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Fighting School Dropouts among Girls

An Innovative Predictive Tool that Empowers Citizens, Communities, and Local Governments with Information

BACKGROUND

Every March in Tanzania, District Education Officers survey schools and record information on student enrolment and performance, the number of teachers and their skills, the number of teaching aides, and the school's facilities and needs in a database called the Basic Education Management Information System (BEMIS). This database then resides at the President's Office Regional Administration and Local Government (PORALG) in Dodoma.

PROBLEM

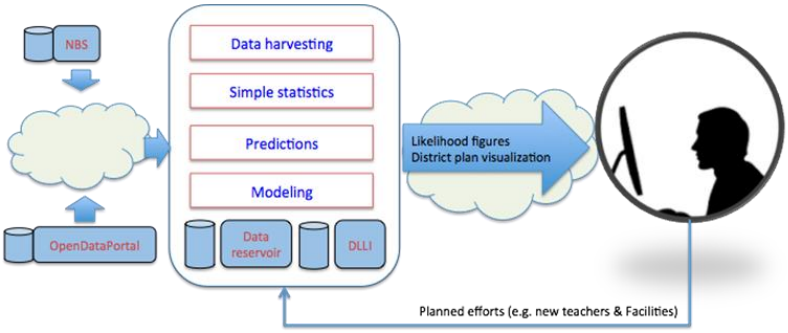
Measures to address school dropouts are often reactive rather than proactive and therefore only help the subsequent generation of students. Only after the data is collected do authorities discuss and address school dropouts and their causes. For instance, educational authorities realized that a lack of menstruation education and hygiene was a cause for school dropouts among girls. In response, Mbeya District implemented a girls' changing room as part of menstrual hygiene management to mitigate future dropouts. Rather than relying on this reactive approach, however, BEMIS data provides a powerful potential tool to identify problems leading to school dropout earlier and to address these problems before students leave.

SOLUTION

The historical data in BEMIS can be used to establish statistical trends in school dropouts and allow District Education Officers to predict and intervene in a timely manner to prevent dropouts. This can be done using predictive analytics and machine learning to help District Planning Officers predict the impact of education budgets – and even of specific budgetary allocations - on the school dropout rates among girls.

The first step is to develop an indicator - called the "Dropoutness Likelihood Index" (DLI) - using school and demographic open data sources. This index will help identify the girls at highest risk of dropping out so that interventions can be more focused and timely. The indicator can then be used in conjunction with an online tool to share the information with government authorities and parents through mobile phones. The DLI tool will have an interface that allows users to input and edit data such as potential budgets for school interventions. The tool will use the DLI to predict the effect on school dropout rates, thereby helping government authorities and parents identify the most effective interventions.

PROCESS



BEMIS data were accessed for Mbeya District, the location of the pilot indicator development. After harvesting and cleaning the data, a multiple linear regression model was developed to predict school dropouts by considering variables such as average school performance, pupil/teacher ratio (PTR), pupil/classroom ratio (PCR), pupil/latrine ratio, school health advisors, and school dropout rates. Contributions from each of these was factored into the final model, with the strongest statistical correlation arising from PTR.

In addition to the district-level data from Mbeya, national data from Twaweza Uwezo were obtained and a binary logistics regression model was used to predict school dropouts using school-related data (number of teachers, classrooms, latrines, parents attending school meetings, and girls' privacy rooms) and household-related data (source of income, household size, rural/urban, meals per day, parent–teacher meetings on students' progress, child gender, and child age). From among these, variables that had a statistically significant impact on school dropout rates included the number of teachers and classrooms in a school, parent attendance at school meetings, girls' and boys' latrines, and girls' privacy rooms.

In order to build interest and obtain buy-in for the tool, workshops with stakeholders were conducted throughout the prediction analysis work. Once the functions have been validated, an online platform will be developed to share the models – and tools to use them – with these same stakeholders, including students, parents, teachers, community members, and government authorities. The platform, which will be mobile-friendly, will include the following features:

- Data visualization dashboard
- Hard coded statistical model with the ability to tinker with the variables for a desirable output (reduction in dropouts)
- School ranking according to likelihood of dropouts

EXPECTED IMPACTS

As the DLI online platform becomes available for parents, community members, and local government in Mbeya, it is expected that it will

- Become a **planning support tool** for District Executive Officers to inform budgets and priority interventions;
- **Increase community participation**, leading to data access and use for local impact;
- **Empower students, parents and communities** with information about school facilities and rankings;

- **Create demand** for more data (leading to increased supply) by fostering recognition of its potential to transform the fight against school dropouts.

KEY COLLABORATORS

Rose Funja is leading a team of innovators in the development of the DLI indicator and online platform through the support of a grant from the Data for Local Impact Innovation Challenge.

The Data for Local Impact Innovation Challenge (DLIIC) is providing financial and technical support to this project. DLIIC is fostering data-driven innovations through small grant challenges for youth and entrepreneurs. Visit www.dlinnovationchallenge.com or follow DLIIC on Twitter @DLIinnovation for more information.

Data were obtained from the National Bureau of Statistics, PORALG (BEMIS), and Twaweza Uwezo.