A STUDY TO ANALYSE THE DEVELOPMENT OF AN EDUCATION MANAGEMENT INFORMATION SYSTEM FROM A SENSEMAKING PERSPECTIVE AND THE APPLICATION OF QUANTITATIVE METHODS TO ANALYSE EDUCATION DATA SETS.

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ABSTRACT

Applying quantitative methodologies to educational data sets, this research examines the creation and effects of an "Education Management Information System (EMIS)" through sensemaking. The necessity to improve data utilization and strengthen EMISs' ability to assist educational decision-making is the driving force behind the project. Educators, administrators, and legislators are just a few of the stakeholders whose capacities are impacted by the design and operation of EMISs, which researchers first analyze in detail throughout their creation process. Using a sensemaking methodology, researchers evaluate the EMIS's contribution to stakeholders' data interpretation and strategic utilization. To do this, researchers must examine how users use the system and assess its ability to support data-driven insights or decision-making. Simultaneously, the research analyses education data sets administered by the EMIS using quantitative methodologies. Evaluating the precision, comprehensiveness, and practicality of the collected data is an important part of this process, as is determining how these quantitative analyses aid in bettering educational results and policy choices. There is an emphasis on metrics like data relevance, data integrity, and the effect of data-driven choices on pedagogical methods. The results should shed light on how to optimize the development of EMIS to boost sensemaking skills and the use of quantitative approaches in the classroom. Better educational results are the ultimate goal of the project, which aims to bridge opposing viewpoints to promote more efficient and data-informed methods of educational administration.

Keywords: EMIS, sensemaking perspective, education data sets, educational administration.

INTRODUCTION

Improving educational results and influencing policy choices in the ever-changing education environment requires efficient data management and use. Crucial to this process is EMIS, which stores, organizes, and analyses massive volumes of educational data. It is essential, however, that various stakeholders' demands, such as those of administrators, teachers, and lawmakers, be thoroughly considered during the design

and development of these systems (Ogunyemi & Oyetunji, 2022). From a sensemaking vantage point, this research delves into the evolution of EMISs and the use of quantitative methodologies in educational data sets. To comprehend the role of stakeholders in interacting with and making sense of EMIS data, the notion of sensemaking is fundamental. People and groups engage in sensemaking when they seek to understand or make sense of data to direct their behavior and choices. In the context of enterprise management information systems (EMISs), efficient sensemaking may greatly improve the system's use and influence, allowing for better-informed planning and decision-making (Yang & Zhou, 2021).

The purpose of this study is to fill the gap between the theoretical advancements of EMISs and their actual implementation in classrooms. Researchers aim to discover critical success factors for data utilization by studying how stakeholders' capacity to comprehend and apply educational data is impacted by the design and operation of EMISs (Berg, 2020). Furthermore, the research assesses the efficacy and quality of data analysis in these systems using quantitative methodologies. Checking the precision of data and the soundness of analysis is part of this process, as is determining how much quantitative insights help with school reform and policymaking. The research aims to provide practical insights for improving EMIS development and data-driven decision-making in education by focusing on both sensemaking and quantitative analysis (Schmidt & Davis, 2023).

BACKGROUND OF THE STUDY

Changing EMIS practices mirror larger shifts in educational institutions' use of technology and information management strategies. In the middle of the twentieth century, educational institutions started using rudimentary computer technology for administrative reasons, and that's when EMIS was born. Data analysis and decision support were severely lacking in the first systems, which were mainly concerned with student records and administrative duties (Kukulska-Hulme & Traxler, 2022). A watershed moment occurred in the 1980s and 1990s when more advanced database technology and software applications were introduced. These developments made it possible to build integrated systems that could manage a wider variety of data, including financial records, faculty information, and student performance measures. While descriptive statistics continued to get the bulk of attention, the idea of handling data in education grew during this time to include analysis and reporting in addition to record-keeping (Khan & Shahid, 2024).

New opportunities for EMISs emerged with the fast development of IT or data analytics in the new century. New tools for sophisticated analytics, cloud computing, and big data have made it possible to analyze educational data in more complicated and subtle

ways. During this period, there was a change towards better data management and the use of data to improve educational results via the generation of actionable insights (Li & Zhang, 2021). It became clear that incorporating sense-making theory into EMIS development was crucial for collecting data and making sure stakeholders could use it effectively. The need for systems that enable meaningful interaction with data and the significance of user-centric design has been recently highlighted. With the advent of predictive analytics or machine learning, quantitative approaches have progressed to a point where they can bolster data-driven decision-making. The increasing importance of EMISs in improving educational processes via better data management or sensemaking is shown by this historical trend. To expand upon this prior research, this study will look at the effects of sophisticated quantitative methodologies on educational data analysis and how modern EMISs might be optimized from a sensemaking standpoint (Brown & Lee, 2020).

