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The Impact of Information Technology on the Education Sector in Afghanistan

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In insecure and fragile environments and especially in countries such as Afghanistan where the education sector comes under direct attack by insurgents, monitoring of project sites becomes hugely complex and physical monitoring becomes near impossible without putting lives at risk. In this context, Afghanistan is an excellent example of how innovative use of Information and Communication Technology (ICT) has not only strengthened overall monitoring systems such as Education Management Information System (EMIS), but also improved the collection and verification of data using the latest in mobile technology.

Background

The Education System was one of the biggest casualties of the three decade old war in Afghanistan. In 2000, when the American led International Security Forces reached Afghanistan, there were less than one million children enrolled in school and virtually no girls in the system. Today, there are over eight million children in school of which 40 percent are girls. Even before the Taliban, investment in the education system was weak. During the rule of the King as well as the Communists the number of schools providing modern education was minuscule. By 1980 only 11 percent of the country’s population beyond the age of 25 had any formal education. By 1996, only 22 percent of the eligible population of children was studying in formal schools.

At the end of the war in 2001, rebuilding the education sector was one of the first priorities of the new government as well as the international community. However, with no accurate and/or reliable data, planning and financing of the sector proved difficult. Data collection, collation and analysis except in the most rudimentary forms were virtually non-existent. Most of the reports were based on extrapolation of historic data. Supported by the World Bank and the Afghanistan Reconstruction Trust Fund (ARTF), the Education Quality Improvement Project (EQUIP) was launched in 2004. At USD 460 million, EQUIP II is today the largest education program in the country. Increasing use of Information and Communication Technology (ICT) in the education sector and strengthening the Education Management Information System (EMIS) has been a priority under EQUIP II. Indeed, the evolution of EMIS has been one of the most important achievements of the project.

Evolution of the Education Management Information System

In the last few years, several ICT based initiatives were undertaken to ensure accurate education data got collected, collated and reported to all stakeholders in a meaningful manner and within a reasonable timeframe. In turn, it has enabled policy makers to fine tune the planning and budgeting process in order to make education services available in a manner that is cost effective and need based. Today a single centralized portal, www.emis.af provides comprehensive education data to stakeholders on a need to know basis. This portal enables visitors to slice and dice the data as per provinces, districts and individual schools. The portal provides a number of reports in terms of gender ratios, teacher pupil ratios, availability of school infrastructure etc. MOE argues that the use of electronic data systems has improved transparency and accountability at every level of the education system. As the education sector grew, the
government realized the importance of accurate data for decision-making – not only how data is collected and analyzed but also how data is applied during every step of the process. No decision could be made without reliable data.

At the start of EQUIP II the EMIS had a few rudimentary applications and a cumbersome centralized system of data collection. Data pertaining to schools and students used to be collected through a paper based system once every year. (Stories of student information sheets being brought to Kabul hidden in vegetable trucks is Ministry lore!) During the course of the next few years a number of ICT initiatives were undertaken by EQUIP II leading to a comprehensive electronic system of data collection, collation and analysis that provides accurate information at the click of button. Apart from education data collection and analysis systems, a number of new technologies including mobile and GIS technologies were introduced to ensure that data analysis happens in real time and becomes available to all stakeholders seamlessly on a device of their choice.

**School Management System:** The system provides details of all schools with information on school location, type of school, number of class rooms, infrastructure, toilets, library, science labs etc. It provides stakeholders with important information on the number, types and quality of school infrastructure in Afghanistan. An independent **Infrastructure Management Information System** is currently under development. This system computerizes all stages of infrastructure development.

Yet another system under development is the **Asset Management System** that provides the financial and operations and maintenance information of all the infrastructure assets in the country. Thus these three systems namely the “School Management System”, “Infrastructure Management System” and the “Asset Management System” completely tracks the school infrastructure in the country from its inception till its regular use and maintenance.

**Student Management System:** The system provides details regarding students, their demographic data, class status etc. Each student is mapped to a school and each school is identified by a unique code. Thus the system provides facility to list details of all students in any given school. An attempt is at hand to identify each student in any given school through the use of a unique ID. Each student entering the education system will be allocated a unique ID which will be used to track the student from his/her entry in to the school system until passing out.
**Teacher Management Information System (TMIS):** This system tracks the induction, training and professional development of teachers. The Ministry started by developing a system which tracks the training status of hundreds of thousands of teachers. Mobile applications are now being used to capture all aspects of pre-service and in-service teacher training and are transmitted to central servers in Kabul for collation. In line with the focus on quality, this system will be further strengthened to include a Teacher Performance Appraisal system that will be based upon Teacher Professional Standards (TPS) and will make a link with Teacher Career Path (TCP). The TCP will be based upon, TPAS, Teacher Course Completion, Teacher Experience, and Teacher Qualifications and allow The Teacher Education Department (TED) to develop needs-based individualized career development programs for teachers. In order to strengthen the current M&E systems at TED, mobile applications and tablets have being introduced allowing field monitors to gather information on handheld devices while at school or at Teacher Training Colleges. This is likely to increase system level efficiency and reduce paperwork that the current system is burdened with.

