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Technology Leadership: Utilization Of Information Systems In Educational Decision Making

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Abstract. The study unveiled the challenges of Information Systems in schools' decision-making process. It employed a phenomenological research design to determine the experiences and perceptions of teachers in the Information Systems in schools' decision-making process. The participants of this study were the 8 Teachers of Compostela West District Davao De Oro Division. The participants were chosen based on the following criteria: (1) must be in the present position for at least 5 years- regardless of their age, sex, and marital status; (2) must be handling Information Communication and Technology (ICT) as an ancillary load, and (2) they must have gained at least very satisfactory rating in their IPCRF. The themes of the challenges teachers faced in utilizing information systems in decision-making were technological capabilities, difficulty in accessing the system, and possible data threats. Moreover, the emerging themes of coping with the challenges in information systems included using cloud services, conducting information system evaluations, and attending end-user training. Lastly, the emerging themes in the educational insights drawn from the teachers' experiences were the observance of data-driven decision-making, the information system being a valuable tool, and strengthening data privacy. These themes implied that to improve the management of information systems, strategies should be implemented to ensure their sustainability. Moreover, the results provided comprehensive data for future research with similar scope.

KEY WORDS

1. Information system 2. decision making 3. coping strategies

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1. Introduction

Information technology is crucial to the development of every nation's educational system. With information and communication technologies, access to educational information is made very simple and quick. Thanks to ongoing technological advancements, the communications infrastructure in many colleges and universities has become much more robust. Nothing is overlooked or missing today, resulting in unprecedented satisfaction among parents, teachers, students, and supervisors. Teachers do not need to provide mountains of handouts to numerous students. As Castells (2001) emphasizes its effectiveness and efficiency, the use of information technology in educational management has rapidly risen. With technological advances, school administrators who previously had to spend much time managing complex allocation

issues such as staffing, resource, and timetabling allocation. Moreover, overseeing school operations now has more options. Information technology makes it easier to decentralize job duties and coordinate them in a live, interactive communication network. They enable more flexibility and networking that prioritizes contact, interdependence, and ongoing adaptability to an environment that is constantly changing. In Zambia, the Ministry of General Education has initiated a pilot project to strengthen its Education Management Information System (EMIS) by implementing a digital report structure to complement its annual, paper-based system. As is well documented in the literature on Information Systems and Health Management Information Systems, contextual conditions in low-resource countries often challenge best practice approaches for implementing functioning, large-scale management information systems. This study shows how centralized approaches to EMIS implementation can be used to simultaneously assess multiple implementation models and how this might increase the gap between local and national data needs. Similarly, Telem (1999) defined it as a system that matches the school's structure, management tasks, instructional processes, and special needs. O'Brien (1999) referred to it as a term given to the discipline focused on the integration of computer systems with an organization's aims and objectives. However, in the literature, research shows that school managers had problems using school management information systems. Visscher and Bloemen (1999), in their study with 195 managers and teachers working in 63 high schools in Holland, found out that school management information systems were mainly used in routine work, and managers and teachers did not have sufficient education on the system. Managers and teachers indicated that while school management information systems had positive effects on the evaluation of the efficiency of the school, development of using sources, quality of educational programming, and in-school communication, it increased their workload and caused stress. In Japan, the information system plays a vital role in decision-making as it can monitor disturbances in a system, determine a course of action, and take action to get the system in control. It is also relevant in non-programmed decisions as it provides support by supplying information for the search, analysis, evaluation, and choice and implementation process of decision-making (Obi, 2003). These systems can provide users with processed information, analytical models, real-time updates, and hypothetical scenarios to assist their decision-making process. In the Philippines, the Education Management Information System (EMIS) is a program by the Department of Education (DepEd) under MEC Memo No. 83, s. 1981 provides information to education administrators in the planning and delivery of educational services. It is a data collection, processing, dissemination, and utilization for planning, implementing, monitoring, and evaluating school operations. The systematic and updated data serves as a guide on what is to be achieved by the school and how to achieve it while relying on the available data. To date, there have been numbers of information systems the Department is utilizing including, Enhanced Basic Education Information System, Learners' Information system and the like. Increasingly, around the world, institutions and organizations are recognizing the value of information in the management and decision-making processes. This has led to the development of various information systems from the bare manual, where mainly pen and paper are used to the computer-based where mainly computer hardware, software and internet are used. Because of their priority in modern societies, Information Technologies have reached a state of high priority in education, too. Recently, contributions of information technologies to education have been among the most emphasized subjects (Webber, 2003) The World

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Bank (2013) observed that many researchers have investigated aspects of ICT infrastructure, but very few are looking at the effect ICT has in supporting policy decisions, most especially in education. This study will focus on the impact of information systems in schools as well as the factors that hinder their effective use. It had a special interest in the kind of information generated from school data and the effect of this information on the decision-making process in core curriculum management.

1.1. Purpose of the Study—The study aimed to explore the challenges of Information Systems in schools' decision-making process. Today, which people call the information age, as many technological developments have been experienced, the most significant risk that an organization could take is to stay insensitive to change. Many significant factors, such as continuous developments in information technologies, information exchange, increasing expectations of society, and modern managing perceptions and applications, cause organizations worldwide to develop new applications to survive. Hence, it was necessary to examine the use of information technologies in schools to determine the strategies for strengthening the efficient use of them.

1.2. Research Questions—The primary research questions of this study are the following:

(1) What are the challenges of teachers in utilizing information systems in decision-making?
(2) How do they cope with the challenges in information systems?
(3) What educational insights can be drawn from the experiences of the teachers?

1.3. Definition of Terms—The following terms are operationally defined to make this study more comprehensive. Technology Leadership involves the information technology (IT) infrastructure and applications that enable and drive the overarching educational strategies and goals. Information Systems- an integrated set of components for collecting, storing, and processing data and for providing information, knowledge, and digital products

1.4. Significant of the Study—The following persons or agencies were the beneficiaries to determine the outcomes of this study and to whom the findings were addressed. Policy Makers. The data gathered would serve as research-based information to strengthen the school information system. School Administrators. The findings would encourage the principals to use information systems as a valuable source for decision-making that can support the implementation of educational reforms. Teachers. The findings would help teachers promote effective information system management and encourage them to continually improve their skills in handling information technology. Researchers. The results would provide comprehensive data for future research with similar or relevant scope.

1.5. Theoretical Lens—Breiter and Light (2006) introduced a theoretical framework that describes generating knowledge for decision-making in a school environment. The process illustrates how to transform data into knowledge for decision-making in schools. Breiter and Light developed this framework by borrowing from Ackoff's (1986) conceptual framework. Ackoff's conceptual framework was in the field of organization and management theory. The model adopted a simplified conceptual framework that linked data, information, and knowledge. Breiter and Light (2006) explored how schools use information. They focused on the

