



# **The Prospects of Effective Management of Educational Data in Primary School at Mbarali District, Tanzania**

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Author OM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author CCN supervised the study and made the necessary contributions to the study literature and analysis. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

In recent years, the use of education data has increased attention. They are important in education planning and development in general. This study assessed the prospects of effective management of educational data in Mbarali District. Our study employed a Cross sectional research design. A quantitative research methodology was used. The population of the study included data managers in primary schools. The study's sample included data managers 285 in primary schools from Mbarali district. Questionnaires were used to gather data. Multiple regression analyses were used to analyse the data. The study revealed that all the four independent variables (effective decision making, minimization of errors, cost effectiveness and efficient operations) uniquely, significantly and positively were influenced by effective data management model ( $\beta=0.257$   $P=0.00$ ), ( $\beta=0.301$

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$P=0.00$ ), ( $\beta=-0.632$   $P=0.00$ ) and ( $\beta=-0.614$   $P=0.00$ ) respectively. Therefore, an effective data management support efficiency in decision-making, leads to cost-effective, minimize errors, and support operational effectiveness.

Generally the appropriate investment in education is largely determines the success of the implementation of any education policy in a country. The government of Tanzania has given primary school heads power as a primary source of education data in order to ensure that the data submitted to various education authorities are accurate, dependable, and secured. Computers and data storage facilities should be among the data management tools and systems that should be available in schools.

Our study then recommends that the government through the Ministry of Education, Science and Technology should make sure current technology is used to manage data in education institutions through updating data management systems and data management tools such as computers, hard drives and data storage facilities to ensure data security and reliability.

*Keywords: Educational data; data management; effective management; Mbarali district.*

## 1. INTRODUCTION

### 1.1 Background of the Study

In recent years, the use of education data has increased attention [1]. They are important in education planning and development in general. For instance, in order to improve student learning outcomes and to show the value of investments made to change instruction, assessment, and professional development, schools are being held more and more responsible for the education they deliver (Huffman & Kalnin,2003). However, more knowledge about the education data to raise the Caliber of schools is urgently required [2]. All these realise the full potential of data in education [3].

The appropriate investment in education in terms of human, physical, and financial resources is largely what determines the success of the implementation of any education policy in a country [4] Similar to this, making an informed decision about where to invest resources to enhance education requires accurate, trustworthy, and secure data [5]. This will help to ensure that resources are allocated where they are most needed. The government of Tanzania has given primary school heads power as a primary source of education data in primary schools in order to ensure that the data submitted to various education authorities are accurate, dependable, and secure [3]. Therefore, Primary schools they also need to ensure diversity in their data.

Although head teachers provide education data that are used to inform various decisions about education improvement, there is little knowledge about the prospects for data management in

primary schools, making this study necessary to fill the gap in the literature. Consequently, the purpose of this study was to evaluate the likelihood of effective data management in primary schools with reference to Mbarali District, Tanzania.

## 2. LITERATURE REVIEW

Recently,different studies have been conducted; The use of data for school growth is influenced by data features, user characteristics, and school organizational characteristics, according to a study by Yibrie [6]. Additionally, data features and school organizational factors have an impact on how data are used to improve instruction. The fact that all three types of data utilization appear to be influenced by school organizational factors points to the significance of the issue. It makes sense to suppose that these components interact as data utilization entails a sophisticated web of interpretive social processes.

In Delta state [7]. conducted research on data management for efficient secondary school administration. The study concluded that secondary school administrators can more effectively achieve their administrative goals when data management technologies are used effectively when they are available, which is largely dependent on the availability of these tools [8].

Again, School Effectiveness and School Improvement were factors that Schildkamp, Poortman, Luyten & Ebbeler [9] looked into in order to determine how they promote and hinder data-driven decision making in schools. The results show that instructors generally perform admirably when it comes to using data for

accountability and school improvement. However, a lot of data sources are only used once a year when it comes to instruction. Among the factors examined, school organizational characteristics and teamwork had the biggest effects on how instructors used data in the classroom.

The results of a study by Mbaidullah et al [5]. Confirm the necessity of creating an information system that is not only trustworthy but also very accessible. In order to improve the current practice of data management in schools and district education officers, a framework was therefore proposed to direct the development of a web-based information system with appropriate functional and non-functional features. This framework would be used by practitioners, particularly school administrators and education officers.

