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Abstract

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Educational Management Information System: Practices and Challenges in Oromia Education Bureau, Ethiopia

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Key Words: Challenges, Education, Information, Management, Practices, System

1. INTRODUCTION

One of the essential requirements for achieving educational goals and objectives lies within the flow of information to educational administrators and policy makers through sound information systems, known as Education Management Information Systems /EMIS/ (Ahmad, Saraogi & Mintz., 2017). Education Management Information System (EMIS) is a system for the collection, integration, processing, maintenance and dissemination of data and information to support decision making, planning, policy-analysis, monitoring and evaluation of all levels of education system. It is a comprehensive system that brings people, processes, and technology together to provide quality education statistics in a timely, cost-effective, and sustainable manner (Bernbaum & Moses, 2011). The combination and existence of these three pillars of the EMIS is essential for the provision of quality education data and information at all levels to satisfy the needs of data and information users across different levels of the education system (UNESCO, 2020). The system is responsible for collecting, processing, analyzing, publishing, distributing, and rendering education data and information for users of educational data and information (Koofi & Karim, 2007).

Educational management information system has evolved from student management systems focused on compliance to instructional data systems focused on learning and efficiency (Abdul-Hamid et al., 2017). This early system on the other hand focused on education inputs, such as the number of schools, enrollment levels, and the number of teachers. Countries like France, India, and China have compiled education statistics on students, teachers, and other aspects of educational institutions for many years. In the United States, the National Center for Education Statistics (NCES), whose responsibility is to collect statistics and facts as shall show the condition and progress of education, has existed in some form since 1867 (UNESCO, 2020). Many countries in sub-Saharan Africa also already have some form of the data collection system in place like OpenEMIS in DRC, Maldives and Lesotho; StatEduc2 in Burundi, Ethiopia and Mali; and Global ED*ASSIST in Zambia (UNESCO, 2020).

Ethiopia's effort to establish a modern education management information system started at the end of 1980 with the name "Education Information System Project" with the assistance from Swedish International Development Cooperation Agency (SIDA) and it was after this project that Ethiopia established computerized EMIS in the Ministry of Education. Though the progress

and effort towards establishing well-organized EMIS continued and it was not until 1995 that Ethiopia had its first EMIS software known as EdDat and was used for ten years until the implementation of the UIS EMIS system. Since 2004, Ethiopia implemented the computerized UIS EMIS model known as StatEduc2, based on the assessment of the country's education management system. Oromia National Regional Education Bureau also uses StatEduc2 software in education management information system.

2. STATEMENT OF THE PROBLEM

Oromia Education Bureau is located in Oromia Regional State, the largest regional state in Ethiopia. It was started to act as bureau of education in 1993 with the main objective of creating equitable quality educational opportunities for all citizens of the region. The overall goals are to create access to education, ensure equity and improve the quality and internal efficiency of education in the region. To achieve these goals and other educational outcomes, there were planning, monitoring and evaluation, resource allocation and decision making processes at all levels of education system in the region which are not possible without using educational data and information.

The regional education bureau collects, compiles, analyses and disseminates educational data and information annually through the regional EMIS. The educational data and information have been collected from all education subsectors like pre-primary, primary and secondary schools on annual basis and used for different purpose at all administrative levels. For instance, the preparation of annual, five years (ESDPs) and ten years plan of the sector at regional, zonal and woreda levels were highly dependent on the educational data and information produced by the EMIS. The data and information have been also used to analyze what have been planned and performed and to project what will be in the future. In the process of resource distribution like school grant budget, student enrolment data from all subsectors were consider and carried out accordingly which helps to enhance allocation fairness and equity. Moreover, the data and information produced by the regional EMIS have been sent to the Ministry of Education to make up the national EMIS.

Educational data and information produced by the EMIS are used in various ways to enhance the education system. The preparation of measurable and achievable plan, appropriate decision

making, fair resource allocation, effective monitoring and evaluation as well as other activities in the education arena are impossible without educational data and information. All these activities on the other hand can be possible through the provision and utilization of quality educational data and information produced by an effective EMIS at all levels. The provision of quality education data and information in a timely, cost-effective and sustainable manner at all administrative level is also possible through the combination of the three pillars of the EMIS which are people, process and technology. The system needs right people which are motivated to perform the EMIS tasks and skilled in their work, the right processes that reduce duplication and reinforce accuracy and accountability and the right technology that need to be appropriate to the state of the country, and the reliability of its infrastructure.

