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Instruction of Mathematics Teachers Toward Numeracy Management Program

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Abstract: Numeracy education stands as a pivotal component of the educational landscape, necessitating attention from both administrators and teachers. To facilitate the ongoing improvement of teachers' numeracy instructional skills, it becomes imperative to confront the barriers hindering students' attainment of educational objectives. The purpose of the study was to evaluate the numeracy instruction provided by mathematics teachers, with an emphasis on its impact on curriculum and pedagogy enhancement. Additionally, it identified issues in the management of numeracy instruction, forming the foundation for forthcoming numeracy management initiatives targeting elementary school teachers. This study employed a researcher-developed questionnaire to conduct a descriptive survey involving 30 elementary mathematics teachers from Marawoy Elementary School. Utilizing statistical tools, specifically the mean, responses were meticulously analyzed, while issues concerning numeracy management instruction were methodically extracted and interpreted thematically. The study affirmed the robust alignment between teachers' knowledge content and pedagogical approaches with the diverse learning needs of their students. Notably, instructional materials, classroom management, and assessment techniques exhibited variation according to students' learning capabilities. Unfortunately, suboptimal Internet connectivity and limited access to learning resources only marginally supported the integration of technology in the teaching and learning processes. Consequently, the implementation of a numeracy management program was recommended to bridge instructional gaps among teachers in the domain of numeracy.

Keywords: Numeracy; Mathematic teacher; Instruction; Management skills; Numeracy management program

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1. Introduction

Education serves as the fundamental influencing factor of an individual's personal and professional development, making it an indispensable facet of learning across various domains. Numeracy stands out as one of the crucial areas of emphasis within education. A strong foundation in numeracy is vital for the holistic development of children and young individuals, enabling them to actively participate in education, reach their full potential, and contribute meaningfully to society [1].

In the context of the 21st century, the demand for globally competitive students navigating a swiftly changing landscape necessitates the acquisition of numeracy skills. Numeracy's pervasive role in our daily lives

has long established its position as a cornerstone of lifelong learning, essential for children's success within and beyond the conventional curriculum [2]. Furthermore, it fosters the growth of critical thinking and problem-solving capabilities.

Numeracy's significance extends to active participation in both educational institutions and broader societal contexts, equipping individuals to engage responsibly in unforeseen circumstances. Its relevance spans across the school, home, community, and future career, underpinning the success of those who demonstrate proficiency in this realm, particularly in this evolving world marked by technological advancements [3].

Effective management, on the other hand, is not just an opportunity but a challenge that confronts every leader overseeing an organization. It is a social process aimed at ensuring cooperation, participation, and the engagement of others in achieving defined objectives [4]. To effectively manage the available educational resources and achieve the national educational objectives, the educational manager or administrator must possess the necessary abilities and skills [5]. In the educational setting, management is pivotal for the delivery of quality education, involving meticulous planning, decision-making, and formulation of educational policies. This facet significantly influences the realization of educational goals and involves the control, regulation, and supervision of formal education systems [6]. It encompasses functions that support the attainment of educational objectives, making it an essential component [7].

Teachers, as key players in numeracy instruction, bear the responsibility of creating a conducive learning environment that fosters numeracy skills acquisition [8]. They must recognize and cater to the diverse learning styles of students, adapting their teaching to individual needs [9]. Additionally, teachers should provide targeted support to students struggling with numeracy, conducting assessments to gauge progress and offering constructive feedback to enhance performance [10].

However, it is a matter of concern that reading and numeracy skills among Filipino students have been declining [11], as indicated by international assessments such as the Programme for International Student Assessment (PISA, 2018) and Trends in International Mathematics and Science Study (TIMSS, 2019). Despite the implementation of the K-12 curriculum by the Philippine educational system, the majority of the schools had extremely low mean percentage scores (MPS) in mathematics. This highlights the urgency of addressing the quality of basic education in the Philippines and underlines the need to evaluate and enhance numeracy instruction for mathematics teachers. The researcher's motivation to uncover these instructional gaps has led to the aspiration for a numeracy management program that can uplift the standards of education.

2. Literature

Numeracy, beyond being a fundamental aspect of mathematics, is recognized as a crucial life skill, providing students with the foundational competence necessary for success in their educational journey and broader curriculum engagement [12]. This enduring significance of numeracy underscores the need to cultivate it from early childhood, playing a pivotal role in supporting children's achievements across various curricular and extracurricular activities [2]. Furthermore, adult literacy and lifelong learning, alongside continued education, are vital components within the framework of Internet-enabled education [13].