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potential of new technologies and new ways of analysis to meet the information needs of educators across different levels of the system. Likewise, the framework has three phases of the continuum that begin with raw data and end with meaningful knowledge used for decision-making. Ackoff (1989) and Drucker (1989) pointed out that a person goes through six broad steps to transform data into knowledge. The first two steps entail collecting and organizing data. The following steps are summarizing and analyzing data and synthesizing information before acting (making a decision). The sequential process underlies how teachers interact with data. Data has no meaning in itself. It exists in any form, usable or not. In this phase, data is in the state in which it was captured or recorded. It was in numbers or bits, as captured in data collection instruments such as forms and tables. It is isolated from context and meaningless unless one is familiar with that particular data type. Breiter and Light (2006) noted that, in this phase, whether or not data became information depended on the understanding of the person looking at the data. Therefore, information derived in this phase is subjective. This first phase predominately dealt with collection and organization of data. It is an important phase that ensures gathering relevant and appropriate data. It determined whether the gathered data could provide the required information. Besides, the most minor data units are given descriptions and translations in this phase. This phase ensured that the following processes worked with the correct data format. The type of information system mattered a lot at this stage. The system design highly depended on the intended output. Therefore, data collection and organization depended on the intended output and the type of Information System. Phase two is information. Information is obtained through summarizing and analyzing data. The elements existing in forms, tables, and observation sheets are turned into information. In this phase, data is given meaning by way of relational connection (Bellinger, Castro, Mills, 2004). Therefore, data is transformed to comprehend and organize the school environment. Activities in this phase unveil and lead to understanding the relationship between data and context. This phase alone does not carry any implications for future action. During data summary, facts about a situation are established. To do this, one needs a thorough understanding of the purpose for which information will be used. The context is examined during analysis, and motives and causes are identified. Analysis of relations between variables such as lesson attendance and performance are generated. The third and last phase is knowledge. It involves synthesizing and decision-making. In this phase, information generated in phase two and deemed useful is collected and eventually used to guide future actions. Synthesis involves the formulation and production of a plan or a proposal set of operations. It also involves the derivation of a set of abstract relations. In this phase, knowledge is created through a sequential process. Information becomes knowledge when the context is applied. For instance, about test information, the teachers ability to see connections between students scores on different item-skills analysis and her classroom instruction, then act on them, represents knowledge. Nonaka and Takeuchi (1995) noted that information is a flow of messages and knowledge. However, it is created by that very flow anchored in the beliefs and commitment of its holder. They pointed out that, essentially, knowledge is related to human action. Drucker, cited in Breiter and Light (2006), claimed that knowledge was information that changed something or somebody—either by becoming grounds for action or by making an individual (or an institution) capable of different or more effective action. In this third phase of knowledge, there is synthesis and decision-making. It entails making judgments based on internal evidence demonstrated by earlier phases. It also involves judgment in terms of

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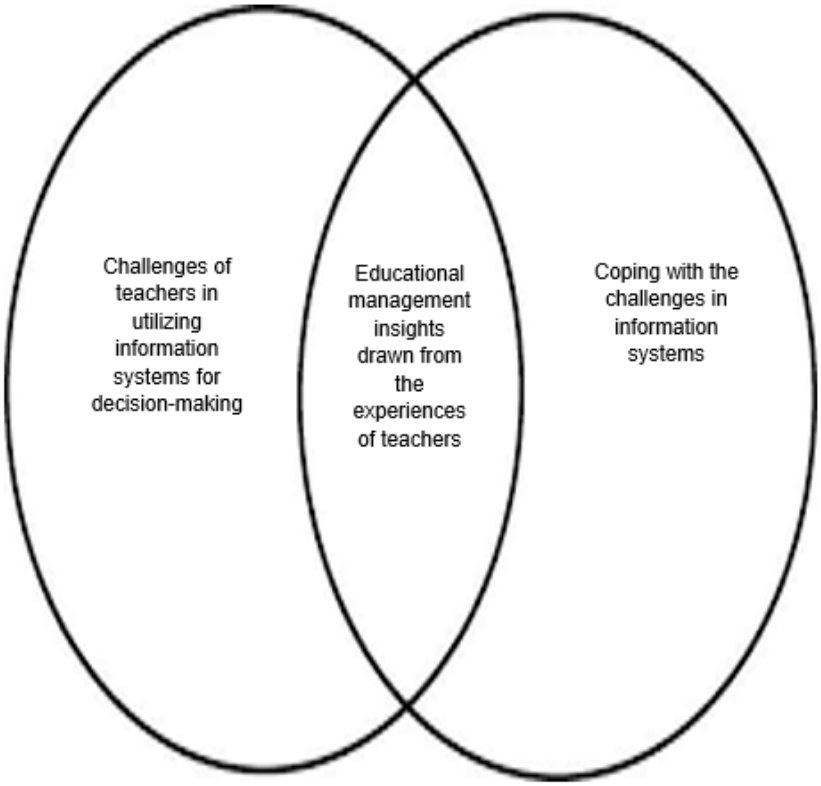

Fig. 1. The Conceptual Framework of the Study

external criteria. Below is the framework of this research, including the study's objective and the above-presented theories. The conceptual framework of the study is presented in Figure 1. Based on the figure, there are two interconnected variables. These variables are the (1) challenges of teachers in utilizing information systems for decision-making, (2) coping with the challenges in information systems, and (3) educational management insights drawn from the experiences of teachers.

2. Methodology

This chapter presents the method, research participants, data collection, role of the researcher, data analysis, trustworthiness of the study, and ethical considerations. Exploring facts and knowledge in this study necessitates the consequent design and implementation, as elaborated in this chapter.

2.1. Philosophical Assumptions—The philosophical assumption was a framework used to collect, analyze, and interpret data in a specific field of study. It established the background for the following conclusions and decisions. Below are typical philosophical assumptions of different types. Ontology. This part of the research pertains to how the issue relates to the nature of reality. According to Creswell (2012), reality is subjective and multiple, as seen by the study participants. The ontological issue addresses the nature of reality for the qualitative researcher. The reality was constructed by individuals involved in the research situation. Thus, multiple realities exist, such as the realities of the researcher, those of individu-

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als being investigated, and those of the reader or audiences interpreting the study. This study explored the realities of teachers utilizing Information Systems in schools' decision-making process. In this study, I relied on the voices and interpretations of the participants through extensive quotes and themes that reflected their words and provided evidence of different perspectives. The participants' answers to the study were coded and analyzed to build and construct the commonality and discreteness of responses. The responses of the participants were carefully coded to ensure the reliability of the result. The researcher upheld the authenticity of the responses and precluded from making personal bias as the study progressed. Epistemology. This refers to the awareness of how knowledge claims are justified by staying as close to the participants as possible during the study to obtain firsthand information. Guba and Lincoln, as cited by Creswell (2012), state that on the epistemological assumption, the researcher attempted to lessen the distance between himself or herself and the participants. He suggests that, as a researcher, he or she collaborates, spends time in the field with participants, and becomes an 'insider.' This study intended to gather information from the realities of teachers in utilizing the Information System in schools' decision-making process. As a researcher, I followed the guidelines set by DepEd and the Inter-Agency Task Force (IATF). It was assured that close interaction with the participants would be established to gain direct information that would shed light on the knowledge behind the inquiry. Axiology. It refers to the role of values in research. Creswell (2012) argued that the role of values in a study was significant. Axiology suggests that the researcher openly discusses values that shape the narrative and includes their interpretation in conjunction with participants' interpretation. As a researcher, I must ensure the dignity and value of every piece of information obtained from the participants. The researcher understood the personal and value-laden nature of the information gathered from the study. Therefore, I preserved the merit of the participants' answers and carefully interpreted them in light of their interpretations. Rhetoric. This philosophical assumption stressed that the researcher may write in a literary, informal style using a personal voice, qualitative terms, and limited definitions. The researcher used the first person in the study to understand how stakeholders' partnerships in school-initiated programs were built and maintained between schools and the surrounding community.

2.2. Qualitative Assumptions—The methodology was different from the method. It was a creative and responsive approach to understanding questions and subject matter, while method refers to the exact knowledge and procedure (Gerodias, 2013). This study explored the realities of teachers utilizing Information Systems in schools' decision-making process, particularly the teachers from Compostela West District, Davao de Oro Division. As a researcher, I wanted to know the deeper meaning of their experiences, which became the basis for doing qualitative research, which was considered helpful in looking for meanings and motivations that underline cultural symbols, personal experiences, and phenomena. Using phenomenology, this need was hoped to be addressed by bringing the stories of the floating teachers so that, as David (2005) wrote, the themes, symbols, and meaning of the experiences were presented. Phenomenological research is based on two premises. The first was that experience was a valid, rich, and rewarding source of knowledge; this experience was a source of knowledge and shapes one's behavior. From the definition, human experience was

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viewed as a cornerstone of knowledge about human phenomena and not an unreliable source. The second premise of phenomenological research lies in the view that the everyday world is a valuable and productive source of knowledge. We can learn much about ourselves and reap key insights into the nature of an event by analyzing how it occurs in our daily lives (Morrissey Higgs, 2006). By using phenomenology, which concerns the "what" and the "how" (Moustakas, 1995), the researcher projected that the subjective experiences, challenges, and coping mechanisms of the physical education teachers were explored, and insights were drawn as a basis for possible future research and policy analysis about this research.