The people pillar of EMIS includes people like data providers (teachers and school principals at school levels), data management units (the EMIS technical staff at different levels) and data users and stakeholders (officials, decision-makers, planners, practitioners, researchers, stakeholders, etc). At school levels, the two main data providers, teachers and school principals are the primary sources of all educational data in school which is meant to make up the overall EMIS. They need to have the capacity, skill and knowledge of educational data management and need to deliver these data as per the required quantity and quality. School principals need to have the capacity and skill on school records keeping, data storage and retrieval, data management and skills for completing ASC electronically. The EMIS staffs at different administrative levels are expected to make the EMIS effective by ensuring the quality of the data in terms of timeliness, accuracy, comprehensiveness, consistency etc. A functional EMIS does require skilled staff, with qualifications and basic training in statistics, coding, data analytics, data visualization, data collection methods, etc (UNESCO, 2020).

The EMIS data and information users like planners, officials, practitioners and other stakeholders are expected to use data and information produced by the EMIS. They are expected to know how, when and from where to get and use the educational data and information they need to use.

The second EMIS pillar is the process that incorporates the enabling environment like the availability of a well-organized structure, EMIS policy and legal framework which help the system to be more effective. A well-organized EMIS structure with attractive situations at all administrative levels is essential. An EMIS policy may enforce and institutionalize the EMIS by

defining the roles and responsibilities of various stakeholders. It can also highlight the roles and responsibilities of data providers at school and EMIS staff at woreda, zonal and regional levels for data falsification or incompleteness and data delay which is the major problem of EMIS in the region.

The third pillar, 'technology', constitutes the availability of hardware, software, internet connectivity, electrical power, etc at all levels which are practically rarely available or unavailable at all when we move from the regional level down to schools. More importantly, the availability of ICT equipments like laptops, desktops and tablets are very essential for online data entry, data analysis and data storage.

The data and information produced by EMIS is assumed to be of quality which can be attributed by its timeliness, accuracy, reliability, comprehensiveness, relevance, accessibility and so forth. If the quality of educational data and information produced by the EMIS could not be met due to what have been stated earlier, it affects every endeavor of enhancing the education sector. It affects activities like setting and assessing the progress toward educational goals, evaluating the effectiveness of programs and practices, enhancing the processes to improve educational outcomes, addressing individual or group educational needs, assessing whether or not service deliveries are being met and allocating and reallocating resources.

However, the quality of the educational data and information produced through the regional EMIS has been affected by several factors. This may include lack of competency of people working on the EMIS, the technology that the system is using and the environment that enable the system to be effective. Amongst the dimensions of data quality, the timeliness of data and information is the major problem that planners and officials always complain due to not getting data and information on time for planning and decision making processes. On the other hand, this condition has been hindering the attainment of "this year's data this year" which is to mean that the current year educational data and information have to be available within the current year for decision-makers and other users.

The researchers are interested to study the status and challenges of EMIS in Oromia Education Bureau for the fact that scanty of research have been conducted on EMIS in the region and hence, much have not been well known about the challenges in each pillar of the EMIS. The

general objective of this study is therefore assess the practice and to identify the major challenges related to the three major pillars of the EMIS (people, process and technology) that are hindering the effectiveness of EMIS in the region through addressing the following two basic questions:

- How data collection, processing, analysis, storage and dissemination are practiced in the region?
- What are the major challenges in relation to the people, process and technology pillars of the EMIS those hinder its effectiveness?

3. METHODOLOGY AND MATERIALS

A qualitative case study research design has been deployed to address the objectives of the research. Case study research design is intended either to develop an in-depth understanding of a single case or explore an issue or problem using the case as a specific illustration (Creswell, 2013). In this regard, the researchers believe that this design helps to understand the overall situation of the EMIS in Oromia region. Among the three types of case study in terms of intent (single instrumental case study, the collective or multiple case study, and the intrinsic case study), the intrinsic case study, in which the focus is on the case itself, has been deployed for two main reasons. First, it was to list out the gaps, problems and challenges within the three pillars which are hindering its effectiveness. Second, it was to identify the most significant pillar among the three (people, process and technology). Hence, the researchers believes that an intrinsic case study is suitable to study the current status of EMIS in the region.

Data were collected from both primary and secondary sources. The primary source data was participants' views, judgement, idea, agreement and claim regarding EMIS through focus group discussion. The secondary data sources were the regional education statistics annual abstracts of published within the last five years.

The population from which samples were drawn consist 17 directorates and 32 case teams in Oromia Education Bureau. ICT and EMIS directorate is among those directorates having 2 case teams and 10 experts including the director. The participants in this study were taken from this directorate and teams which were supposed to be the appropriate source of data for their in-depth experience in the area.