Teachers, in their role, incorporate their knowledge bases into diverse teaching activities. Research highlights that teachers' mathematical knowledge for teaching directly correlates with improved mathematics achievement among students in both the early and later grades, underlining the significance of this pedagogical knowledge [14,15]. The adoption of deductive teaching methods offers a direct and time-efficient approach. Effective teachers leverage their understanding of students' backgrounds, interests, and abilities to plan

instruction that caters to the diverse needs of learners [16,17].

Collaborative learning fosters enhanced productivity, stronger relationships, improved psychological well-being, refined social skills, and boosted self-esteem. Experiential learning empowers students by granting them more authority and responsibility, directly involving them in the learning process within their learning environment [18,19]. Teachers must possess comprehensive knowledge to effectively teach various facets, including feedback, handling mistakes, questioning techniques, and structuring lessons. Factors like motivation, humor, and opportunities for active learning also prove important [20].

To promote student progress, educators should explore diverse techniques when creating problem sets. Teachers, with their prior knowledge and strategic skills, can significantly influence students' proficiency in mathematical problem-solving [21]. Understanding the preferred learning methods of students guides teachers in devising multiple approaches to enhance students' mathematical performance. Student-centered learning promotes an active learning style, aligning learning programs with each student's unique learning pace [22,23].

Technological tools play a crucial role in the teaching and learning of mathematics, shaping both curriculum content and student learning experiences. However, the effective use of instructional technology hinges on factors such as computer availability and Internet connectivity. These factors significantly impact the quality of education schools can provide [24,25]. In the modern classroom, incorporating technology-enhanced elements fosters student engagement, concentration, and active learning [26]. The use of Google apps, for instance, encourages critical thinking and collaborative activities, aligning with the principles of mathematical practices [27].

The quality of instructional aids, such as textbooks, holds paramount importance in the improvement of instruction. It is not the physical structures of educational institutions but the quality of processes occurring within them that shape effective teaching and learning [28,29]. Manipulatives play a crucial role in enhancing conceptual understanding in mathematics by bridging formal and informal techniques and connecting tangible and abstract concepts [30,31]. Well-equipped schools, featuring educational facilities such as libraries and laboratories consistently perform better in standardized examinations [32].

Efficient assessment techniques that contribute to enhanced learning have long been advocated. Well-developed assessment methodologies positively impact students' achievement [33]. Pilot testing proves indispensable in conducting large-scale surveys, enhancing the reliability, validity, and practicability of the questionnaire [34]. Ensuring the reliability of assessments involves making sure that different test forms within a single administration are equivalent, that retests remain consistent with the original test, and that test difficulty remains constant over time. Challenges often arise when students struggle with mathematical terminology and its related concepts [35,36].

3. Research objectives

This study focused on the management of numeracy instruction by the mathematics teacher of Marawoy Elementary School for the school year 2022–2023. Specifically, it sought answers on the following research targets:

(1) Assess the level of management of numeracy instructions in terms of:
   (a) Content knowledge;
   (b) Pedagogical approaches;
   (c) ICT-related skills;
   (d) Classroom management;
   (e) Preparation of instructional materials;

(f) Preparation of assessment tools.

(2) Identify the issues in the management of numeracy instruction.

4. Research methods and procedures

4.1. Research design

In this study, a descriptive survey methodology was employed to assess the necessity of fostering a research-oriented culture among elementary education teachers. Descriptive research entails the examination of specific attributes of a given phenomenon through observation or the exploration of potential correlations between multiple phenomena [37]. This research design facilitated a comprehensive examination of the extent to which teachers incorporate various numeracy instruction methods in their mathematics teaching.

4.2. Respondents and sampling

A total of 30 mathematics teachers of Marawoy Elementary School were recruited as the respondents as they have experience in utilizing numeracy instruction. **Table 1** shows the tabulated presentation of the number of respondents in this study.

Table 1. Participants of the study

Grade level	Teacher
Kinder	5
Grade 1	7
Grade 2	5
Grade 3	7
Grade 4	3
Grade 5	2
Grade 6	1
Total	30

4.3. Data collection instrument

The primary data-gathering tool employed by the researcher for the teacher respondents was a questionnaire created specifically for this study. This questionnaire comprised statements related to numeracy management within the context of teachers' numeracy instruction. Moreover, it aimed to uncover issues surrounding the management of numeracy instruction. The development of these questionnaire items underwent a rigorous process that involved seeking input and expertise from various professionals to ensure accuracy and clarity. Several rounds of restructuring and revisions were carried out to enhance the questionnaire's comprehensibility to the respondents. Furthermore, valuable insights and recommendations from experts were considered, leading to the refinement of the questionnaire. The final version of the questionnaire was presented to a panel of experts for their comments, suggestions, and recommendations, which were duly incorporated.

