to coordinate, in an organized and systemic way, information necessary for educational planning, policy formulation, decision making and resource allocation. This includes, **information on both formal and non-formal education, higher institutions, technical and vocational education, special education and educational research institutes.**

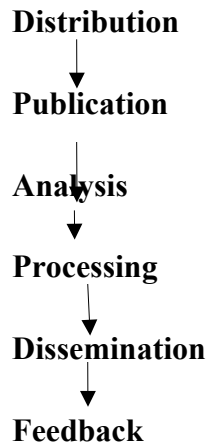
Important steps/ Procedures to follow to organize EMIS

The procedure begins with an appraisal of the ministry needs. **Here is where you can asses what you can collect, from where and what you cannot collect.** This means a decision has to be reached as to what to collect and what not, balancing between the needs and the manpower available and the material and financial resources available.

This is followed by data processing, analysis, publication, and dissemination. Dissemination includes reporting to relevant clients within or outside the ministry.

Collection





4.5. Manpower requirements/Structure:

The manpower requirement for EMIS depends mainly on the amount of work involved.

However, there are important qualifications required. These are shown in the sample structure.

Note that the sample structure is for a hypothetical country. No single structure may fit any one country.

1. As every unit of the ministry of education, EMIS needs a leader. A professional leadership that bring together all the components of MEIS, in attitude and spirit, is needed to achieve and effect the vision set forward – informed decision making.
2. Under the management of EMIS we also need computer professionals – both hardware and software professionals. Computer Programmers and skilled application package users are among them. Programmers are mainly responsible for writing computer codes for data entry and retrieval purposes as well as supervision and maintenance of the programs at the time of data entry and retrieval.
3. Then statisticians for data analysis and compilation of reports. These are also responsible for dissemination – communicating the results to users in an organized and effective way.
4. The last block in the figure above shows the information support system. This section of EMIS, liaisons with users and gives information service to users. They share feedback with other EMIS staff and users. The section is also responsible for collecting, compiling and presenting feedback information.
5. Finally, data entry clerks are needed. Their job is to enter data into the computer according to pre-prepared templates.

4.6. Training:

Training is one of the essential components of EMIS. It is an all round and continuous activity that the management needs to pay greater attention to. It is an all round activity because the system works with each components working together to make the vision happen. These are steps starting from data collection through feedback and implementation. It is a continuous one because

1. The field of technology is changing fast,
2. The manpower turnover is high thus necessitating that a continuous training is maintained throughout in the long run.

The general content of EMIS training could be summarized as:

- Survey administration including methods of collection data collection, instrument design, including content outline and layout, pre-testing the instrument, publication, distribution, and follow up.
- Systems development, programming including end-user computing and development of application software for data capturing and retrieval.
- Policy related data analysis and presentation
- Compiling reports
- Publication, distribution and dissemination
- Networking and communication
- Maintenance of both hardware and software.
- Documentation
- EMIS management and innovative leadership
- Planning and programming
- Monitoring and evaluation

Basic training: Basic skills is needed for all employees, not only EMIS but the whole ministry.

Intermediate training: An intermediate training is organized for those who have basic skills but lack enough knowledge to fully apply their knowledge to achieve results to meet the goals. It may be arranged as the need arises.

Advanced training: Advanced training is necessary to be self sufficient in major areas of application: EMIS management, data analysis, programming, networking, data processing. Such a move enables EMIS to be self sufficient in these areas.

Training of trainers: In large ministries, the central EMIS alone cannot coordinate the provincial, district and school level training programs. Hence, the best approach (strategy) will be for the center to train trainers at provincial level who can train trainers at district level.

Self learning: self learning is one way of increasing skills in EMIS as the facilities and know-how are available within EMIS. The best way of learning is to consult and practice and practice again to develop one's own skills to the level of mastery and produce better results.

Group learning: Everyone in EMIS is surrounded by a group of professionals or outside EMIS but nearby. One knows better than the other in certain areas. Another good way of learning is to encourage and promote group learning with colleagues in the office and outside the office and birng in skills that enable produce better output.