Most of the scholars in the area of qualitative research agree that the ideal number of participants in a focus group discussion can be 4-12. Although it is generally accepted that between six and eight participants are sufficient, some studies have reported as few as four and as many as fifteen participants (Nyumba et al., 2018). In this case study, the researchers have included all 8 well-experienced individuals from ICT and EMIS directorate. It was believed that these people have an in-depth knowledge about the overall status of the EMIS in regional. It was also due to the reason that it is possible to get ample information that enables examine the major challenges related to the three major pillars that are hindering the effectiveness of EMIS in the region.

A purposive sampling technique was undertaken as an appropriate technique for this case study. This technique is used to select the samples based on the knowledge and credibility of the researchers for a specific purpose. Ball (1990) in Cohen et al. (2007) highlighted that in many cases purposive sampling is used to access knowledgeable people, i.e. those who have in-depth knowledge about a particular issue, maybe by their professional role, power, access to networks, expertise or experience (Cohen, L., Manion, L. & Morrison, K., 2007). Hence, all the 8 experts in the ICT and EMIS directorate of the bureau have been taken purposefully for their professional role, expertise and experience in the issue under study.

In this case study, the process of data collection was mainly through focus group discussion (FGD) and document review. Focus group discussion is a technique where researchers assemble a group of individuals to discuss a specific topic, aiming to draw information from the complex personal experiences, beliefs, perceptions and attitudes of the participants through a moderated interaction (Nyumba et al., 2018). Therefore, the researchers believes that focus group discussion (FGD) is the appropriate tool to collect relevant information to examine the status and the major challenges in related to the three major EMIS pillars which are hindering the effectiveness EMIS in the region. Document analysis is the other source of data to get information about the current status of EMIS in the region. There was reviewing the regional Education Statistics Annual Abstract to analyze the publication time of the documents that help to understand whether it has been delaying or not

In this study, the thematic data analysis method has been used to analyze the data obtained through the focus group discussion and document review. In the analysis process, the researchers has used the three major pillars of EMIS as themes to group data and to develop lists of

significant statements to identify the most significant pillar that hinders the effectiveness of EMIS in the region. Meanwhile, the gaps, challenges and problems in the three major pillars of the EMIS hindering its effectiveness were also analyzed. Personal information of participants: age, sex, role, education level, a field of study, year of experience, etc have also been considered to analyze the data. A transcription template was prepared to make the transcription process easy in converting the ‘Afan Oromo’ audio data to written forms. In the transcription process, a line-by-line and word-by-word/verbatim transcription method has been deployed by applying the principle of fidelity to stick to the original meaning of the words of the participants. The transcription was made directly from the recorded discussion based on the response given by participants. Right after completing the transcription of all the information, the transcribed script was also translated into English language for further analysis.

4. FINDINGS & DISCUSSION

4.1. Background Information of the Participants

The data for this study were obtained from the eight participants of the regional education bureau ICT and EMIS directorate through the focus group discussion held at their office. The background information data of all the participants have shown in the table as follows.

Table 1: Background Information of the Participants

Participants' Code	Sex	Education Level	Field of study	Work experience		Current Position
				At Bureau level	At any other Administrative level	
FGDP01	M	MSc	Statistics	15	4	EMIS Expert
FGDP02	M	MSc	Computer Science	7	1	Network Administrator
FGDP03	M	MSc	Computer Science	12	0	ICT Expert (Team Leader)
FGDP04	F	MSc	IT	6	0	ICT Expert
FGDP05	M	BEd	Mathematics	18	12	EMIS Expert
FGDP06	M	BA	EPDM	5	17	EMIS Expert
FGDP07	M	BSc	Computer Science	2	3	ICT Expert
FGDP08	M	MA	Educational Policy	15	15	UNICEF TA

As shown in the table, there were 7 (87.5%) of them were male and only 1 (12.5%) was female which indicates that the number of female experts in the ICT and EMIS directorate is low. Regarding the education levels, 5 (62.5%) participants have a qualification of master's degree

and 3 (37.5%) were bachelor's degree holders. Except for two participants, six of them have served at other administrative levels, maybe zone or woreda, and are supposed to have practical experience in the area under study. Half of the participants have an experience of more than ten years at the bureau level and the remaining participants also have a remarkable experience at this level which informs that the participants have potential know-how regarding the issue under study. Out of the eight participants, three of them (37.5%) are working as ICT experts; three of them (37.5%) are working as EMIS experts, one (12.5%) is working as a network administrator and the other one (12.5%) is a former regional EMIS staff member and recently working as UNICEF technical assistant (TA0 for the regional EMIS. This current position of the participants also revealed that they are the right people to deliver ample information about the overall status and shortcomings hindering EMIS effectiveness in the region.

