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EdData II

Kenya Big Data Activity

Briefer

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EdData II: Education Data for Decision Making Big Data in Kenya

Overview

The Kenya Big Data Activity is an operations research study to help the Kenya Ministry of Education, Science, and Technology (MoEST) identify the challenges, opportunities, and capacity requirements for implementing a school-based digital Education Management Information System (EMIS) at scale and sustainably. This activity was funded by the U.S. Agency for International Development's Task Order 19, *Data for Educational Research and Planning (DERP) in Africa*, under the Education Data for Decision Making (EdData II) program.

The following three sub-components composed the study: (1) shadow the national paper-based EMIS forms by using telephone and tablet-based applications, (2) support data validation efforts by county and sub-county officials, and (3) produce and distribute school report cards to schools. The study pilot tested telephone-based EMIS applications in 109 schools in Isiolo County (see map), and tablet-based EMIS applications in 97 schools in Mombasa County.

Implementation Process and Research Plan

During October 2015, the Head Teachers and Deputy Head Teachers received the initial training regarding the digital EMIS applications; EMIS data were recorded and submitted by schools from November to December 2015. During the same time frame, the Head Teachers submitted forms



separately through two different means: electronically (via telephone or tablet) and by paper, which is the regular reporting format for the EMIS. During January and February 2016, the County and Sub-county Officers conducted data validation site visits to a total of 40 schools in Mombasa and Isiolo Counties (20 schools in each county). During February 2016, the Head Teachers and Deputy Head Teachers were trained on how to use the school report cards. After the interventions, during March and April 2016, a series of qualitative assessments and stakeholder feedback sessions were held.

This study was designed to identify the extent to which using the digital EMIS applications resulted in gains regarding the improved timeliness and accuracy of the EMIS data submitted by schools and to identify likely issues that would be encountered in a national roll-out of electronic reporting, so as to prevent possible problems.

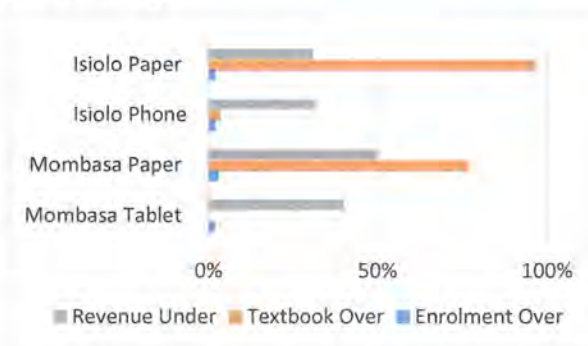
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The Research Team for this study compared the enrollment, textbook, and school revenue data reported both electronically and by paper with the actual validated data to identify the error or discrepancy rates because of the financial implications that these data points have on the financing and resources available to schools. Increased accuracy and timeliness of these data will directly impact the efficiency of the funding and resources available to the schools. These items will be impacted because the Free Primary (FP) capitation school grant is based largely on enrollment and because the funds earmarked for textbooks are derived from the FP grant.

The findings and recommendations draw from the data validation exercise, stakeholder feedback sessions, and other observations of the DERP Team from ongoing implementation of the study.

Findings

The results of the data validation effort show that discrepancies in textbook data far exceeded discrepancies in reported enrollment and revenue data as shown in the following figure. (Note: The degree of error is reported as a percentage of total validated data for revenue, textbooks, and enrollment.)



¹ Two weeks after initial data collection in both Mombasa and Isiolo Counties, 163 schools (79%) had completed their EMIS

The degree of error reported by paper for textbooks and revenue stand out in comparison to the accuracy of the data reported electronically; specifically, 18 out of 20 schools in Mombasa County and 19 out of 20 schools in Isiolo County had greater than $\pm 10\%$ error for their paper-reported data regarding textbooks. The validation results also found that the school revenue discrepancies varied significantly between counties, but not between the electronic or paper forms.

Conclusions from the Validation Findings

The validation results revealed the following general trends that are instructive and actionable:

- Textbook and resource data submitted by schools tend to be vastly over-reported, requiring disciplined validation and double checks of the data reported.
- The accuracy of electronic submissions tends to improve when Head Teachers work from completed paper forms.
- When trying to interpret these findings, caution should be used because the results compare only the validated electronic and paper form submissions of the same schools and counties.

Implementation Challenges

Although a vast majority of the schools could submit their EMIS data electronically in a timely manner,¹ the Head Teachers and Deputy Head Teachers experienced several challenges regarding the digital EMIS. Their infrequent use of the devices and software led to unfamiliarity with the applications and limited utility and sharing of the report cards and dashboards (a screen capture of a county dashboard is presented as follows).

submission, 26 schools (13%) were in progress, and 17 schools (8%) had not yet begun.