2.3. Design and Procedure—This study employed a qualitative approach, specifically a phenomenological research design, since it would focus on teachers' experiences utilizing an Information System in schools' decision-making process. According to Creswell (2012), phenomenology is an approach to qualitative research that focuses on the commonality of lived experiences within a particular group. The fundamental goal of the approach was to describe the nature of the particular phenomenon. Typically, interviews were conducted with individuals with first-hand knowledge of an event, situation, or experience. Other forms of data, such as documents, observations, and art, were also used. The data were read and reread and were culled for phrases and themes grouped into clusters of meanings. Through this process, the researcher constructed the universal meaning of the event, situation, or experience and arrived at a more profound understanding of the phenomenon. Moreover, Maxwell (2013) added that phenomenology, rooted in philosophy, psychology, and education, attempts to extract the purest, untainted data. In some interpretations of the approach, the researcher used bracketing to document personal experiences with the subject to help remove him or her from the process. One method of bracketing is taking notes. According to Corbetta (2003), the phenomenological research design was a qualitative type of research for which interviews provide an in-depth method that can grant access to deep knowledge and explanations and help grasp the subjects' perspective. Creswell (2012) also claimed that qualitative research primarily uses interviews. They occur when researchers ask one or more participants general, open-ended questions and record their answers. Often, audio tapes are utilized to allow more consistent transcription. Interviews helped follow up with individual respondents after questionnaires, such as investigating their responses further. In this qualitative research, interviews were used to explore the meanings of central themes in the world of their subjects. The main task in conducting interviews is to understand the meaning of what the interviewees say (McNamara, 1999). Based on Quad's (2016) statements, the researcher transcribed and typed the data into a computer file to analyze it after the interview. Interviews were beneficial for uncovering the story behind a participant's experiences and pursuing in-depth information about a topic. Moreover, I collected data from individuals who have experienced the phenomenon under investigation, typically via extended interviews. Next, the data analysis involved triangulation, extracting significant statements from the transcribed interviews. The significant statements were transformed into clusters of meanings according to how each statement fell under specific psychological and phenomenological concepts. Moreover, these transformations were tied together to make a general description of the experience, a textural description of what was experienced, and a structural description of how it was experienced. As a researcher, I incorporated the personal mean-

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ing of the experiences here. Finally, the report was written so that readers could better understand the essential, invariant structure of the essence of the experience. Conversely, several challenges have been pointed out. I required a solid grounding in the philosophical guidelines of phenomenology. The subjects selected for the study were individuals who had experienced the phenomenon. I was bracketed by my own experiences and observations, which was difficult to do. As a researcher, I must decide how and when my observations will be incorporated into the study. Epistemologically, phenomenological approaches were based on the paradigm of personal knowledge and subjectivity and emphasized the importance of personal perspective and interpretation. As such, they were powerful tools for understanding subjective experience, gaining insights into people's motivations and actions, and cutting through the cluster of taken-for-granted assumptions and conventional wisdom. Since the focus of this study was to explore and asses the teacher experience and feelings towards the school environment and the perspectives of the teachers, the researcher intended to employ the phenomenology type of qualitative method research.

2.4. Research Participants—The participants of this study were the 8 Teachers of Compostela West District Davao De Oro Division. The participants were chosen based on the following criteria: (1) must be in the present position for at least 5 years- regardless of their age, sex, and marital status; (2) must be handling Information Communication and Technology (ICT) as an ancillary load, and (2) they must have gained at least very satisfactory rating in their IPCRF. The researcher utilized the purposive sampling design since the participants were chosen based on the criteria or purpose of the study (Creswell, 2014). It is also known as judgmental, selective, or subjective sampling. The selection of the participants was purposefully done to ensure that the findings would be authentic (Marshall, 1996).

2.5. Ethical Considerations—Ethical considerations were significant in the design of this research study. As a researcher, I needed to consider several ethical issues regarding the research participants in this field. Ethical considerations can be specified as one of the most important parts of the research. I need to adhere to the aims of the research, impart authentic knowledge and truth, and prevent errors. Social Value. The research was essential to the society. In this study, the social value was focused on the experience of teachers. This study was conducted explicitly among the elementary teachers. This study also served as a basis for the higher authorities to create more programs and resolutions from which classroom teachers could benefit. Thus, the social problem that pushed me to have an interest is the challenges the teachers face in using interactive media instruction in the classroom to ameliorate teaching competence. Informed Consent. In the conduct and practice of this study, the Treaty Principle of Participation, as cited by McLeod (2009), was adhered to. The invitation to the participants was ensured that their participation in the research is entirely voluntary and is based on the understanding of adequate information. The recruitment and selection of participants are lodged in the appendices of this study. Gaining the trust and support of research participants was critical to informed and ethical academic inquiry and phenomenological research (Walker, 2007, as cited by Pillerin, 2012). All participants were given an informed consent form be-

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fore scheduling the interviews and participating in the phenomenological research process. Each participant was required to provide a signed personal acknowledgment, consent, and an indication of a willingness to participate in the study release. The purpose of the informed consent letter is to introduce the research effort, provide contact information, articulate the study's intent, request voluntary participation by the recipients, and anticipate the information the informants were expected to provide. All participants were required to sign and return the consent letter to the researcher before participating. Vulnerability of Research Participants. The participants of this study could answer the research instrument because they are all professional teachers in public elementary schools. Thus, I assured them that as the researcher, he or she can easily be reached through the contact number and address in case of any clarifications or questions about the study. Risks, Benefits, and Safety. The recruitment of the respondents was free of coercion, undue influence, or inducement. Moreover, respondents were provided with the contact numbers of the chair of the panel or panel members if they had queries related to the study. Furthermore, if respondents experienced potential discomfort and inconvenience while answering the questions, they were not compelled to participate in any manner. Further, I ensured the respondents were safe during the survey and interview. Thus, the questionnaire was distributed in a safe venue and administered at a convenient time. The dominant concern of this study is the Treaty Principle of Protection, as reflected in the respect for the rights of privacy and confidentiality and the minimization of risk. This was done by assigning pseudonyms for each informant so as not to disclose their identity. The possibility of a degree of risk inherent to this was minimized by taking all reasonable steps to guarantee participant confidentiality. Privacy and Confidentiality of Information. This study observed the Data Privacy Act of 2002 to ensure that the data cannot be traced back to their actual sources to protect participants' identities. Thus, utmost care was taken to ensure the anonymity of the data sources. Hence, any printed output that was carried out from this study was kept in anonymity. Furthermore, all the issues were considered to avoid a conflict of interest between the researcher and the respondents. Any misleading information and representation of primary data findings in a biased way must be avoided. Justice. The respondents were informed of the researcher's role and their corresponding role during data gathering. They were briefed that they had to be fully honest in answering the survey questions and that any communication related to the research should be done with honesty. Similarly, they were informed that they were the ones to benefit first from the study's results. Transparency. The respondents accessed the results of the study heads of the participating schools because the information was available and placed on a CD or other storage devices that the I can request. In addition, by learning about the study's results, classroom teachers were aware of the significance of the study and its contribution to their well-being. Further, each participant was advised that they have the right to withdraw their information at any time up to the completion of the data collection process. They can be requested and allowed to verify their transcript after the interview. This allowed the participants to amend or remove any information they felt might identify them. Likewise, I reserved the right to use pseudonyms and change names and/or non-significant dates to protect the participant's identity in all subsequent data analysis and reporting. Qualification of the Researcher. As a researcher, I ensured that he or she possessed the necessary qualifications to conduct the study. I should have completed the academic requirements and passed the comprehensive examination before thesis writing, the last requirement to obtain the mas-

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ter's degree. The researcher should also be qualified to conduct the study physically, mentally, emotionally, and financially. In addition, the advisee-adviser tandem ensured that the study reached its completion. Adequacy of Facilities. As a researcher, I strived hard to ensure that the study could be completed successfully in the specified time and that the researcher was equipped with the necessary resources. Likewise, the technical committee helped enhance the paper by giving the needed suggestions and recommendations. Also, the researcher ensured that he or she had enough funds to continue and finish the research. Thus, this study was hoped to be completed within the target time. Community Involvement. In this study, I showed respect for the respondents' local traditions, culture, and views. Moreover, this study did not use deceit in any stage of its implementation, specifically in recruiting the participants or data collection methods. Furthermore, I expressed great pleasure in the wholehearted participation of the interviewees in the study. Plagiarism and Fabrication as the researcher. I respected other works by properly citing the author and rewriting what someone else said his or her way. The researcher also used quotes to indicate that the text had been taken from another paper. Similarly, the researcher assured that honesty was present when working on the manuscript and that no intentional misrepresentation and making up of data or results was included or that conclusions were purposefully put forward that were not accurate.