4.2. Major Findings

4.2.1. Educational Management Information System Practice in Oromia Education Bureau

The collection, compilation, organization, analysis and delivery of educational data and information passes through a tiresome process and is seems to be traditional. This annual-based process is started every year by customizing and updating the annual data collection questionnaires prepared at the national level. Following that, the tools are translated into Afan Oromo, printed out and finally disseminated to all educational institutions in the region to be filled out.

The process of encoding data into the StataEduc2 software continues right after the filling out of the questionnaires at the educational institutions level and collected back to the districts and administrative towns' level. After the completion of data entry, the district and administrative town statisticians send the database to Zonal education offices (ZEO) for verification and further cleaning. The data verification at this level enables checking and correcting the errors within encoded data and also enables the verification of the data with different techniques. After the data is verified at ZEO level, all the databases are sent to the region and merged at the regional level to have one regional database. The next process is the regional-level data verification & refining by Zonal statisticians under the supervision of the regional EMIS team to validate and confirm the accuracy, comprehensiveness and consistency of the data.

After the regional final data validation and verification process, the regional EMIS team carries out the preparation of quick education statistics annual abstract for immediate utilization after the mid-school year most of the time. Meanwhile, the preparation of the Education Statistics Annual Abstract is carried out and thoroughly edited by experienced OEB experts to finalize it for printing. Then, the Regional Education Statistics Annual Abstract is ready to be disseminated to all users and stakeholders at different levels mostly at the end of the school year and often delayed to be released in the next school year. Even though educational data and information delivery is characterized by dalliance, the published Annual Abstracts have distributed to most of the stakeholders like Ministry of Education and most of the regional sectors, Zonal and woreda education offices. However, recently, it was made possible to get the Regional Education Statistics Annual Abstract online from the bureau's website to ease its access to users and stakeholders.

Quality education data and information is vital for effective educational management. The quality of educational data and information on the other hand is dependent on the effectiveness of the EMIS, which can be dealt with its three most commonly known pillars called people, process and technology. In this regard, before dealing with the challenges regarding these three pillars of the EMIS, the first issue raised and discussed with participants was whether or not the regional EMIS is effective.

The participants have forwarded different ideas regarding the effectiveness of EMIS in the region and agreed that the system is said to be effective since it is delivering regional education data and information. The ICT team leader expressed this issue as:

“...though the data collection process has been taking a longer time, resource consuming and a tiresome, the educational data and information of the region has been collected and delivered through only EMIS which officials, planners and other stakeholders use it for different purposes. In this case, it is possible to say it is effective”

On the other hand, even though it is delivering the educational data and information requested at the ministry of education, regional, zonal and woreda levels, the system is characterized by poor quality, especially for its dalliance. The educational data and information is expected to be delivered early in the school year or at the mid of the school year. According to the participants, however, it is taking a year and sometimes after the end of a school year that the educational data

and information has been released which greatly reduces the value of the data for planning, monitoring and evaluation, decision making and resource allocation. In this regard, it was perceived as effective due to its being source of data and information for planning and decision making which does not mean that the EMIS in the region is efficient.

To support the participants' responses regarding the dalliance of educational data delivery, the last five years' regional Education Statistics Annual Abstracts were also reviewed and found that the publications were released so late in most of the years and have been published and delivered for the users in the next school years. Accordingly, the preparation of the 2009 (2016/17 G.C) regional Education Statistics Annual Abstract was completed in February 2010 (2017/18 G.C) and published 8 months later after the completion of the school year. The preparation of the most recent regional Education Statistics Annual Abstract of 2014 (2021/22 G.C) has not been completed till November 2015 (2022/23 G.C) and its publication supposed to be practical after two or three months which also means that the delivery of educational data is still too late. This dalliance of educational data and information delivery in the region may negatively affect the appropriate data-driven decision making, preparation of achievable plan, effectiveness monitoring and evaluation and satisfaction of educational data users. It is also against what has been stated by Abdul-Hamid (2014) which advocated that the final statistics should be derived from the administrative school census and disseminated within 6 to 12 months after the beginning of the school year (Abdul-Hamid, 2014). However, the delivery of the regional educational statistics through publication has been practical after the end of a school year and mostly in the next school year which may lead to inappropriate decisions due to not being taken on time. This dalliance of data is in line with what has been stated in Ministry of Education ESDP VI which highlighted that, despite efforts made to maximize the benefits of this system, it has not yet produced the desired quality of information on time (MoE, 2021).

4.2.2. Major Challenges in the EMIS of Oromia Education Bureau

Regarding the major challenges that hold back the effectiveness of the regional EMIS, the participants' responses revealed that the system is characterized by time-consuming, paperwork, especially at the school level, tiresome and pass through a long process, rigid, complicated and so forth. Meanwhile, it was found that most the challenges of the regional EMIS were directly related to the three EMIS pillars which extend from the regional level down to the schools.