A few Head Teachers were reluctant to openly use the device at school for fear of someone mishandling or breaking it. In addition, schools varied in terms of the assigned roles and responsibilities for completing and submitting the form.

In addition, some staff at some of the schools were unable to complete the forms by using the electronic means because of many reasons. The reasons are as follows: the device was broken, there was a lack of data units (because individuals used up the mobile data provided through the activity), there was a lack of network coverage area, and staff were unable to correctly submit the form. Given these challenges in the pilot experience, careful consideration and precautions are recommended if a mass-scale roll-out is undertaken in the future.

Some officials at the schools in the counties and sub-counties also experienced challenges regarding their capacity to implement the validation activity and support the completion of the EMIS forms. The most immediate concern is the limited number of available individuals to provide support. This challenge is complicated by competing demands on their time and a clear lack of expectations in terms of their roles and responsibilities in supporting the EMIS. This issue, mentioned during a pilot activity, might be either worsened or improved during a mass-scale roll-out, or

enhancement of the EMIS function more generally, depending on how well the roll-out is handled, how integrated the data platform systems are, and how well the roll-out is resourced.

At the national level, the MoEST must address institutional and capacity challenges. The institutional challenges involve the number of agencies and offices operating independently within their bureaucratic silos. As a result, multiple and disparate records and databases proliferate across the MoEST and counties and sub-counties. This issue leads to inaccurate and inconsistent records. For instance, school officials may report a different number of students and teachers to the Teachers' Service Commission (TSC) than what they report on their EMIS forms or what is collected by the Kenya National Examinations Council for examinations registration.

A capacity challenge focuses on the capacity of the central Ministry to manage and administer a large-scale, complex national information system. The MoEST should consider increasing the staffing and resources allocated to the EMIS Unit in order to handle a system that requires functional teams to manage the database administration, the network administration, and the data processing and analytics. If hiring more staff is not an option, then the MoEST could consider hiring private contractors to source the required human resources to manage such a system. To assess the likely uptake of a school-based information system at scale, the DERP Team conducted a strengths, weaknesses, opportunities, and threats (SWOT) analysis. The main findings of the SWOT analysis are presented as follows.

| Strengths | Weaknesses |
|---|--|
| <ul style="list-style-type: none"> • Political will and leadership • Familiarity with EMIS questionnaire and/or protocol • Project demonstration of school-based information systems • TSC and Kenya National Examinations Council demonstrations of distributed data entry systems • Kenya as an Information and Communication Technology (ICT) hub and talent base for East Africa generally | <ul style="list-style-type: none"> • Limited financing for recurrent costs • Limited personnel (manpower) at the county and sub-county education offices • Limited use of existing data that are being captured by the EMIS form • Unclear roles and responsibilities of actors • Poor network coverage in some areas • Weak boards of management and poor relationship with schools • Weak management capacity of County and Sub-county Officers |
| Opportunities | Threats |
| <ul style="list-style-type: none"> • Medium-Term Plan II and EMIS Roadmap • Leveraging donor initiatives • Multi-modal and channel platforms • Semi-autonomous government agencies (SAGA) plans and investment strategies • Board of management expectations and demands • Tethering of FP capitation grants | <ul style="list-style-type: none"> • Administrative burden to Head Teachers • Norms and beliefs about data accuracy • Entrenched legacy systems and siloes • Expectations of quality assurance and validation roles • Perceived uselessness of the data • Accountability threat to Head Teachers |

Recommendations and Ways Forward

The challenges experienced by the MoEST, the schools, and the counties are understandable, given that the EMIS process was only revived in 2014 after seven years of dormancy.

The findings and recommendations are not intended to belittle the remarkable progress that the MoEST has made; instead, the issues can be used to help identify the systemic threats that could derail the successful implementation of a digital school information system or even an enhancement of paper-based systems.

The actionable recommendations in advancing this initiative are as follows:

- Articulate the vision, goals, and strategy in a revised EMIS Roadmap and other strategic documents
- Scaffold MoEST's capacity to scale and sustain a digital school information system
- Establish a centralized ICT office
- Differentiate rollout to schools based on readiness and capacity
- Leverage existing initiatives
- Design and implement a change management and targeted behavior change and communications strategy.

USAID's EdData II project is led by RTI International.

The project's Web site is www.eddataglobal.org.

RTI International is a registered trademark and a trade name of Research Triangle Institute.

Requesters are invited to contact one of the following people to express interest in EdData II:

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