This section reviews different material (literature) reviewed in conducting the study. The section also has the methods which were employed in conducting the study.

### 2.1 The Concept of Data in Education System

Data is described by Schildkamp et al [10]. As "any information that is gathered and structured to reflect some element of the school." This definition is broad because it covers a wide range of informational sources and data types that administrators and teachers need to consider when making decisions to advance student learning. There are many different data sources, including input data (such as student characteristics), process data (such as instructional quality), outcome data (such as

student test scores and well-being), and context data (such as policy and resources) [11]. Data are presented in their raw state, without any judgement, interpretation, or significance. It cannot therefore be used to reach conclusions. Implementing an interpretative data usage process that involves identifying the data, making sense of it, and developing actionable implications is necessary to make data meaningful [12].

### 2.2 Data Management in Education Organizations

Generally, data management is the intentional process of gathering, analysing, using, and storing data with the intention of coming to decisions, drawing inferences, creating new knowledge, supplementing or changing existing knowledge with new evidence, and creating a platform for later retrieval and re-use. In our study it is the procedure for gathering, classifying, coding, putting together, performing, and analysing (using appropriate statistical techniques), presenting, interpreting, storing, and protecting data with the intention of using that data to address immediate problems and serve future needs.

Ezeagu [13] defined data management as the efficient coordination of people, tools, and processes to filter, analyse, evaluate, and disseminate necessary, pertinent, and accurate data for decision-making. To maintain the data's accessibility, dependability, and timeliness for its users, data management is an administrative process that includes gathering, validating, storing, safeguarding, and processing the necessary data [14].

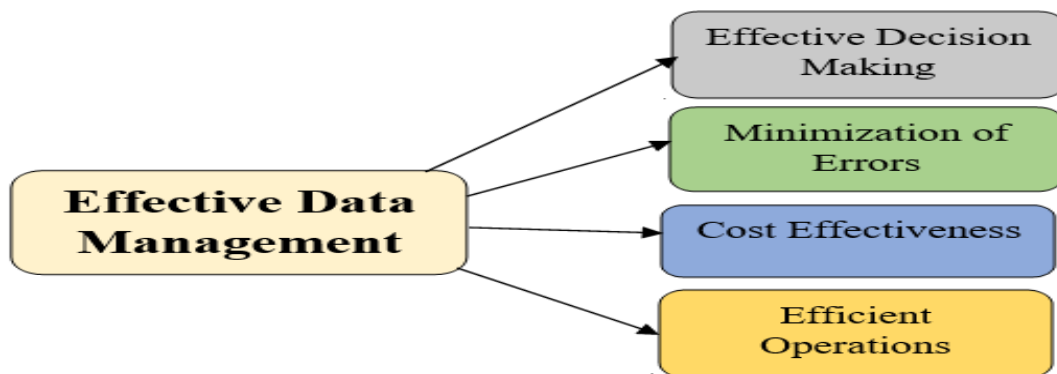


Fig. 1. Conceptual framework  
Source: Researcher data (2023)

## 2.3 Theory of Change in Data Management

This study was grounded from a theory of change Weiss developed in 1995 as a way for explaining how a certain intervention, or collection of treatments, is likely to lead to a specific developmental change, based on a causal analysis of existing data. In education, a theory of change assists in identifying solutions to effectively address the causes of problems that impede progress and in guiding decisions on which approach should be taken, considering comparative advantages, effectiveness, feasibility, and uncertainties that are inherent in any change process. A theory of change may also assist in identifying the underlying assumptions and hazards that need to be understood and revisited throughout the process to ensure that the strategy contributes to the intended transformation (UNDG, 2020). Data has risen to the top of the global development agenda. Recent landmark studies in the education industry mirror this transformative fervor for more and better data. The 2016 Global Education Monitoring report advocates for the collection and utilization of education data, particularly learning indicators, in order to achieve the promise of education for everyone (UNESCO, 2017). Therefore, the theory of change in this study indicates the current focus (Change) which is instituted by educational institutions in data management. The theory is useful in explaining the anticipated changes i.e. prospects from effective data management in primary schools.

## 3. METHODOLOGY

### 3.1 Research Design and Approach

A cross-sectional research design was adopted in this study. This study also adopted a quantitative research approach where a relationship between variables was quantified to establish the extent at which effective data management leads to positive outcomes in education processes and endeavours.