The People Pillar of the EMIS

This pillar is one of the major pillars of the EMIS which includes teachers and school principals at school levels, statisticians at woreda, zonal and regional levels as well as data users like officials, planners and other educational practitioners at different levels of the education system. For the effectiveness of the EMIS, the capacity, commitment, readiness and awareness of these people in terms of providing data, data management and usage is fundamental.

Through the intensive discussion with the participants about the issue, they have explained that this pillar is the most important and can have a significant role to play in the overall effectiveness of the EMIS. They highlighted that even though the regional EMIS is delivering what is expected and possible to consider it as an effective, there are challenges regarding the people pillar that are hindering its effectiveness at different levels. According to the participants' view, even though the magnitude differs, these major challenges of the people pillar can be manifested as a lack of commitment, awareness, know-how and capabilities among data providers, statisticians and data users.

It was thoroughly discussed that most of the school principals who need to compile and manage the overall school data properly are lacking the know-how and awareness of the data they are providing to the larger EMIS. Some school principals are not aware of even what an EMIS is and how their school data are important for the overall system. Others do not know even what to fill in the questionnaire sent to their schools and sometime fill in the questionnaire with unrealistic data. For instance there were school principals who fill all grade one students under age 7 while there may students below and above age seven in the school. Some other school principals fill teachers' data wrongly like filling a teacher with PhD qualification in primary schools and so forth. It is believed that these are due to the being bulk of the questionnaire, lack of patience and not understanding the matter well to fill with the appropriate data. Most of the time, these data errors have found at regional level data verification and attempts were made to correct it and store the corrected data in the database. The practical evidence presented by the former EMIS team leader and working currently for UNICEF as technical assistant for the EMIS is that:

“....some principals don't even know how to fill it. Data that don't exist on the ground are filled in and sent to us. For example, what happened to me this year is that, according to UNICEF, there is a back-to-school campaign program through which we have provided some budgetary assistance to the UNICEF-supported districts. We sent money to 23 districts saying that we have allocated a

budget based on the number of students you have... And I also told school principals their plan from the regional EMIS database. I also told them that their plan should be the same as that came out of the database. Last year's first grade becomes a 2nd-grade plan this year, and what was in 2nd grade last year is a plan for 3rd grade, and so on. I passed on that they would add at least 2% of the students who dropped out. That's what their plan is to be. Now, what happened was that they refused the plan I told them; they said to me 'from where did you get these plans that you have piled up for us?' 'it is from what you filled into the database and sent to us and we took it out from EMIS data base,' I said. I don't even know the data base you are talking about; we have never had that much number of students.' they said. What this means is that on the other hand, the data they fill out and send us is not accurate. They are sending us something that is not on the ground”

This implies that the educational data and information in the region might be inadequate and inaccurate. Hence, to have adequate and accurate educational data and information at regional level, paying attention to schools level data management through enhancing the capacity of schools principals is crucial.

Regarding EMIS staff at different levels, the participants in the discussion have highlighted that the people working on EMIS at different levels, especially at woreda levels lack awareness, know-how and capabilities due to several reasons. Amongst all, people are assigned to this position without considering the requirements for the job and in some places; the assigned people are those who couldn't get a chance to be assigned somewhere else. On the other hand, the properly assigned people have not willing to stay a long year to work on EMIS due to the lower salary for the position and hence there is high turnover that let the EMIS staff member to leave and the acquired knowledge and skills also leave with the departing person. To replace these people, a new placement is needed which requires training for these people to inculcate EMIS knowledge and skills. This implies that, most of these people lack the training which enable them to be aware the overall work of the EMIS due to being new to the position. They also lack the awareness and know-how to work properly on EMIS that in turn hinders the effectiveness of the EMIS at all levels. The issue was expressed by one of the regional EMIS as:

“...the shortcomings in this area include the assignment of people, especially at lower levels. Officials assign people to this position carelessly, and there is no consideration for whether these people have an understanding of the job or not. They assign someone if they don't have a place to assign but not on what the job requires... The attention given to this work by various bodies is very weak. Even, they don't view data as useful...”

The implication of this situation is that to have well functional EMIS, the people working on the EMIS at different level require a capacity and know-how to work properly on the position. This

can be possible through delivering continuous capacity building trainings for people already assigned and working on the position and awareness creation trainings for newly assigned people for the position. This is against the remedy forwarded by UNESCO which states providing an attractive working environment, continuous professional development opportunities, a competitive salary, and improving incentives for staff retention (UNESCO, 2020).