2.6. Role of the Researcher—The researcher was responsible for uncovering, transferring, and exploiting knowledge to benefit educational institutions. To do so, the researcher takes up the following roles in the course of the study: Facilitator and Promoter of Unbiased Research. The researcher conducts interviews with the participants and guides them in the process. The researcher interprets ideas and responses based on existing literature and related studies and not on the researcher's own knowledge, thoughts, and feelings to avoid the intrusion of bias. Expert in qualitative methods. The researcher implements the qualitative method correctly. To do so, the researcher assesses himself and seeks help from the research adviser and other research professionals. These help him exhibit competence in explaining the study without biasing the participants, conducting interviews properly according to the design, making appropriate field observations, selecting appropriate artifacts, images, and journal portions, and employing Environmental Triangulation and Thematic Content Analysis precisely. Collector and Keeper of data. The researcher ensured different ways of recording what was said and done during the interview and Focus Group Discussion, such as taking handwritten notes or audio and/or video recording. The recordings were transcribed verbatim before data analysis can begin. Records done by the researcher were secured adequately as they contained sensitive information and were relevant to the research. However, the data were being collected, and the researcher's primary responsibility was to safeguard participants and their data. Mechanisms for safeguarding must be clearly articulated to participants and approved by a relevant research ethics review board before the research begins. Analyst of data. The researcher saw the phenomenon or problem from the participants' perspective by interpreting data, transcribing and checking, reading between the lines, coding, and theming. The researcher ensured that the findings were accurate to the participants and that their voices were heard. The researcher organized and presented the data, as well as the problem and the related literature and studies that support it. The study's findings were presented, too, by the research question, stating

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the results for each one using themes to show how the research questions were answered in the study. Moreover, the researcher gave future directions and implications of the study for improving educational policy and practices.

2.7. Data Collection—To ensure safe educational continuity admits the challenge of COVID-19, this study adhered to the Department of Health (DOH) Administrative Order No. 2020-0015 or the Guidelines on the Risk-Based Public Health Standards for COVID-19 Mitigation, cited by the IATF to aid all sectors in all settings to implement non-pharmaceutical interventions. The following step-by-step process was used to gather the data needed. Asking permission from the Schools Division Superintendent. As a researcher, I asked permission from the Schools Division Superintendent to conduct the study in the identified school and likewise sent a letter addressed to the Schools Division Superintendent with Chapters 1 and 2 attached, together with the research instrument, which explains the study's objectives and the identification of the participants. I waited for the SDS's response before conducting the study. Asking permission from the school heads. After securing the approval of the SDS, I sent letters to the principals of the schools explaining the study to be conducted in their schools. Obtaining consent from the participants. I asked permission from the participants and their parents/guardians. They were formally oriented about the study and the process they would undergo as participants. Conducting the interview. As a researcher, I conducted the in-depth interview using the interview questionnaire. I took the participants' profiles, took notes, and recorded conversations using a sound recorder for ease of transcription. The researcher carefully listened and responded actively during the interviews. I precisely transcribed the interviewees' responses by recalling their answers from the sound recorder. Since the participants used their vernacular language, the researcher translated it into English. Data Coding and thematizing. After the transcription, the data were then categorized and coded. Then, themes were extracted, and individual participant data were compared and contrasted. I conducted a second round of interviews (FGD) to corroborate any data that needed further explanation and input from the participants; additional information gathered was examined thoroughly and integrated into the existing body of data. After this, data were compared and contrasted between the participants to develop patterns and trends.

2.8. Data Analysis—In this study, thematic analysis was utilized to analyze the gathered data. The researcher analyzed the participants' answers from the interviews using Creswell's Model, specifically the identifying of themes approach. According to Creswell (2012), themes in qualitative research were similar codes aggregated together to form a significant idea in the database. Familiarization with the data was common to all forms of qualitative analysis. The researcher immersed herself in and became intimately familiar with their data, reading and re-reading it and noting any initial analytic observations. Coding refers to a common element of many approaches to qualitative analysis. It involves generating pithy labels for important features of the data relevant to the (broad) research question guiding the analysis. Coding was not simply a data reduction method but also an analytic process, so codes capture both a semantic and conceptual reading of the data. The researcher coded every data item and

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ended this phase by collating all their codes and relevant data extracts. Searching for themes was a coherent and meaningful pattern in the data relevant to the research question. The researcher ended this phase by collating all the coded data relevant to each theme. Reviewing themes. The researcher reflected on whether the themes tell a convincing and compelling story about the data and began to define the nature of each theme and the relationship between the themes. Defining and naming themes: The researcher prepared a detailed analysis of each theme, identifying the 'essence' of each theme and constructing a concise, punchy, and informative name for each theme. Writing up involves weaving together the analytic narrative and data extracts to tell the reader a coherent and persuasive story about the data and contextualizing it in relation to existing literature. The researcher made sure that the experiences of teachers in utilizing Information Systems in schools' decision-making process were presented comprehensively.

2.9. Framework of Analysis—The framework analysis of this research was flexible to allow the researcher to either collect all the data and then analyze it or do data analysis during the collection process. The gathered data was sifted, charted, and sorted by key issues and themes in the analysis stage. This involves a five-step process: (1) familiarization, (2) identifying a thematic framework, (3) indexing, (4) charting, and (5) mapping and interpretation (Ritchie Spencer, 1994). Familiarization refers to the process during which the researcher becomes familiarized with the transcripts of the data collected (i.e., interview or focus group transcripts, observation, or field notes) and gains an overview of the collected data (Ritchie Spencer, 1994). In other words, the researcher becomes immersed in the data by listening to audiotapes, studying the field, or reading the transcripts. Throughout this process, the researcher became aware of key ideas and recurrent themes and noted them. Due to the sheer volume of data that can be collected in qualitative research, the researcher may be unable to review all the material. Thus, a selection of the data set would be utilized. The selection would depend on several aspects of the data collection process. For example, a mix of methods can be used (e.g., interviews, documents, observations). The second stage, identifying a thematic framework, occurs after familiarization, when the researcher recognizes emerging themes or issues in the data set. These emerging themes or issues may have arisen from a priori themes; however, at this stage, the researcher allowed the data to dictate the themes and issues. The researcher used the notes taken during the familiarization stage to achieve this end. The key issues, concepts, and themes expressed by the participants now form the basis of a thematic framework that can filter and classify the data (Ritchie Spencer, 1994). Indexing means identifying data portions or sections corresponding to a particular theme. This process is applied to all the textual data gathered (e.g., transcripts of interviews). Figure 2 shows the steps in the study's analytical framework, which involves familiarization, coding, developing a thematic framework, indexing, charting, mapping, and interpretation. For convenience, Ritchie and Spencer recommend using a numerical system to index references and annotate them in the margin beside the text (1994). Qualitative data analysis tools are ideal for such a task. The final stage, mapping, and interpretation, involves the analysis of the key characteristics as laid out in the charts. This analysis should be able to provide a schematic diagram of the event/phenomenon, thus guiding the researcher in their interpretation of the data set. At this point, I was cognizant of the objectives of qualitative analysis: "defining concepts, mapping range and

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nature of phenomena, creating typologies, finding associations, providing explanations, and developing strategies" (Ritchie Spencer, 1994). Once again, these concepts, technologies, and associations reflected the participant. Therefore, any strategy or recommendations the researcher made echoed the participants' actual attitudes, beliefs, and values.

