
Challenges in Implementation of Education Management Information Systems in Schools of Pakistan

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Abstract

This paper presents a study of the challenges faced during implementation of Education Management Information Systems (EMIS) in the educational institutes of Pakistan. An EMIS is a system that ideally contains all academic as well as human resource data regarding teachers and students, which may contribute in the improvement of the education being imparted. However, there are several challenges faced when it comes to the implementation of such systems in developing countries. Identification of these challenges has been carried out through a thorough literature review. It is observed that the National Education Management Information System (NEMIS) faces several challenges; many of which may be resolved if the challenges in implementation of EMIS systems at school level are addressed. Once EMIS systems are functional at schools, they can help in disseminating up-to-date and accurate data directly to NEMIS in a timely manner.

Keywords: Education, Management, Information system, Challenges, Implementation of EMIS.

INTRODUCTION

Education may be considered the backbone of social and economic development of a nation. Education not only helps reduce poverty and social injustice by providing career opportunities to the under privileged but also provides ways for social inclusion. Currently, as the focus around the globe is on 'knowledge economy', education becomes an essential asset for the development of human capital for any nation [1]. A society that consists of literate and skilled citizens can hope to develop its cultural, social and political values and lead the economy towards the path of sustainable economic development. Thus, improving the education priority within under developed countries is the pressing need of the time.

According to Shafique and Mahmood [2], 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).

An EMIS is a tool that systematically organizes educational data. It may be defined as a system that collects, integrates, processes, maintains and disseminates an integrated set of reliable, timely and unambiguous data to education leaders, decision makers and planners, thus contributing towards the achievement of goals and objectives of their organisation [3]. The terminology of an EMIS may be used in a broader sense, i.e. referring to the national level education management information system, as well as being used for the narrowed down concept of an EMIS for a single educational institute [2].

Information systems are a combination of tasks to be performed, people performing those tasks and technology through which this performance is made possible. Once an EMIS is implemented within an educational institute, all information within that system can be streamlined and becomes easily accessible to relevant personnel within and outside the system, assuming personnel have appropriate training and the required resources.

The standard of education at the national level depends upon the quality of education being provided within primary and secondary level education institutes. However, lack of proper planning at the national level seems to be the underlying cause of several unaddressed issues. The pre-requisite of planning, decision making, monitoring and evaluating the education system at various levels within Pakistan depends on the availability of valid, reliable, comprehensive and up-to-date educational statistics/data. Having the data is critical, so too is planning and so forth; there is also a matter of the skills, knowledge and motivation of policy makers and operatives re-translating what has been gathered and developed in 'action on the ground'.

In Pakistan, there is a need to improve individual education institutes through proper management, moreover to introduce information management systems within schools so that complete education statistics and data can be generated from each educational institute. Information systems which have been developed for facilitating educational administrators are neither robust nor well-planned, and do not aid them in realistic planning and decision making [2]. Therefore, there is a dire need for designing effective and user-friendly education management information systems at the institute level as well as national level.

REVIEW OF EMIS IMPLEMENTATION IN DEVELOPING COUNTRIES

In order to get a clear picture of what shortcomings have been faced during EMIS implementation in developing countries and what measures were taken to avoid those shortcomings, a review of previously implemented EMIS solutions has been carried out. This review will provide some insight for reaching conclusions on which methods should be followed and which to be avoided if an EMIS solution is to be implemented in Pakistan's schools.

Major concerns include analysis of implemented systems that not only help to maintain student and academic data but contain other modules such as HR, Finance, Event Management, so forth; enabling the institute to monitor the school's overall performance (including student and teacher performance) via a single system, monitor conduction of quality of education, link their schools and colleges to district and provincial EMIS cells for education planning and policy making at the national level.

Developing countries (defined according to their Gross National Income (GNI) of US \$11,905 and less per capita per year, specified by the World Bank, 2013) have recently been provided with the chance to improve their educational standards by the implementation of national level EMIS by projects funded by various donors and United Nations agencies such as the World Bank, United Nations Educational, Scientific and Cultural Organisation (UNESCO), the United Nations Children's Fund (UNICEF), the United States Agency for International Development (USAID) and the Department for International Development (DFID) [4]–[6].