The other issue raised regarding the people pillar was the disappointing situation at different levels, especially at the regional EMIS. As forwarded by ICT team leader, people working on EMIS are mainly disappointed due to three major reasons: failure of the data to be utilized by users, elongated process and the type of tool the system is using.

“...and there are various external factors that can cause this. Some of the various external influences include; 1st people being 'disappointed' if something they did doesn't be utilized, 2nd they are 'disappointed' if they don't get enough incentive for what they did. 3rd they are 'disappointed' if the tool and the process are not suitable. So, come to EMIS, these are EMIS's problems in our case. There is no sufficient payment and no attractive structure which is leading to high turnover.Therefore, the impact is greater if there is no user, if there is little to be paid, and if the working conditions are exhausting”

It was also found from the discussion that most data users at different levels of the education system in the region have little awareness on how to use when to use and from where to get the appropriate data they require. Even, most of the officials at different levels of the education system in the region have little awareness to use the data produced by the EMIS in intervening to enhance the educational issues. It was expressed by the former EMIS team leader and technical assistant for EMIS as:

“... Leave alone others, our leaders have no understanding of it. Even...nobody asks for the student to drop out, and the various things we put in the Abstract. I have worked in this bureau for more than 10 years, and no one has ever called us and asked us about this ... They never look at it. Therefore, the leaders themselves do not need to ask about the data and hence do not pay attention to it”.

This implies that the regional EMIS team has to create awareness for data users on how to use the data they produced. Most importantly planners, officials and educational practitioners need to be aware of what types of data and information have been produced for the year, how to get it and the implication of some of the information. The team also needs to launch the final education data and information produced in annual basis which enable users to be aware of the overall status of education performance in the region.

Overall, some skill gaps were identified in relation to the people pillar of the EMIS team in the region which can be attributed by for example unable to write queries to generate data as per required by data users that could not be generated by default and unable to customize the data entry interface on software as per the updated questionnaires. The other gap identified was that there is lack of giving awareness to data users on how to use the produced data and hence users' awareness to use the data was found as limited. This implies that unless users have awakened and utilized the data in a proper manner, its production is nothing and it is simply consuming time and resource through the process. In addition, it was found that there are some challenges concerning this pillar which are manifested by little attention paid by officials to have strong EMIS at regional level. The EMIS position is the lowest in the bureau as compared to other directorates which fails to attract experienced people to the position and the current situation reveals that most of the regional EMIS positions are operated by people borrowed from other directorates. It was believed by the researchers that these gaps and challenges concerning the people pillar of the EMIS may affect the effectiveness of the EMIS which in turn affect the quality of the overall educational management in general

The Process Pillar of the EMIS

For the effectiveness of the EMIS, there should be an enabling environment which may include EMIS policy, legal framework, institutionalized processes and organizational structure. According to UNESCO, education data policy helps to enforce and institutionalize an EMIS by defining the roles and responsibilities of various stakeholders in charge of collecting, processing, producing, sharing, and disseminating data, including the school, community, district, regional and national levels (UNESCO, 2020). In line with assessing the practical situation of these enabling conditions in the region, the participants of the focus group discussion have raised their views in relation to institutional arrangement and legal framework.

According to the participants, even though the organizational structure for EMIS and ICT that extends from the regional level down to woreda exists, the rank (position level) assigned for the EMIS at regional, zonal and woreda levels is low and hence low salary as compared to even other positions in these respective administrative levels. Even though there is an organizational structure to woreda levels, it fails to hold people to be assigned and stay longer years in the position due to lower level of the position. At the regional level for example, out of the six EMIS

positions only the team leader is assigned through competition. The team leader position is somewhat better as compared to other position in the team. Three of them were those assigned to some other position in other directors and now working on EMIS position for their experience and two positions are still not occupied for being lower level and lower salary which is assumed to be due to less attention given to the position at the initial time.

The participants in this study also agreed that except the EMIS guideline; there is no EMIS policy even at regional and at national level too. In the same phenomenon, most of the participants have agreed that there is no legal framework which is very essential for ensuring responsibility and accountability in the case of data falsification, incompleteness and dalliance. According to their view, all these gaps and problems are due to the poor attention and emphasis given to data by officials at different levels. Some of the participants fear that these enabling environment shortcomings may not be solved even in the future unless the officials' attitude towards data will be changed. In this regard, the former EMIS team leader and technical assistant for the EMIS said that:

“...In terms of policy, there is no policy for now. Maybe it comes out in the future. I don't think so in the future even. Because the top leaders have low data-related thinking and attitudes and I don't know if this policy will be fixed in the future. May God make it right for us, I do not think that it will be formulated in the future unless official from top to bottom change their attitude towards data”.