2.10. Trustworthiness of the Study—The concepts of validity and reliability were relatively foreign to the field of qualitative research. Qualitative researchers substitute data trustworthiness instead of focusing on reliability and validity. Trustworthiness consists of components such as credibility, transferability, dependability, and conformability (Harts, 2016). Credibility. It involves establishing that the research findings are credible or believable from the participant's perspective. Observing the attributes of prolonged engagement was where credibility contributes to a belief in the trustworthiness of data. To address the credibility issue, the researcher interviewed as many research participants as possible or up to the point of saturation. Meanwhile, transferability is the degree to which the findings can be generalized or transferred to other contexts. In this, the researcher did a thorough job of describing the relevant research context and assumptions. Dependability. It was the consistency and repeatability of the research. The researcher made sure that the study's findings were evaluated by the participants and scrutinized by an external reviewer. Lastly, conformability was the degree to which other researchers could confirm or corroborate findings. The researcher documented the procedures and rechecked the data during the research process. The researcher also made sure that the findings were free from bias.

3. Results and Discussion

This chapter presents and discusses the study's results with reference to its aim. It also discusses the themes that emerged from the data gathered. The results present the description and background of the participants who were assigned pseudonyms to conceal their identities.

3.1. Challenges of Teachers in Utilizing Information Systems in Decision-Making—The field of information systems is new and distinct, and it is continually undergoing rapid change and upheaval. At several organizational levels, information systems support the organization's long-term strategic milestones. Information systems are used in educational management to gather, integrate, process, maintain, and disseminate an integrated set of timely, relevant, reliable, and unambiguous data and information to education leaders, decision-makers, planners, and managers at all levels to carry out their duties and accomplish an organization's goals and objectives. Webs, online systems, electronic systems, and manual systems may all be used to access this information system. Information systems at the Department of Education are the result of this. The participant's management of the school information system experiences are listed below, organized into themes to show trends.

3.1.1. Technological Capabilities—Not all teachers, according to the participants, are proficient in using the system. They disclosed that although some systems have been put into place, limited training sessions have been held on how to use them. They also observed that teachers

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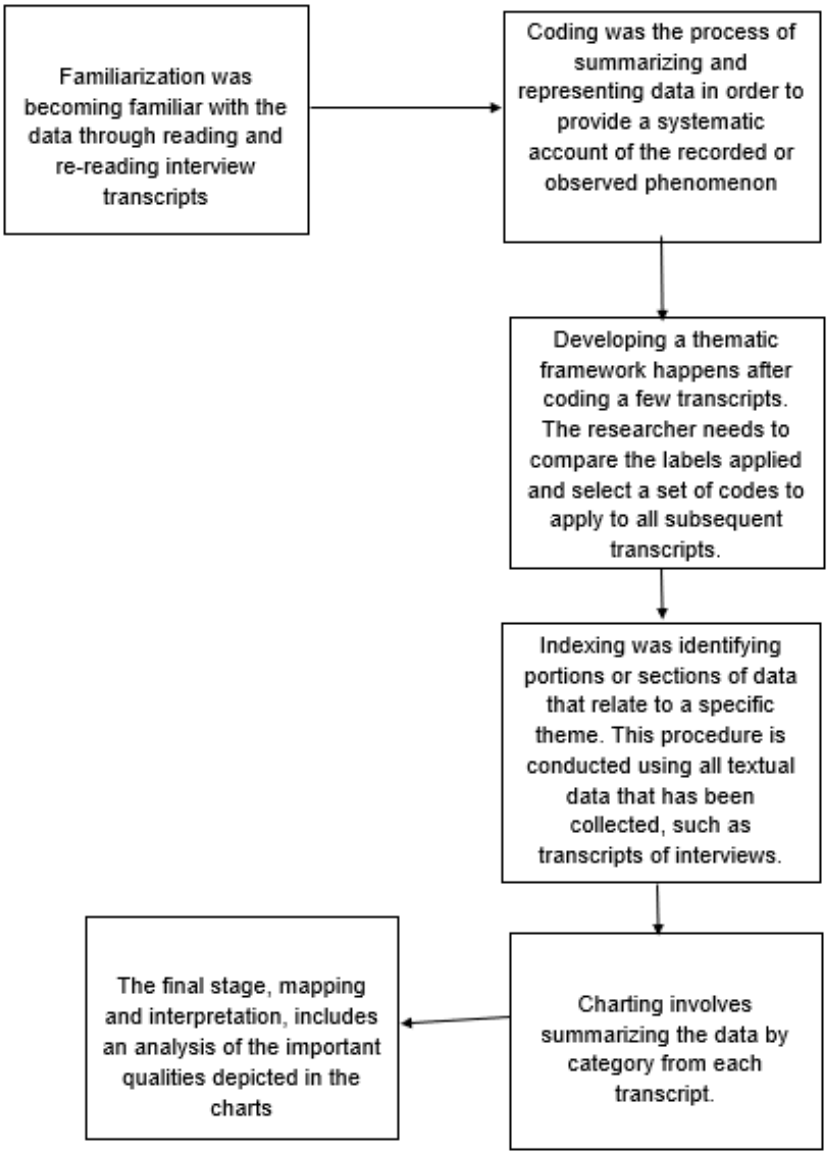

Fig. 2. Analytical Framework of the Study

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had difficulties using the system, particularly at the beginning and end of the school year. The slow transfer of information is a result of teachers' lack of expertise. According to ICS (2018), age may be a factor in the technological skills gap among teachers. According to his research, younger, more recently qualified teachers use ICT significantly more than teachers over the age of 35. He continued by saying that teachers are discouraged from enhancing their digital abilities for more reasons than just age and a lack of practical experience. Lack of confidence or fear of using ICT for learning can be the cause of resistance. Teachers frequently worry that their knowledge does not match that of their students, who have grown up with technology. This takes attention away from one of ICT skills for educators' primary benefits: the ability to facilitate lessons more successfully with digital technology. However, some teachers are not convinced of the benefits it can bring to their teaching. The classroom has not been as quick to embrace technology's advances as other workplaces have. The participants expressed that they have very little background in using and accessing the algorithms in information systems. As Anderson and Dexter (2005) also noted, school managers are essential to boosting the use of technology in classrooms. Thus, they should learn how to use it while performing their duties. As a result, managers need to be educated in technology use just like teachers do. It is difficult to support additional ideas in a unfamiliar field. Leadership is an important component of any technological advancement. No matter how much technological training teachers receive, they cannot be put into effect without the direction of the education manager. (DawsonRakes, 2003). Since the majority of managers in the field have had education in using computers, the term "education" in this context refers to more in-depth studies that can help managers become computer literate rather than to quick in-service training sessions. According to Pelgrum (2001), one of the biggest challenges managers face when implementing managerial information systems is that they never have enough support available to them when they need it. It is obvious that schools want specialists to assist management in resolving issues with software as well as information technologies. One of the computer technology teachers or another teacher in the school with extensive training in this area could be one of these specialists.

3.1.2. Difficulty in accessing the system— Teachers currently use a wide range of technologies to formulate and carry out decisions thanks to recent advancements in computer-based information technology. These systems, which differ greatly from conventional electronic data processing systems, have typically been created from the ground up for specific objectives. Participants in the department discussed how the division office provides web-based information solutions that are being introduced to the schools. They think that while web-based information systems have advantages, particularly in terms of their effectiveness in data collection and decision-making, there are drawbacks as well. The participants explained that as more web-based information systems were introduced to schools, they began to see how difficult it was for teachers to remember and keep track of their login and passwords. The inadequate availability of computers and internet connectivity was identified as one of the major barriers to the use of management information systems in studies by Pelgrum (2001) in 26 countries and Mentz and Mentz (2003) in South African schools. Because of this, it can be claimed that there was a significant infrastructural issue with the implementation of information systems for school management in today's schools. According to Gregorash

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(2004), the use of technology grew consistency with technical advancements. Because of this, it is imperative to provide educators, especially school administrators, with sufficient technology options to enable them to adopt and integrate the advancements. The issues discovered demonstrate the need for information system applications to be carried out within the parameters of a successful program. This imbalance have are some inequalities related to the usage of these technologies' opportunities not only for the manager and teachers but also for the students. This situation shows that there is a possibility of coming face to face with the problem which is discussed widely and called digital division not only country-wide but also in the schools in the same province (Demir, 2006). As it was stated before, instrument insufficiency in technology is a serious handicap for managers and teachers in using information technologies in their studies and for expectations such as being a literate of information and leader of technology to become real (Demir, 2006). As previously said, the lack of adequate technological tools makes it difficult for administrators and instructors to use information technologies in their classrooms and for aspirations like being a leader in technology to materialize (Demir, 2006).