4.4. Data collection

Following the preparation and finalization of the researcher-designed questionnaire, formal approval and support were sought from the Schools Division Office of Lipa City to conduct the study among thirty mathematics teachers at Marawoy Elementary School during the 2022–2023 school year. Upon obtaining

the necessary permission, the researcher personally approached the school principal to request authorization to administer the questionnaire to the respondents. The distribution and retrieval of the questionnaire were executed at the convenience of the respondents. Subsequently, the completed questionnaires were collected, collated, and tabulated for further analysis.

4.5. Data Analysis

In this study, the researcher employed descriptive research methods, which involve the systematic identification of attributes related to a specific phenomenon through observation or the exploration of potential correlation between multiple phenomena [38]. The collected data were meticulously tallied, tabulated, analyzed, and interpreted using descriptive statistics, particularly the mean, to gauge the extent to which various numeracy instruction approaches were utilized in mathematics teaching. Additionally, in the second part of the questionnaire, a thematic approach was adopted. An open-ended question was included to elicit valuable statements, elucidate their meanings and themes, describe the phenomenon, and provide insights. The responses obtained from the respondents underwent analysis and interpretation, involving the extraction of key themes and the segmentation of ideas.

4.6. Ethical considerations

Ethical principles were rigorously observed during the study. All necessary permits and consents were obtained from the respondents, and the researcher adhered to a strict oath of confidentiality. The data collected from the respondents were treated with the utmost confidentiality, ensuring the protection of their identities and interview responses from the public eye. The results of the interviews were used exclusively for this study, in line with the provisions of the Data Privacy Act of 2012.

5. Results and discussions

This section delves into the presentation of collected data along with the corresponding analysis and interpretation. The data is presented in an organized and sequential manner, addressing the questions posed at the outset of the study.

5.1. Numeracy instruction of teachers

5.1.1. Content knowledge

Content knowledge serves as the bedrock for understanding and effectively conveying a subject. **Table 2** exhibits the data retrieved from respondents regarding the content knowledge of numeracy instruction.

Table 2. Respondent's assessment of the numeracy instruction in terms of content knowledge

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Have a deeper knowledge and understanding of the properties and relationships of numbers, as well as the different ways to represent numbers (e.g. fractions, decimals, percents).	3.67	Highly utilized
2. Have a deeper knowledge and understanding of the properties of geometric figures and their relationships to each other.	3.47	Utilized
3. Have a deeper knowledge and understanding of the concepts of probability and use them to make predictions and basics of statistics, such as mean, median, and mode.	3.27	Utilized

Table 2. (continued)

Item statement	Mean	Verbal interpretation
4. Use critical thinking and analytical skills to solve mathematical problems.	3.17	Utilized
5. Use logic and deductive reasoning to make mathematical arguments and proofs.	3.03	Utilized
Composite mean	3.32	Utilized

It is evident from the table that teachers possess a profound understanding of a variety of content knowledge aspects, tailoring their knowledge to the learners' specific grade levels. This aligns with research conducted by Duncan, which emphasized teachers' incorporation of their knowledge bases into various teaching activities [14].

This also signifies that teachers employ diverse strategies and approaches for problem-solving, utilizing tools such as diagrams, tables, or equations based on the problem at hand. This approach echoes findings by Gurat, where varied techniques in creating problem sets were deemed essential for student progress, enhancing their abilities in mathematical problem-solving due to teachers' prior knowledge and skills in strategies [21].

The composite mean indicates that teachers possess a strong grasp of the subject matter, including key concepts, skills, and inquiry methods, enabling them to identify crucial concepts and topics that each student needs to learn at their respective levels. Hill's research found a positive correlation between teachers' mathematical knowledge for teaching and student mathematics achievement during the early grades, emphasizing the importance of this pedagogical knowledge [15].

This suggests that teachers are cognizant of students' diverse needs, interests, and aptitudes, which aids in curriculum modifications to meet individual student requirements. Recognizing students' preferred learning styles, as mentioned by Cardino Jr. and Ortega-Dela Cruz, can greatly assist teachers in planning and implementing effective strategies that cater to their unique learning preferences [22].