Another EMIS team member added on the issue as:

“...Concerning work-related EMIS policy and legal framework, they are not available as mentioned earlier. We only have the EMIS guideline but there is nothing about EMIS policy... the issues of not providing data on time, not providing clean data, incomplete data are related to this”.

Regarding institutionalized processes, the participants were discussing the issue and agreed that the process of educational data production in the region is tiresome, elongated and still accompanied by paperwork. This long process was expressed by ICT team leader as that the data collection and delivery process through EMIS is an elongated, backward, and exhausting.

Under the process pillar of the EMIS, the overall idea that the participants were talking about was that there is poor and even no enabling environment for the effectiveness of the EMIS and the environments are not conducive. According to their view, the occurrence of most of these

problems was due to the less attention given by the officials at different levels to data collection and processing issues in the system.

The Technology Pillar of the EMIS

Technology is the other most important pillar of the EMIS which can facilitate the electronic transfer of data and information from schools to the regional education bureau with the help of devices like computers and laptops. To fully utilize technology for educational data collection and processing in a proper manner at all levels it requires hardware facilities, software applications, skilled manpower, internet connectivity and electric power availability. Through all these, it is possible to transform data collection and processing from a paper and pencil system to an automated one. It also helps to improve the timeliness of the data through online data entry, lessen the tiresomeness of the process and ensure the overall quality of educational data that have a positive impact on the educational management system in general and data-driven decision-making in particular.

In line with this, the participants in this study have discussed thoroughly the challenge, gaps and problems regarding this pillar that are hindering the effectiveness of the regional EMIS. The issues which the participants have seriously considered were the attitude towards accepting new technology, the outdated technology that the regional EMIS is using, lack of hardware equipment like laptop computers, network connectivity problems and unavailability of electric power.

According to most participants' view, the challenges to using technology in data collection and processing starts from the attitude towards accepting new technology at all levels. There is resistance to new technology fearing that, its applicability and complexity. What has been raised as an example was that, the resistance of some regional EMIS & ICT experts to the recently introduced data collection technology that intended to collect data from schools through online data entry using tablets or smart cell phone. They argue that this online data entry could not be realistic in the current condition where schools have no tablets and poor network connectivity, especially in the remotest areas in the region.

The other issue that the participants agreed upon was about the being old and outdated software that the regional EMIS is using. The regional EMIS is currently using educational statistics application software called StatEduc2, which is a web-based database application system for data

entry, storage, and processing. It was introduced to the Ethiopian education statistics system by UNESCO before the Ethiopian Millennium which is 15 years ago. The software has not been upgraded or changed since then with up to dated software as expressed by one of the EMIS team member.

“... Concerning software, the software is rightly called obsolescence. For example, Microsoft office after 2010 doesn't connect to it. It means that recently produced laptops with Microsoft office after 2010 will not connect, unless it is office 2010, 2007 or whatever. So it's backward. On the other hand, it is not flexible, not being able to be customized by any other user. It is rigid”.

Of course the software has been used for longer years and can be categorized as the oldest version. Even though the software is free to choose Microsoft Access, Microsoft SQL Server, Oracle, MySQL, etc. (UNESCO, 2020, P.112) it hasn't been updated to strong databases like SQL and Oracle, rather using Microsoft Access which is less capable as compared to others. On the other hand although the system supports data collection remotely from schools through, it hasn't been upgraded to this functionality and has only been operating in standalone mode and local area network (LAN) which need due attention to upgrade and change the system to the recent and appropriate technologies.

The other issue that the participants were discussing was lack of adequate hardware equipment. Accordingly, the most important hardware equipment like desktop and laptop computers are rarely available and most of the available laptops are old and not working properly as needed. It was the responsibility of zonal and woreda education office to equip the respective EMIS with the necessary equipments. However, this has not been realized to the expectation and the practical situation revealed that the available laptops are found as old. An ICT expert who participated in the discussion has expressed the issue as:

“Remember those laptops around us for repairing during the training we have delivered last year. Are those laptops the laptops that need to work this time? This day, the Intel and dual processors have passed and we are in core processor. I found that there are laptops which are not even dual. There are laptops with Intel processors. The laptops some of them are using meant that they were made in the 1980s. If we try to format, they don't support the software we are going to use to format the laptops. They are that much outdated”.

At the regional bureau level, the availability of both desktop and laptop computers is better as compared to both zonal and woreda levels. All the regional EMIS team members have both the equipments. However, the laptops used by the regional EMIS staff were found as old that are attributed by very slow at the time of opening and shutting, installing different applications and

being busy. Hence, they need to be replaced by laptops with ultimate capacity and which support the recent data collection and storage technologies.