3.1.3. Possible Data Threats—The idea of an information system has made life simpler for schools since it allows them to retain data much more effectively than they could previously. In any event, there is a ton of information that needs to be managed and saved effectively for all the schools to deal with. In the past, people had to accomplish this on paper, which resulted in a never-ending amount of paperwork and cumbersome ledgers and files that were difficult to keep track of. Additionally, they took up a lot of room that could have been used much more effectively. The participants reported that their schools were starting to implement localized information technology to facilitate tasks; these systems primarily consist of online Google systems (attendance, training evaluation, etc.) and electronic document filing (grades, human resource information, etc.). They discover that this technique cuts down on the amount of time teachers need to complete the duties. They acknowledge, though, that these systems are exposed to dangers and risks. The participant responses asserted that the potential threat stems from the misuse of data within the school information system. While the system primarily exists to streamline administrative processes, there is always the risk of data being misused or mishandled. Unauthorized individuals may use the data for identity theft, harassment, or even cyberbullying. Additionally, if the information falls into the wrong hands, it could be exploited for fraudulent activities or social engineering attempts. The misuse of data can have severe consequences for students, parents, and staff members, undermining trust and potentially damaging the reputation of the educational institution. Since many schools now use technology, the data and information of students and even their parents are kept in the database of the institution for better operation and management of each department inside the school. It is a fantastic tool, but if student data is not preserved and safeguarded properly, it might be very harmful (Rokde, 2018). All students' and their parents' information is stored in the school's database. Additionally, it includes each student's academic standing and grades for simple evaluation and organization. However, if the data and information are not sufficiently secured, those with bad intentions could get access to the database and alter student grades and other administrative data stored there. When school databases are not adequately protected, this breach is conceivable (Rokde, 2018). Teachers and principals must grasp the value of safe-

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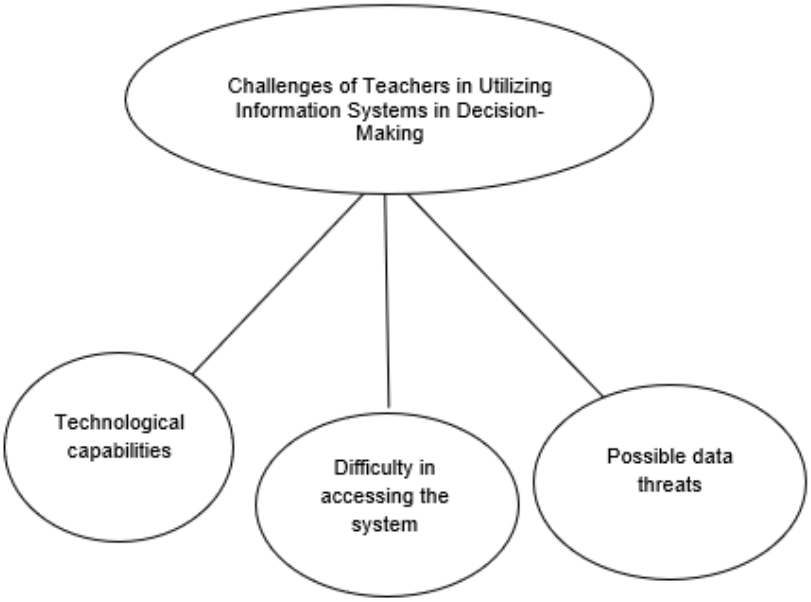

Fig. 3. Emerging Themes on the Challenges of Teachers in Utilizing Information Systems in Decision-Making

guarding databases, the expanding internal and external dangers to companies' information, and how government rules affect data protection. To avoid the compromise of private student and school information, schools should implement database security best practices (Ian, 2015). The figure shows the challenges teachers faced in utilizing information systems in decision-making, including technological capabilities, difficulty accessing the system, and possible data threats. These themes implied that the abilities of the manager and user are essential to the efficient management of information systems. To make the most of the system's capabilities, they need to thoroughly understand how to utilize it. In terms of leadership, decision-making, workload, human resource management, communication, accountability, and planning, school management has altered due to school management information systems.

3.2. Coping with the Challenges in Information Systems—A noteworthy general finding is that both good information systems and bad information systems encourage the making of poor decisions. UStudin (2010) argues that the quality of managerial decision-making directly depends on the quality of the information at hand. As a result, teachers should foster an environment that promotes the development and viability of quality information. This information trend will likely run into difficulties, setbacks, and accomplishments. Reviewing the issues with the establishment, use, and growth of management information systems in schools can significantly impact how public and private sector organizations make decisions. The challenges of management information systems are outlined below through themes, and the participants share some of their solutions to overcome them.

3.2.1. Making use of cloud services—Data security in schools is about preventing information from being damaged, lost, or stolen. Computer systems are extensively reliant on in all

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schools. Any business should assess the risks to its information assets with the same level of rigor that it would apply to legal, regulatory, financial, or operational risk, according to best practices. The participants stated that they use cloud services like Google Drive, One Drive, iCloud, and others to protect the sensitive data on their computers from malware, unintentional deletion, unauthorized access, and other potential hazards. Users of these services transfer their private information to a cloud-hosted server, which is then stored for subsequent access. These programs are helpful for individuals, but they are even more helpful for businesses that need to have access to data over a safe network connection online (Singh, 2020). It is simple to ignore some of the more common physical hazards that data encounters daily when there are so many news stories about cyberattacks, hackers, and malware these days. The participants agreed that having information systems stored on the cloud is particularly beneficial in the event of unforeseen physical disasters like fires, floods, or other types of natural disasters that can completely wipe out all the data on a computer and make recovery very hard. The phrase ”cloud computing” has become often used in recent years. It is become harder and harder for people and organizations to maintain all of their crucial data, programs, and systems on in-house computer servers because to the exponential rise in data use that has followed society's shift into the digital 21st century. The answer to this issue has existed for almost as long as the internet, but it has only recently found widespread use in corporations and educational institutions (Singh, 2020). Data backups shouldn't feel like a nuisance as we transition to a society where everyone has a digital identity. They ought to provide one piece of mind knowing that crucial information has been protected. Furthermore, it was advised by Chivers (2021) to not undervalue the importance of retaining physical copies of items because it's a good idea to keep a file of your most critical documents in addition to any digital data backups. The most crucial component of data backup is documents.

3.2.2. Conducting information system evaluation—The participants think it's important to assess the information system's performance. The activity of assessment offers monitoring, which helps to direct the management of information in systems correctly. According to Hirschheim and Smithson (1999), evaluation is routinely carried out to determine how effectively something satisfies a specific expectation, purpose, or need. According to Willcocks (1992), information system evaluation is specifically the activity of determining the value of information technology to the organization using quantitative and/or qualitative methods. An organization can decide how to manage its information systems using the results of such an assessment. Organizations must make crucial decisions at various stages in the life cycle of an information system. In order to learn more about their programs and make informed judgments about how to implement them, teachers can and should undertake internal assessments. Internal evaluation ought to be carried out routinely and rigorously at all organizational levels and across all program areas. Additionally, the management, staff, and beneficiaries of the program should all be appropriately included in the review process. This cooperation ensures that the evaluation is fully inclusive and strengthens everyone's commitment to using the findings to make important program improvements (CenterPoint Institute, 2005). Although most evaluations are done internally, conducted by and for program managers and staff, there is still a need for larger-scale, external evaluations conducted periodically by individuals from outside

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the program or organization. Most often, these external evaluations are required for funding purposes or to answer questions about the program's long-term impact by looking at changes in demographic indicators such as graduation rate or poverty level. In addition, occasionally, a manager may request an external evaluation to assess programmatic or operating problems that have been identified but that cannot be fully diagnosed or resolved through the findings of internal evaluation (CenterPoint Institute, 2005). There is a need to continuously measure the success of the information system. Kom (2018) claims that the outcomes of the measurements will empirically reflect user satisfaction with the system, offer guidance on how to improve the usability and management of the system, and let users know whether the system's objectives were met. Indeed, program evaluation is a fundamental step in the user-centered design process of any interactive system, be it software, a website, or any information and communication technology or service. User experience is crucial for system development, particularly for this web-based information system, as it can reveal how users judge a system's usability and effectiveness. The System Usability Scale (SUS) of Kortum Sorber (2018) and the User Experience Questionnaires UEC of Faria (2017) are only two examples of the many evaluation measures that can be employed.