**Learning Assessment System:** The first ever learning assessment for students at the primary and secondary level is being done using tests specially configured over computing tablets. Students are expected to take the tests using multiple choice formats over the tablets. Once the tests are completed the scoring happens automatically and test results are transferred on to standardized computing platforms. Learning Assessment Applications then pick up these test results and provide the outcomes for the assessment.

**Education Data Centre:** The Ministry has recently established a state of the art data center. This data center is capable of housing all the applications developed at the ministry on a series of servers housed on racks with in the center. Availability of such a data center highly enhances the capability of MoE to centrally host the applications and make them available to all the stakeholders spread across the country as well as outside of it.

**Certificate Distribution System:** In an education system that can be easily manipulated this system allows the Ministry to easily identify authentic students registered in the system and distribute school leaving certificates only to them. The authentication of students is conducted by the General Education Department. The system picks up data from this database and prints the certificates and arranges them as per the distribution lists for the various schools. This automated process has reduced the time of distribution of certificates from as long as 3 years to a few months.

**Human Resource Management System:** An HRMS application was developed to manage the entire life cycle of Technical Assistants working in the Ministry. Since the Ministry employees over thousand TA this application has led to easy facilitation of all functions related to the management of TAs including their selection, induction, performance assessment, payment and promotion. Using this system as a model, an initiative is currently underway to roll out a comprehensive HRMIS system for the entire ‘Tashkil’ (civil servants) of the Ministry that accounts for over 250,000 employees including the teacher community. Such a system will effectively facilitate management of the entire establishment at the Ministry from selection to retirement.

**Mobile Applications:** In 2013, Ministry of education undertook an important experiment in hosting a mobile based application in schools within the Uruzgan province, one of the most insecure provinces in the country. Data pertaining to school management was recorded on mobile devices and transferred to a central server in the data center using the mobile technology. Principals of the schools and the school shuras (equivalent to Parents Teacher Associations) were involved in monitoring the data and giving their inputs using mobile devices. The experiment proved to be very successful and has led to development and hosting of similar applications in other spheres of MoE. Now the Teacher Education Department is
monitoring the performance of Teacher Training Colleges using mobile technology; similar technology is being used in monitoring infrastructure development/school construction. The rapid increase in the use of mobile technology is expected to move a number of applications to the mobile platform in the days to come. Geographical Information System (GIS) technology is being effectively used to depict data on maps. Such visualization provides contextual understanding of the data being presented. One such example is as shown in the GIS Map below.

This GIS presentation depicts the number of students, teachers and the Pupil Teacher Ratios in different districts of Afghanistan. Since Green shows better density and red shows poor, a reader of this map immediately understands which provinces in Afghanistan have better Pupil Teacher Ratios.

**Capacity Strengthening**

Despite capacity constraints at every level and without the use of huge numbers of expatriate staff, the EMIS Department of the MOE has developed robust capacities in building and maintaining modern computerized systems. The department is not part of any Project Implementation Unit and is led entirely by civil servants. While they bring in outside technical assistance as necessary, capacity has been built within the Ministry to develop, implement and manage this decentralized system in all 34 provinces. Internal programmers and system architects are now able to conceptualize, design, architect, build and implement a number of user friendly ICT systems that are invigorating the decision making and functioning within the Ministry. Third party monitors are engaged in verifying data.
Some of the systems built are captured in the figure below:

Riding on the success of different initiatives in the domains of school management, mobil-based applications, GIS applications and centrally implemented education data management, MoE has rapidly moved towards a modern, highly integrated electronic environment that supports decision-making in real time. All this has contributed to modernizing the education environment in the country from a stagnant system in the early part of the century to a very vibrant system that is moving head in keeping with the times. This is as captured in the figure below.

### Education Domain Afghanistan

**By 2001**
- No. of Schools... Approx 4000
- No of Children in Schools 1 million
- No of Girls in schools... Virtually non existent due to Taliban Dictate.
- ICT Based data Monitoring...Non Existent
- Use of ICT in education...Non Existent
- Use of Mobil Solutions in the Education Domain...Non Existent

**By 2014..**
- No of Schools... > 16000
- No of Children in schools. > 8 million
- No of Girls in schools... Close to 40%
- ICT Based data Monitoring... Completely Automated and Centralized.
- Use of ICT in Education. ICT education a part of the modern curriculum.
- Use of Mobile Solutions in Education Domain...Beginning to be used