PURPOSE OF THE STUDY

The study's overarching goal is to examine the evolution of EMIS and the use of quantitative approaches to analyze educational data sets from a sensemaking perspective. The research seeks to discover enhancements that enhance decision-making based on data by evaluating how stakeholders' capacity to perceive and use data is affected by the design and functioning of EMISs. The study also aims to find out how well quantitative methods work for making sense of educational data and drawing conclusions that might improve educational administration.

LITERATURE REVIEW

Technological developments and rising data demand in education have played several roles in the literature on EMIS, which shows the complex evolution of these systems. The primary purpose of EMISs was the management of student data and administrative duties in the early studies. More complicated data types needed to be integrated, or the need for analytical skills beyond basic reporting became apparent, as technology progressed (Garcia & Lopez, 2023). To comprehend the role of stakeholders in EMIS interactions, the notion of sensemaking has assumed central importance. People and groups, according to sensemaking theory, make sense of complicated data to direct their behavior. The capacity of EMISs to facilitate sensemaking via the presentation of data in an understandable and actionable manner is crucial to their efficacy. Systems that enable good sensemaking may greatly improve decision-making in educational contexts. At the same time, as big data and sophisticated analytics have grown in popularity, quantitative approaches have found more and more uses in the classroom. More and more, researchers are turning to data mining and predictive analytics—two quantitative methods—to extract meaning from massive educational datasets.

Educational data analysis may be made more accurate and relevant by combining advanced statistical methods with machine learning algorithms (Harrison & Evans, 2022).

A greater focus on user-centered design and the integration of sophisticated analytics has been seen in recent EMIS improvements. The goal of this strategy is to make EMISs more user-friendly and to improve the quality of insights obtained from quantitative analysis. According to the research, educational practices and results may be enhanced by optimizing EMISs for greater sensemaking and by using sophisticated quantitative approaches. To close the gap between educational settings, sensemaking capacities, and quantitative data analysis, this review stresses the need for continuing study in this area (Miller & Peterson, 2021).

RESEARCH QUESTION

How can quantitative methods be applied to enhance the analysis and utility of educational data sets managed by EMIS?

RESEARCH METHODOLOGY

The researcher used a convenient sampling technique in this research.

RESEARCH DESIGN

Quantitative data analysis was conducted using SPSS version 25. The combination of the odds ratio and the 95% confidence interval provided information about the nature and trajectory of this statistical association. The p-value was set at less than 0.05 as the statistical significance level. The data was analyzed descriptively to provide a comprehensive understanding of its core characteristics. Quantitative approaches are characterized by their dependence on computing tools for data processing and their use of mathematical, arithmetic, or statistical analyses to objectively assess replies to surveys, polls, or questionnaires.

SAMPLING

A convenient sampling technique was applied for the study. The research relied on questionnaires to gather its data. The Rao-soft program determined a sample size of 669. A total of 850 questionnaires were distributed; 795 were returned, and 17 were excluded due to incompleteness. In the end, 778 questionnaires were used for the research.

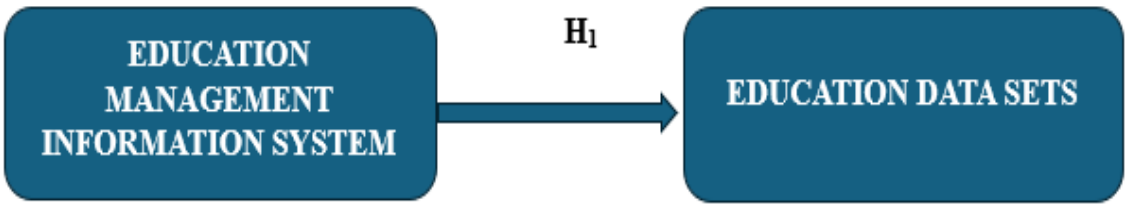
DATA & MEASUREMENT

A questionnaire survey served as the main data collector for the study. There were two sections to the survey: (A) General demographic information and (B) Online & non-online channel factor replies on a 5-point Likert scale. Secondary data was gathered from a variety of sources, with an emphasis on online databases.

STATISTICAL TOOLS

Descriptive analysis was used to grasp the fundamental character of the data. The researcher applied ANOVA for the analysis of the data.

CONCEPTUAL FRAMEWORK



RESULTS

Factor Analysis: Factor Analysis (FA) is often used to validate the underlying component structure of a collection of measurement items. The scores of the observed variables are thought to be impacted by latent factors that are not readily observable. The methodology of accuracy analysis (FA) is a method that relies on models. This research primarily focuses on constructing causal pathways that link observable events, underlying causes, and measurement errors.