3.2.3. Attending End-User Training— Data should be relevant in school management information systems, and teachers should make sure that the data is current and responsive to each teacher's curriculum. The usage of the systems in schools is, however, directly impacted by a number of impediments, such as a lack of infrastructure, a lack of support and training, and teachers' incapacity to evaluate data efficiently. They implemented training and orientation on how to manipulate it, how to analyze and interpret it, and the process of its rollout deployment to schools in order to fulfill the teachers' needs in accessing the school's systems, both Division and localized. Information systems management should also concentrate on figuring out how to make teachers and administrators use them more effectively. With appropriate training and strong leadership, the advantages of information systems could be increased in school and classroom administration. Computer programs are increasingly being employed in classrooms. As a result, computer literacy is becoming increasingly crucial for information instructors (Gupta et al., 2010). In order to boost knowledge, performance, attitude toward, and utility of such computer applications in the field of information systems (IS), training are put into place (Arthur et al., 2003). Users are taught how to use a target information system during end-user training efficiently. According to research (Igbaria et al., 1995), such end-user training promotes using a certain information system within an organization.The social aspects of working with information systems must be strengthened to close the gap between complexity, automation, and inextricably human tasks. Teachers need to be personally satisfied with using the system (DeLone McLean, 2003) and identify themselves with it to participate in system usage (Yap et al., 1992). Therefore, the acceptance and attitude towards the system must be increased to foster system adoption. It is argued that this can be achieved by providing individually tailored end-user training. The social aspects of working with information systems must be enhanced to bridge the gap between complexity, automation, and activities that humans must always perform. To use the system, teachers must feel personally happy utilizing it (DeLone McLean, 2003), and they must identify with it in order to do so

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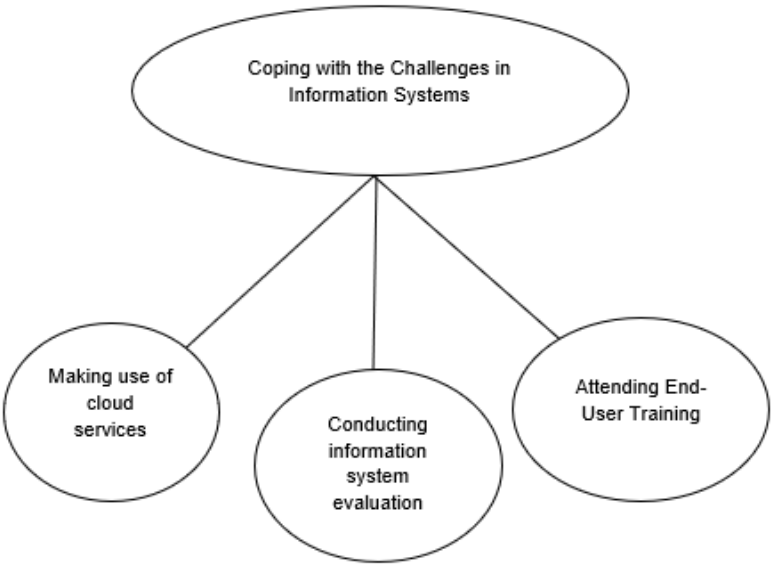

Fig. 4. Emerging Themes on Coping with the Challenges in Information Systems

(Yap et al., 1992). Therefore, improving system acceptance and attitude is necessary to encourage system adoption. It is claimed that this can be accomplished by offering specialized end-user training. The figure above shows the emerging themes in coping with the challenges in information systems: using cloud services, conducting information system evaluation, and attending end-user training. These themes implied that strategies should be implemented to strengthen the management of information systems to ensure their sustainability. The most important contributions of information systems are the changing opinions about technology, increased quality of the studies, courage to look for different alternatives to solve problems, and increased ability to solve problems.

3.3. Educational Insights that were drawn from the Experiences of the Teachers—This section presents the participants' educational management insights. Their responses were narrowed down into one to generate themes and subthemes. These were carefully analyzed and formulated based on informants' accounts and reflections.

3.3.1. Observance of Data-Driven Decision Making—Data and analytics also play a vital role in addressing inequalities in education. Significant achievement gaps persist between students from low-income households and those from high-income households. With an increasing wealth disparity, the number of children deprived of equal opportunities in education grows. The participants believe that by analyzing data, they can identify how factors such as nutrition, educational programs, and parental involvement impact achievement gaps. They can also assess whether interventions and policies positively or negatively affect outcomes such as graduation rates and the achievement of key learning milestones. This vital information arms educational teachers with what they need to implement the most promising strate-

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gies and advocate for policies that effectively close achievement gaps Schools use collaborative approaches to make data work for them. Teachers may study standardized test scores, attendance, and behavior data to make school decisions. Processes like these can catch students falling through the cracks, identify gaps in curriculum coverage, and better align curriculums across departments and grades (SEO, 2019). Data has limits. Teachers and principals need to remember that not all data analysis can be applied in the same way. Even when situations seem similar, factors that are not obvious at first may result in different outcomes. Any number of factors can impact student learning, which means teachers and teachers must be mindful of how they interpret data and consider the many things that can affect results, including class structure, class size, and student ages and backgrounds (SEO, 2019). Even when the data are available, they are often inaccessible. Wayman (2005) noted that extensive data have been available to schools for many years, but this availability has not translated into information richness because of the way data are stored and accessed. Massell (2001) noted that most state and local accountability policies assume teachers know how to turn data into useful information; however, most teachers are not trained to do so (Mandinach Gummer, 2013). Therefore, teachers must consider this aspect in their decision-making as well.

3.3.2. Information System is a Valuable Tool—The participants discussed how schools use management information systems to assist a variety of tasks, such as staff and resource allocation, attendance tracking, assessment records, reporting, and financial management. They claimed that the technology gives them the data they need to properly and efficiently run both businesses and classrooms. These systems, according to O'Brien (1999), are different from other information systems since they are made to be used to assess and support strategic and operational operations within the business. Computers are seen as having the ability to significantly improve teaching, learning, and administration in educational institutions. If there is evidence that information and communication technology (ICT) has had a commensurate impact on school performance and effectiveness, a significant investment in ICT—including hardware, software, networking, and staff development—will be considered worthwhile (Condie et al., 2007). Due to its effectiveness and efficiency, the use of information systems in educational management has rapidly risen. Due to improved technology, teachers who previously spent much time managing complex allocation issues have more options. The decentralization of job activities and their real-time coordination in an interactive network of communication are made possible by information systems. This makes Greater networking and flexibility possible by emphasizing interconnection, communication, and ongoing adaptation to a constantly changing environment (Castells, 2001). Additionally, information systems are essential for decision-making because they can autonomously monitor system disturbances, choose a course of action, and implement that course of action to bring the system under control. Information systems are also pertinent to non-programmed decisions since they support decision-making by offering information for the search, analysis, assessment, and decision-making process (Obi, 2003). These systems can offer users processed data, analytical models, in-the-moment updates, and fictitious situations to aid decision-making.