### 3.2 Sample Size

A sample for this study was drawn from the data managers from the district council's office and public primary schools in Mbarali District. This study involved a total of all 285 respondents as a sample. This study employed a simple random sampling technique to select subjects (n= 285).

## 3.3 Methods of Data Collection

The study employed a survey method to collect primary data from the selected respondents. Survey method through questionnaire is a method used in collecting quantitative primary data. This method was used because the study will need primary quantitative data to answer the research questions as well as fulfilling the research objectives.

## 3.4 Data Analysis

Data was analyzed through multiple regression analysis to establish the relationship between independent and the dependent variable.

## 4. RESULTS AND DISCUSSION

The results show that effective data management model predicts effective decision making, minimization of errors, cost effectiveness and efficient operations in school academic and managerial endeavors) with a correlation of 88.3% and R square equal to 0.638, Table 1. This means that the predictor variables jointly explained 63.8% of an effective data management model. Table 1 shows the multiple regressions model summary.

From the multiple regression coefficients, the study revealed that all the four independent variables (effective decision making, minimization of errors, cost effectiveness and efficient operations) uniquely, significantly and positively were influenced by effective data management model ( $\beta=0.257$   $P=0.00$ ), ( $\beta=0.301$   $P=0.00$ ), ( $\beta=-0.632$   $P=0.00$ ) and ( $\beta=-0.614$   $P=0.00$ ) respectively. Results are indicated in Table 2.

$$\text{From the analysis model } Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$$

Then;

$$\text{Effective Data Management Model} = \alpha + \beta_1(\text{EDM}) + \beta_2(\text{ME}) + \beta_3(\text{CE}) + \beta_4(\text{EO}) + \epsilon.$$

Therefore;

$$\text{Effective Data Management Model} = 0.005 + 0.257 (\text{EDM}) + 0.301 (\text{ME}) + 0.632 (\text{CE}) + 0.614 (\text{EO})$$

Therefore, an effective data management model should be the one that assisting in decision making, minimizes errors, cost effective and brings operational efficiency. Also, Breiter and

**Table 1. Multiple regression summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.883	0.638	0.633	0.71329

Source: Research Findings (2023)

**Table 2. Multiple regression coefficients**

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.005	0.129		0.038	0.97
Effective Decision Making (EDM)	0.257	0.041	0.304	6.286	0.00
Minimization of Errors (ME)	0.301	0.045	0.340	6.684	0.00
Cost Effectiveness (CE)	0.632	0.054	0.604	11.720	0.00
Efficient Operations (EO)	0.614	0.086	0.384	7.160	0.00

Source: Research findings (2023)

Light [15] conducted research on data for school improvement and posited the effectiveness of successful information systems in assisting school decision-making. Similarly, Schildkamp et al [9]. investigated variables that support and obstruct data-driven decision making in schools, School Effectiveness and School Improvement [16-20]. Their results indicated that a data management system which assists in decision making is useful for minimization of errors in operations and enhancing efficiency and effectiveness of the school [20-23].

## 5. CONCLUSION

This study held a conclusion that an effective data management model predicts productive results in school operations and endeavours. Therefore, the government should ensure that data management is done using modern technology through the Ministry of Education. Computers and data storage facilities should be among the data management tools and systems that should be available. This will guarantee effective data management and safe guard against data loss. Second, to ensure data security in terms of data loss, there should also be data backup facilities like external hard drives and other data storage methods. This will ensure that data is stored in multiple locations to increase security. Therefore, data sourcing, data recording, data processing and analysis and data evaluation were the common practices of data management in primary schools in Mbarali District. Moreover, the data were processed through ICT and manual data systems. The findings revealed challenges of data management based on technology obsolescence, data loss and data breach. An

effective data management facilitates sound decision making, cost effectiveness in handling educational activities, minimization of errors and operational efficiency. It's clear that data management will play an increasingly important role in primary education. Primary schools will effectively manage and leverage their data and will be better positioned to improve the student experience, make informed decisions, and ensure their financial sustainability in general.

## 6. RECOMMENDATIONS

The study recommends that the government through the Ministry of Education, Science and Technology should make sure current technology is used to manage data in education institutions through updating data management systems and data management tools such as computers, hard drives and data storage facilities to ensure data security and reliability.

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## CONSENT AND ETHICAL APPROVAL

The authors have obtained consent from respondents and maintained written ethical approval following the journal requirements and international standards.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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