Network connectivity plays a significant role in effective implementation of the technology pillar in the EMIS. In this regard, poor network connectivity, especially in the remotest area of the region was raised by the participants as the other challenge in the technology pillar of the EMIS. Strong internet network connectivity is essential and mandatory for online data entry which can be carried out at schools or woreda levels and help to store the data in the central server. However, the current network situation doesn't support online data entry from schools due to poor internet network connectivity.

Electric unavailability is also found to be the other challenge in EMIS effectiveness. According to the data obtained from the regional Education Statistics Annual Abstract as of 2014 (2021/22 G.C), out of the total 15,044 primary schools in the region, only 4,489 (29.8%) had electric power availability from different sources like hydro, generator, solar and biogas. Most of the primary schools 10,555 (71.2%) in the region have no electricity as of the due year. Regarding secondary schools, out of the total 1,351 schools, only 1,094 (81.0%) have electricity from those different sources. All these data revealed that there is poor availability of electric power which is very essential for the effective functioning of the technology pillar of the EMIS at all levels of education system.

5. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The importance of quality education data and information are vital for data-driven planning, monitoring and evaluation, decision-making, budgeting, policy formulation, resource allocation and overall educational management at all levels. These quality educational data and information can also be realistic through an effective Education Management Information System (EMIS). The EMIS on the other hand can be effective if its three most commonly known pillars, the people (data providers, technical staff and data users), the process (organizational structure, policy and legal framework) and the technology (hardware, software, internet connectivity and electrical power) are adequately available and utilized appropriately.

In Oromia, the current EMIS can be considered as effective for it is delivering the required education data and information needed by different stakeholders. However, the system is characterized by poor data quality in terms of timeliness and reliability which is affecting the decision making, the preparation of plans, monitoring and evaluation, resource allocation and so forth. Hence, strengthening the EMIS in the region through overcoming the challenges identified in this research is important. Because effective EMIS helps to get quality educational data and information which enable educational leaders and practitioners to prepare achievable short and long-term plans, make appropriate and equitable decision and carry out effective monitoring and evaluation for better enhancement of the education sector in general and to achieve the intended educational goals in particular.

Recommendations

The collection of data, its conversion to information and its proper storage, retrieval and utilization need an effective Education Management Information System (EMIS) which can be possible through an endeavor to overcome the challenges in the three major pillars of the system. Hence:

- It needs the commitment of regional bureau officials to allocate adequate resources to replace the current old software, purchase necessary IT equipment, providing relevant training to personnel at different levels.
- It is also better if the regional education bureau officials give due emphasis to educational data and hence the career structure of the EMIS at all levels will be improved and the high turnovers of EMIS staff at different levels will be minimized.
- It is recommended that the regional education bureau needs to develop EMIS policy and legal framework in collaboration with the federal MoE which helps to make all stakeholders accountable for their responsibilities.
- Moreover, it is recommended that further research at national and regional levels need to be conducted to come up with appropriate interventions for the challenges in the three EMIS pillars to strengthen the entire system.

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FOCUS GROUP DISCUSSION GUIDING QUESTIONS

This study is conducted by Mengistu Leta, Doctor of Education/DEd candidate in Educational Policy and Strategic Management in Jimma University. The study intends aimed to examine the practice of Educational Management Information Systems in Oromia and to identify the major challenges which are hindering its effectiveness. Oromia Education Bureau ICT and EMIS directorate has been selected as a source of data for this study because of its major role it is playing in providing educational data and information in the region for different purposes. The information you provide will help the researcher to understand how **the challenges related to the three major pillars of the EMIS are hindering its effectiveness**. Your participation in this discussion is entirely based on your consent and the information obtained will be kept strictly confidential and used only for the purpose of this study.

I. General Information

1. Name of the organization Oromia Education Bureau, ICT and EMIS Directorate
2. Date of Focus Group Discussion:
3. Place of Focus Group Discussion:
4. Estimated time for the Focus Group Discussion: 1:00-1:30
5. Number of EMIS team involved in the discussion $M=$ ___ $F=$ ___ $T=$ ___
6. Number of ICT team involved in the discussion $M=$ ___ $F=$ ___ $T=$ ___

II. Focus Group Discussion Guiding Questions

1. Would you explain the practice of EMIS in Oromia please?
2. Do you think that the EMIS in Oromia effective? How?
3. What do you think are the major challenges in relation to the “PEOPLE” pillar of the EMIS?
4. What do you think are the major challenges in relation to the “PROCESS” pillar of the EMIS?

5. What do you think are the major challenges in relation to the “TECHNOLOGY” pillar of the EMIS?

Thank You for your time!!