3.3.3. Strengthening Data Privacy—

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The global shift towards digitized learning, accelerated by the COVID-19 outbreak, dramatically impacts the education system, from personalized learning experiences and improved engagement to reduced costs and more regularly updated content. However, at the same time, new data protection laws have been coming into force worldwide to bolster individuals' privacy rights in today's data-driven landscape. As a result, the participants believe schools must comply with much stricter data privacy. Data security has always been crucial. It is why people rent safety deposit boxes from their banks and lock up their filing cabinets. However, as information becomes increasingly digital and more straightforward to share online, data privacy is becoming increasingly important (Stahl, 2016). According to the National Privacy Commission (2020), the advisory emphasized accountability, the treatment of information about education as sensitive personal information, legitimate interest, legitimate purpose, proportionality, and transparency to conduct personal data processing activities deemed necessary or related to online learning. Moreover, bad things can occur when confidential information falls into the wrong hands. For instance, a data breach at a government organization could give access to highly sensitive information to someone with malicious intentions and personal gain. Therefore, it is important to protect sensitive data frequently kept in schools, such as employment records, student information, transactional data, or data collecting (Stahl, 2016). The figure shows the emerging themes in the educational insights drawn from the teachers' experiences, which included observing data-driven decision-making, recognizing that information systems are valuable tools, and strengthening data privacy. These themes implied that by implementing these insights, decision-makers can make informed decisions, improve student outcomes, and maintain the safety and security of sensitive information. With the ever-increasing role of technology in the education sector, these insights are essential for the future success of schools.

4. Implications and Future Directions

This chapter presents a brief overview of the study, followed by implications based on its findings. Future directions in the field of management information systems are also discussed here.

4.1. Findings—The study explored the challenges of Information Systems in schools' decision-making process. The themes regarding teachers' challenges in utilizing information systems in decision-making were technological capabilities, difficulty accessing the system, and possible data threats.

4.2. Implications—Technological capabilities. One significant factor contributing to teachers' lack of technological capabilities was the limited availability of professional development opportunities focused on technology integration. Many teachers have not received adequate training and support to develop the necessary skills for utilizing technology information systems. Insufficient access to professional development programs tailored to teachers' specific needs hinders their ability to leverage these systems in the classroom effectively. Difficulty accessing the system. Technology resources are distributed unequally among schools and districts in many educational contexts. Schools in underserved areas or those with limited fund-

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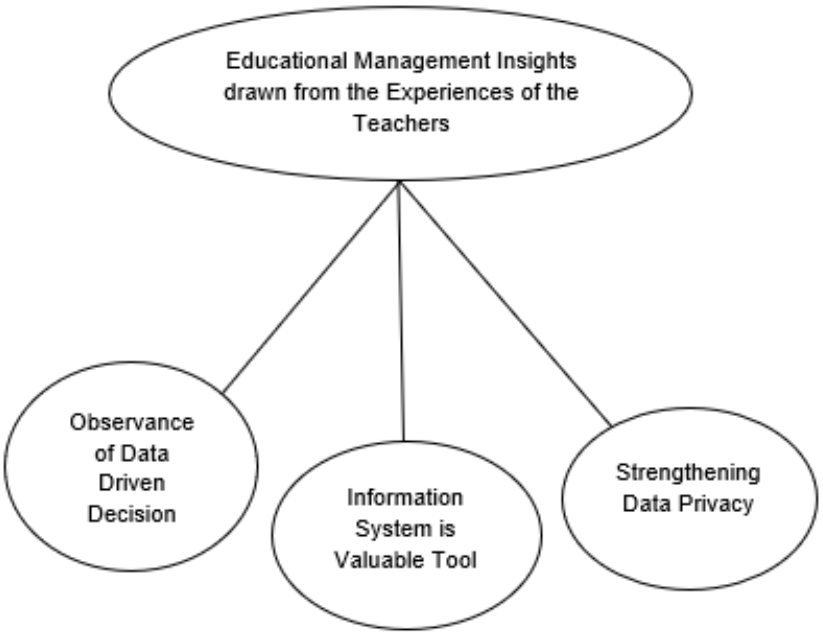

Fig. 5. Emerging Themes on the Educational Insights that were drawn from the Experiences of the Teachers

ing often face more significant challenges accessing information technology systems. This digital divide exacerbates educational inequalities and hampers teachers' ability to leverage technology effectively. Teachers in resource-constrained environments may lack the necessary tools and equipment, hindering their access to information technology systems. Possible data threats. School information systems were valuable tools for efficiently managing administrative tasks. However, the potential threats associated with their data should not be overlooked. Data breaches, unauthorized access, misuse of data, compliance issues, insider threats, and human error all pose significant risks to the confidentiality, integrity, and availability of sensitive information. These themes implied that the abilities of the manager and user are essential to the efficient management of information systems. To make the most of the system's capabilities, they need to thoroughly understand how to utilize it. School management has altered leadership, decision-making, workload, human resource management, communication, accountability, and planning due to school management information systems. Moreover, among the generated themes on coping with information systems challenges, the emerging themes were using cloud services, conducting information system evaluation, and attending end-user training. Making use of cloud services. Cloud services' accessibility and convenience enable teachers to access their materials anytime, anywhere—enhanced data security safeguards sensitive information, fostering trust and compliance with privacy regulations. Collaborative features promote teamwork and sharing among educators. The efficiency and organization provided by cloud services streamline workflows and save time. Conducting information system evaluation. Actively engaging in the evaluation process, teachers ensure that implemented systems support their instructional practices, enhance student learning experiences, and align with educational objectives. In this way, teachers become drivers of posi-

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tive change, empowering themselves and their educational institutions to achieve excellence in teaching and learning through effective information systems. Attending end-user training. These training sessions provide comprehensive guidance on system features, functions, and navigation. Teachers learn how to create and manage user accounts, access resources, input and retrieve data and utilize system tools relevant to their instructional needs. Teachers can confidently integrate information systems into their teaching practices by improving technological competence. These themes implied that strategies should be implemented to strengthen the management of information systems to ensure their sustainability. The most important contribution of information systems is that the changing opinions about technology, increased quality of the studies, courage to look for different alternatives to solve problems, and increased ability to solve problems come together. Lastly, the emerging themes in the educational insights drawn from the teachers' experiences were the observation of data-driven decision-making, the value of information systems, and the strengthening of data privacy. Observance of data-driven decision-making. Data-driven decision-making enables teachers to gain valuable insights into their students' strengths, weaknesses, and needs. By analyzing assessment data and other relevant metrics, educators can identify specific areas where students struggle and tailor their instructional approaches accordingly. This personalization ensures that students receive targeted support, leading to improved academic performance and increased engagement. Information systems were valuable tools. They revolutionize the way educational institutions operate and enhance students' learning experiences. Information systems encompass various technologies and platforms that facilitate the management, storage, retrieval, and analysis of data in educational settings. Strengthening data privacy. Protecting sensitive student information and maintaining trust within the educational community was imperative. Schools can create a secure environment for students, parents, and staff by safeguarding personal information, protecting academic records, minimizing data collection and retention, obtaining informed consent, educating students on digital citizenship, and conducting regular audits. Prioritizing data privacy, schools demonstrate their commitment to upholding ethical standards and ensuring the confidentiality and integrity of student data in an increasingly interconnected world. These themes implied that by implementing these insights, decision-makers can make informed decisions, improve student outcomes, and maintain the safety and security of sensitive information. With technology's ever-increasing role in education, these insights are essential for schools' future success.

4.3. Future Directions—Data obtained had implications for various educational stakeholders, including policymakers, administrators, and teachers. The future directions of practice of this study are as follows: Policymakers may electronically link all technological information systems to perform all information management activities (including data collection, compilation, integration, and dissemination) in one portal with subsystems across the Internet for fast data availability and usability for decision-makers at all levels. An adequate computing environment should be provided for a functional information system, including proper network and computing infrastructure, sufficient capacity of servers, backups, and security facilities, and appropriate and regular maintenance. School Principals may be encouraged to use information systems, and they should believe that data are valuable sources for decision-making

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and that the information systems back up the implementation of educational reforms. It should be ensured that school managers take part in making decisions about these applications to make them embrace innovations. To provide a comprehensive plan, it was necessary to use information systems in the organizations before using the information system. Teachers may continually improve themselves in information technology and spread awareness about data privacy to parents and learners. Future Research. Several areas for future studies within this field remained unexplored. Further development on the similar and different contexts can be done in this study.

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