4.7. Monitoring and Evaluation:

Monitoring is an important component part of our work. It is part and parcel of the EMIS activities to look into what was planned, implemented and what remains to be done. Monitoring is our tool to investigate into, see and learn not only what have been done but also what problems were encountered during implementation and with particular emphasis on how the problems were tackled. This paves the way for future enhancement of the implementation program. Bamberger defines monitoring as follows:

4,7,1, Monitoring:

Monitoring is a continuous internal management activity whose purpose is to ensure that the program achieves its defined objectives within a prescribed time-frame and budget. Monitoring involves the provision of regular feedback on the progress of program implementation, and the problems faced during implementation. Monitoring consists of operational and administrative activities that track resources acquisition and allocation, production or the delivery of services, and cost records.

It is important to note that is a collection of information in a systematic way in the hope of learning *f*

- What has been done and in what way? *f*
- What problems have been encountered during implementation and how we tackle them *f*
- What lessons or ‘best practice’ to be learned for future implementation

4.7.2. Evaluation

Evaluation is an internal or external management activity to assess the appropriateness of a program’s design and implementation methods in achieving both specified objectives and more general development objectives; and to assess a program’s results, both intended and unintended and to assess the factors affecting the level and distribution of benefits produced

Evaluation is basic for every activity/task we undertake. EMIS activities are no exception. Evaluation can be done internally by EMIS in the form of self evaluation or externally or by professionals from the user community. In this manual we our emphasis is self evaluation by EMIS team with the objective of improving implementation and management style to meet the desired objective.

This refers to where we look back to what we have done, and see the strengths or weaknesses, what to modify and extract out ‘good practices’ for further implementation that ensures better performance.

4.8. Decentralization:

In the context of EMIS management, decentralization is defined as the share of authority, responsibility, accountability of data collection, processing, analysis, publication, distribution, reporting and dissemination of information to lower levels of administrative units. In most literatures, I have read about decentralization, the word transfer is used instead of the word share above. This eliminates the chances of working together, assisting each other, learning from each other etc which has to exist in order to have a proper functioning EMIS. We are sharing the work load between the center, provinces, districts, schools or lower down as appropriate.

Decentralization of EMIS to lower levels also means, as was mentioned above, sharing of authority, responsibility, accountability of data collection, processing, analysis, publication, distribution, reporting and dissemination of information to the different departments within the Ministry of education – horizontal distribution of information for users. It is EMIS's responsibility to assess the demand and supply of information for each department and division of the ministry of education.

4.8.1. Advantages of Decentralization of EMIS

1. The routine workload at the center, data collection, data entry and monitoring of returns will be lower. The staff at the center can now use the available time for data analysis, training and other more innovative activities. The summary statistics will be collected from provinces electronically, either on diskettes or email facilities where applicable.
2. The work of EMIS will get more attention and more coverage. Provinces can now collect more data on top of what is required by the center and use it for their own advantage.
3. It is hoped that the quality of data collected will improve. However, more technical support and awareness training has to be given to provincial staff through regular long term training in which details for the working procedures and problems are addressed.
4. It is hoped that provinces will give better services for provincial level information users and central level reporting by increasing their own level of awareness through time.

5. The center will have more time to coordinate the work of provinces but also more time to train the provinces. Assess the work of the provinces and assist the provinces in sharing technical expertise and introducing new innovations.

4.9 Documentation:

One of the most important things is documenting the results of our work. This is often forgotten or overlooked. Simple reports, abstracts, policy papers, mechanism for feedback information collection, methods of monitoring activities, evaluation reports, technical and training manuals, hardware and software manuals etc. all have to be documented not only for our own reference at a later stage but also for the next generation.

All records be kept in a safe, and easily retrievable place. Such records include Data collection instruments

Software and hardware manuals

Abstracts

Reports of various kinds

Planning documents

Feedback information records

Evaluation reports

Indicators reports

Physical and computer files of various kinds

Chapter Five

5. COMPUTATIONAL TECHNIQUES APPLIED IN EDUCATION PERFORMANCE INDICATOR

A. Rates and Ratios

The following are key indicators which can measure the efficiency, effectiveness, equity and quality of the education system.