The suitability of the data for factor analysis may be evaluated using the Kaiser-Meyer-Olkin (KMO) Method. The sufficiency of the sample for each variable in the model, as well as for the model as a whole, is evaluated. The statistics measure the magnitude of potential shared variation among many variables. Data that has smaller percentages is often more appropriate for factor analysis.

KMO generates random integers within the range of zero to one. A sample is considered sufficient if the Kaiser-Meyer-Olkin (KMO) value is between 0.8 and 1.

It is necessary to take remedial action if the KMO is less than 0.6, which indicates that the sampling is inadequate. Use your best discretion; some authors use 0.5 as this, therefore the range is 0.5 to 0.6.

• If the KMO is close to 0, it means that the partial correlations are large compared to the overall correlations. Component analysis is severely hindered by large correlations, to restate.

Kaiser's cutoffs for acceptability are as follows:

A dismal 0.050 to 0.059.

• 0.60 - 0.69 below-average

Typical range for a middle grade: 0.70–0.79.

Having a quality point value between 0.80 and 0.89.

The range from 0.90 to 1.00 is stunning.

Table 1: KMO and Bartlett's Test.

KMO and Bartlett's Test[a]		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.984
Bartlett's Test of Sphericity	Approx. Chi-Square	6850.175
	df	190
	Sig.	.000
a. Based on correlations		

The overall significance of the correlation matrices was further confirmed by using Bartlett's Test of Sphericity. A value of 0.984 is the Kaiser-Meyer-Olkin sampling adequacy. By using Bartlett's sphericity test, researchers found a p-value of 0.00. A significant test result from Bartlett's sphericity test demonstrated that the correlation matrix is not a correlation matrix.

TEST FOR HYPOTHESIS

DEPENDENT VARIABLE

Education Data Sets: Data sets about education are structured compilations of information about different facets of the educational setting. Student demographics, academic achievement, attendance, conduct, and instructor credentials are all part of these datasets. They may also include allocations of resources, information about the curriculum, and financial records. Educational data sets help with trend tracking, result assessment, and policy and institutional decision-making. When handled correctly, the insights provided by these data sets may improve educational policies and procedures, as well as teaching methods, student learning experiences, or resource utilization (Smith & Turner, 2022).

Independent Variable

Education Management Information System: An Education Management Information System, often known as an EMIS, is a digital tool or platform that is used by educational institutions or government organizations to systematically collect, store, manage, and analyze data about different areas of education. Through the provision of a centralized repository of information, it helps in the administration, surveillance, and assessment of educational procedures and outcomes (Nguyen & Nguyen, 2023).

Relationship Between Education Management Information System and Education Data Sets: An essential component of efficient educational administration and decision-making is the connection between education data sets and EMIS. EMIS is a hub for all things related to education data sets, such as administrative records, student attendance, and grades. Accurate reporting, trend analysis, or data-driven decision-making are made possible by EMIS via the integration and processing of different data sets (Lee & Roberts, 2021). The system's capacity to provide insightful data and back up good management practices is highly dependent on the data sets' quality and completeness. As a result, better educational results and resource allocation are made possible by a well-designed EMIS, which increases the usefulness of education data sets (Anderson & Wang, 2020).

Based on the above discussion, the researcher formulated the following hypothesis, which was to analyze the relationship between education management information systems and education data sets.

H_{01}: There is no significant relationship between education management information system and education data sets.

H_1: There is a significant relationship between education management information system and education data sets.

Table 2: H_1 ANOVA Test.

ANOVA					
Sum					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	68971.927	491	5747.661	2047.151	.000
Within Groups	251.513	286	2.891		
Total	69223.440	777			

In this study, the result is significant. The value of F is 2047.151, which reaches significance with a p-value of .000 (which is less than the .05 alpha level). This means the **"H_1: There is a significant relationship between education management information system and education data sets."** is accepted and the null hypothesis is rejected.

DISCUSSION

The impact of stakeholders' sensemaking on the construction of an EMIS and the efficacy of quantitative approaches in analyzing educational data sets are both investigated in this research. The research emphasizes how well-designed EMISs assist users in understanding and making use of data for decision-making by including a sensemaking viewpoint. Additionally, it delves into how quantitative approaches may enhance data quality and provide practical insights. To make sure data-driven initiatives are understandable and effective, the results may direct changes to EMIS design that aid educational practices and policymaking. Improving educational results via more efficient data utilization is the goal of this study on EMIS optimization.

CONCLUSION

To conclude, this research highlights the need to develop EMIS with a sensemaking approach. Improvements in the analysis and decision-making of data are achieved by the use of quantitative approaches and effective EMIS design, which in turn increases stakeholders' capacity to understand and utilize educational data. Optimization of data usefulness, improvement of educational outcomes, and informed decision-making that drives improved educational procedures and regulations may be achieved by educational institutions by aligning the design of systems with sensemaking principles and using sophisticated quantitative approaches.

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