Attfield and Vu [7] focused their study on improving quality of education in Vietnam and discussed a new approach involving flexible data systems for adoption of new standards. A project was initiated that developed human resource (HR), administrative and school inspection information management, called V. EMIS, which was implemented in many upper secondary schools. This study points in the direction of having all major components/ modules within a single EMIS system, i.e. administrative, HR as well as some school progress monitoring system, in order to keep an eye on improvement of quality of education; one of the aims of our study.

According to Motala [8], quality education factors have been identified as local change agents such as teachers, students, the process, policies or an information system that is directly linked to the progress of the school. Improving the capacity of these change agents is necessary for their active participation in the schooling process and progress. Similarly, within Pakistani schools, capacity building of these change agents needs to be arranged for improvement of education quality and school performance.

CHALLENGES TO EMIS INTRODUCTION AND USE

Various challenges have been identified in the implementation of information systems in numerous developing countries. These stretch from limitations of data collection to multiple socio-technical aspects such as technical challenges, organisation structure challenges, psycho-social challenges, challenges in achieving goals and values, and managerial challenges detailed below.

The Limitations of Data Collection

According to the district education profile of Pakistan, the report prepared by Amin *et al.* [9] shows the education related data collected for the national EMIS, from the various

districts of Pakistan. This data is limited to the number of institutions within a district, number of institutions within each level (primary, middle, higher secondary), number of enrolments within each level, number of teachers within each level, institute building details (ownership, availability of electricity, drinking water, toilets, boundary wall, building condition). This data fails to provide any insight into academics and the quality of education being provided at these institutes.

Bhatti and Adnan [10] highlighted the challenges to the use of EMIS in NWFP (province of Pakistan now named as Khyber Pakhtoon Khwa, KP) by conducting a study of the existing EMIS system at district and provincial level. Their focus was on district EMIS offices and the factors hindering effective communication between district and provincial EMIS. Complete web-based EMIS solutions, if implemented in Pakistani schools may feed the district and provincial level EMIS chain with the required accurate and up-to-date data. However, the issues relating to interface of district EMIS with individual sub-units, i.e. educational institutes, such as reliability and timely communication of information need to be considered for getting a holistic view of EMIS implementation in schools.

Tikly [11] draws attention to the difficulties linked to EMIS systems, specifically lack of participative approaches in relevant data collection. Data verification at appropriate points within the workflow is also an essential requirement. Serious delays in data collection through EMIS are faced if data verification is not done appropriately and timely; within workflows at district level. Verification of collected data should be incorporated within the district level EMIS, which receives data directly from schools [12]. Trucano [13] identifies gaps in the planning and implementation of an EMIS indicating the lack of support and commitment from the district offices and schools to the data collection and analysis process.

Technical Challenges

Numerous technical challenges in the smooth running of EMIS at various levels in Pakistan were identified in the study by Bhatti and Adnan [10] including scalability, security and robustness of the database systems being used, database integration and backup, lack of information sharing, delays in data dissemination process, delays in planning and decision making, internet accessibility and most importantly, allocation of budget. Furthermore, shortcomings to effective EMIS implementation were identified to include inadequate computing environment with insufficient capacity of servers, backups, security facilities as well as lack of regular maintenance. In a country report on Pakistan's education system by Shah [14] district EMIS cells were found non-functional due to the lack of financial, personnel and hardware resources, compelling the provincial EMIS units to compile district data, which resulted in delayed and inaccurate report generation.

The study by Aggarwal and Kaur [6] provides useful insights to technical challenges in using EMIS such as IT accessibility, poor system maintenance due to inadequate training, and lack of financial resources allocated to EMIS.

Structural Challenges within the Organisation

The major elements of the structure of a school include tasks, information flow, work flow, procedures, rules and policies. Oulai *et. al.* [15] and Shah [14] identify educational planners as having an inadequate profile for interpretation of policies, analysis and usage of education data for monitoring of implementation plans. Moreover, the few qualified planners are overworked to fill the gaps caused by other planners' lack of skills. It is a pre-requisite that all institutes have EMIS implemented at their premises and have the required structural changes implemented within the institute to ensure a smooth work flow. This will enable schools to not only analyse their own data internally but to participate in providing their education data for the compilation and analysis at the district level EMIS. As information systems involve both the technical and human aspects, it is essential to have an organisational structure that incorporates a balance between the two.