1. Participation Rate or Net Enrolment Rate (PR or NER)

The percentage of the 10-12 years old enrolled in the middle school to the population of the same age range.

$$\text{PRorNER} = \frac{\text{No. of 10-12 years old enrolled in Sy 1998-99} \times 100}{\text{Population of 10-12 age grouped, 1998}}$$

2. Gross Environment Ratio (GER):

The percentage of the age-group population 10-12 years enrolled in SY 1998-99 in the middle school.

$$\text{GER} = \frac{\text{Total middle school enrolment in SY 1998-99} \times 100}{\text{Pop.(10-12 year) in 1998}}$$

3. Retention Rate

The percentage of the enrolment in any school year that continues to be in school the following year.

$$\text{RR} = \frac{\text{Enrolment in Grade 7-8, SY 1998-99} \times 100}{\text{Enrolment in Grade 6-7, SY 199-98}}$$

4. Transition Rate

The percentage of students who graduated from one level of education and moved on To the next higher level.

$$\text{TR} = \frac{\text{No.of students enrolled in grade 6 in Sy 1998-99} \times 100}{\text{No. of Primary school graduates (grade 5)in SY 1997-98}}$$

5. Cohort Survival Rate

The percentage of the enrolment of a certain cohort of students in the beginning grade at a certain level of education who reached the final grade/ of the required number of years for the level.

$$\text{CSR} = \frac{\text{Enrolment in Grade 8 in S Y 1998-99} \times 100}{\text{Enrolment in Grade 6 in S Y 1997-98}}$$

6. Drop-out rate

The percentage of students who left school during the school year to the total number of students enrolled during the previous school year.

$$DR = \frac{\text{No. of drop-out in Gr.6-8 in Sv 1998 -99} \times 100}{\text{Total enrolment in the middle school SY 1997-98}}$$

7. Repetition Rate

The percentage of students who enrolled in the same grade more than once in the school year N to the total number of students enrolled in the same grade during the previous school year.

$$RR = \frac{\text{No- of students who repeated Grade 6 in SY Nf 1998-99} \times 100}{\text{No. of students enrolled in Grade 6 in SY N-l(1996-97)}}$$

8. Graduation Rate

The percentage of graduates of a certain level of education in a given school year to the total enrollment in the terminal year of the same level.

$$GR = \frac{\text{No. of graduates in GR. 8. SY 1998-99} \times 100}{\text{No. of Grade 8 enrolled in SY 1998-99}}$$

9. Completion Rate

The percentage of students completed (graduates) the particular cycle of education to those enrolled in first year of the cycle.

$$CR = \frac{\text{No. of graduates in the middle school (grade 8) SY 1998-99} \times 100}{\text{No. of students enrolled in grade 6 in SY 1996-97}}$$

10. Student - Teacher Ratio

The proportion of the students enrolled in a certain level at a given school year to the number of teachers teaching them. On the average, the number students to a classroom teacher.

$$\text{p}^{\text{TM}} = \frac{\text{Enrolment in the middle schools (grade 6-8)}}{\text{No. of teachers in the middle schools (grade 6-8)}}$$

11. Class -classroom Ratio

The relative value of the number of classes to the number of classrooms.

$$\text{PPR} = \frac{\text{No. of Classes in the middle schools (grade 6-8)}}{\text{No. of classrooms Used/Available}}$$

12. Student-Textbook Ratio

The proportion of the enrolment at a certain level in a given school year to the number of usable textbooks available at the same level in the same school year. On the average, it is the number of textbooks for every students.

$$\text{SST} = \frac{\text{Enrolment in the middle school in grade 6-8)}}{\text{Total number of available usable Textbooks}}$$

13. Per Student Cost

The ratio of the total education expenditures to the total enrolment in a given school year.

$$\text{PSC} = \frac{\text{Total Expenditures (salaries + other school operating expenses) for middle school in SY N}}{\text{No. of students enrolled in middle school in SY N}}$$

5.2. Challenges related to EMIS

- The quality of EMIS's vary, and they are often plagued by a variety of problems. These include:
- Lack of compliance by schools in filling out the forms in a correct and timely manner

- Lack of consistent historical data for monitoring trends
- Weak procedures for cleaning and validating data
- Low capacity of staff and infrastructure for maintaining EMIS and generating reports 
 - Insufficient procedures for wide and timely dissemination
- Lack of Awareness:
- Less Budget allotment:
- Personnel shortage: Trained professionals, both in quantity and quality, are in short supply. Long term training for professionals
- Budget for EMIS professionals and workers is scarce.
- Overrating of the capacity of EMIS: emergence of fast growing technology, has led to a need, both for short and long term training. Lack of continuous training:

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