Psycho-social Challenges

Among other factors, a culture of caution in the dissemination of transparent, detailed and disaggregated data was identified by Attfield and Vu [7], which caused hindrance in the implementation of school data systems. The human element within information systems brings about both positive and negative concerns. Crouch *et. al.* [16] state various reasons for resistance to EMIS implementation, such as staff considering it to create extra work for them, increase in accountability, limit in patronage due to transparency of data and the possibility of political sensitivity if unfavourable outcomes are observed. Teachers face various fears on the use of data. The reservations involved in EMIS development need to be addressed by converting them into favourable outcomes of the solution by discussions and presentations of system usage emphasizing on its possible benefits.

Challenges in Meeting Goals and Values

Meeting the requirements of every stake holder and EMIS user becomes challenging at times, as systems tend to be over-designed due to unrealistic expectations [16]. In order to meet the goals and values of an educational institute, faculty members have certain demands; Chapman [17] identifies that specific users have specific demands of data to make decisions for which they are responsible. Their demands however, need to be given the required importance, because these users hold an equal share of importance in the development of such socio-technical systems.

Managerial Challenges

Even though data becomes available due to education management information systems but decision makers hardly use that data for planning and education policy development [12]. Some reasons for this limitation in the correct use of data are lack of proper presentation and dissemination of statistical data.

In light of the previous work, it may be observed that there is a need to study the data systems being implemented in Pakistan, at various levels. Starting at the grass-root level, i.e. schools and colleges, the challenges regarding implementation of EMIS, as well as the inter-connectivity of these data systems with the district and provincial EMIS cells need to be addressed to provide deeper insight to policy and decision makers.

DATA DISSEMINATION TO DISTRICT AND PROVINCIAL LEVEL

As evident from the literature review, the current data collected in the provincial and district level EMIS cells of Pakistan does not comprise of any data related to ‘quality of education’. Moreover, the entire process is manual; data collection forms are distributed to schools within each district, to be filled out and returned. This process not only involves delays in data collection but also lacks reliability as the data entry of hundreds of forms is done by the limited data entry staff available at the cells. Further delays are introduced in the data entry process due to the numerous limitations at these EMIS offices.

PROPOSED SOLUTION FOR IMPROVEMENT OF EDUCATION RELATED DATA RECEIVED AT NEMIS

In order to improve the reliability of data received from the schools and speed up the process of data collection, it is proposed to have education management information systems implemented at majority of schools. Data should be sent from the school EMIS electronically to the district level EMIS as suggested by Wang & Zhao [18] and Ruchika & Goel [19].

The change proposed for ensuring the element of ‘quality education’ to be incorporated in national level education planning and policy making suggests that additional information be sent to the district level EMIS, which may include the institute’s education related details. Apart from the school inventory and student enrolment details, the data sent from schools could include the following, as is also depicted in the data flow diagram in Figure 1.

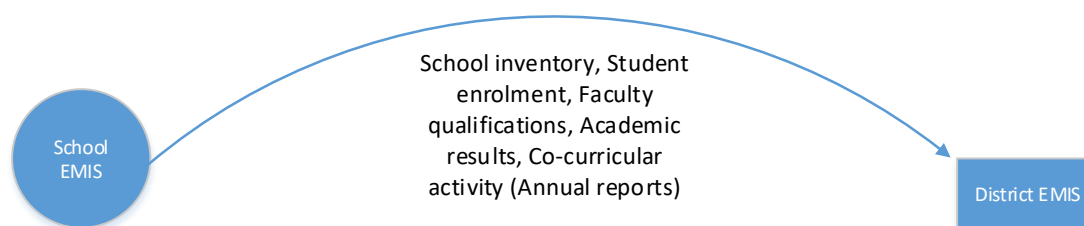


Figure 1: Context level DFD - Output from School EMIS to the District EMIS

- Faculty qualifications along with updated data on annually received trainings and any update in qualifications.
- Academic results which include pass percentages in each class as well as dropout rates.

- Co-curricular activities taken place in each academic session as well as approximate number of students who participated, inter-school student participation, annual expenditure on events.

CONCLUSIONS

Education management information systems implemented across the globe in various developing countries were studied, aiming to identify the major challenges faced in their implementation. It is concluded that if EMIS systems are implemented in Pakistani schools, urban as well as rural, by addressing all such identified challenges; we can hope to improve the education scenario of Pakistan not only at the Primary level but at higher level as well. The educational institutes will be able to better plan and manage their own education system as well as provide accurate data to the district and provincial level EMIS. This will result in accurate education sector planning at the national level.

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