5.1.2. Pedagogical approaches

Pedagogical approaches encompass the variety of techniques and strategies employed by teachers to facilitate learning and growth. **Table 3** showcases data collected from respondents regarding the pedagogical approaches within numeracy instruction.

Table 3. Respondent's assessment of the numeracy instruction in terms of pedagogical approaches

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Directly teach the content to the students.	3.80	Highly utilized
2. Involve students working together in groups to achieve a common goal.	3.73	Highly utilized
3. Focus on learning through hands-on experiences.	3.70	Highly utilized
4. Involve the students in their own learning process by asking questions, investigating, and exploring.	3.43	Utilized
5. Focus on the student's active construction of knowledge by letting them build their own understanding through their experiences and interactions with the environment.	3.30	Utilized
Composite mean	3.59	Highly utilized

The table reveals that teachers frequently employ deductive teaching, a method that introduces themes and content at the beginning of class, followed by illustrative examples. The advantages of deductive teaching,

which emphasize its straightforward and time-efficient nature, were observed in previous research by Abdukarimova and Zubaydova [16].

Moreover, some teachers heavily favor collaborative learning, where students learn from their peers, often in group activities. This aligns with findings from Laal and Ghodsi, indicating that collaborative learning leads to enhanced productivity, better relationships, improved psychological well-being, refined social skills, and heightened self-esteem [18]. In certain learning contexts, students are encouraged to engage in self-discovery as a primary means of learning. As suggested by Kolb and Kolb in their study, experiential learning empowers students by granting them more authority and responsibility and involving them directly in the learning process within the learning environment [19].

This suggests that teachers employ a variety of pedagogical approaches to address individual differences and learning needs based on the student's grade levels. Cardino Jr. and Ortega-Dela Cruz highlighted in their study that understanding students' preferred learning methods allows teachers to develop numerous strategies to enhance students' learning, thereby boosting their performance in mathematics [22].

5.1.3. Information and communication technology skills

Information and communication technology (ICT) plays a significant role in education, enabling teachers to access and exchange information. **Table 4** presents data related to ICT skills within numeracy instruction.

Table 4. Respondent's assessment of the numeracy instruction in terms of ICT-related skills

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Use online resources, such as educational videos and simulations, to reinforce mathematical concepts and provide additional practice opportunities.	3.60	Highly utilized
2. Utilize educational software and apps that allow students to engage in learning.	2.47	Slightly utilized
3. Use interactive whiteboards or projectors to display and manipulate mathematical diagrams and equations in real-time during lessons.	2.47	Slightly utilized
4. Incorporate online collaboration tools, such as Google Docs or Padlet, to facilitate group work and allow students to share their work.	2.47	Slightly utilized
5. Teach students how to use spreadsheets to analyze and visualize data, and create graphs and charts to represent mathematical concepts.	2.17	Slightly utilized
Composite mean	2.64	Utilized

The table indicates that teachers extensively utilized online platforms and other digital resources, such as educational videos and simulations, to reinforce mathematical concepts and provide additional practice opportunities, enhancing student engagement and learning in mathematics. Technology has a huge impact on teaching and learning [24]. However, the table also reveals that the use of online educational tools is limited, likely due to issues such as insufficient access to ICT materials. This echoes Johnson *et al.*'s research, which emphasized that instructional technology's effective use is contingent upon adequate computer availability and a fast Internet connection, both of which are essential for the quality of education [25].

The composite mean suggests that a significant challenge in many public schools is the lack of technologically advanced teaching materials, which deprives students of access to a wealth of knowledge and resources that could enhance engagement and promote interactive learning. In today's educational landscape,

teachers must acquire the skills to design, analyze, synthesize, and utilize technology effectively while incorporating educational technologies to facilitate learning and materials analysis [26].

This implies that teachers are adapting to modern teaching practices, embracing online educational resources that enhance the effectiveness of teaching and learning. Such resources allow for differentiation and personalized learning, encourage inquiry and exploration, and make mathematics education more engaging. On the other hand, the limited use of educational online software and tools is likely due to insufficient ICT resources, which hinders effective implementation. In this era, where students should acquire skills relevant to the rapidly developing society, ICT tools play a pivotal role in effective teaching and learning [16].

5.1.4. Classroom management

Effective classroom management demands a diverse skill set, including establishing standards, regulating student behavior, and engaging students actively.

Table 5. Respondent's assessment of the numeracy instruction in terms of classroom management

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Praise students for their hard work and good behavior.	3.90	Highly utilized
2. Build positive relationships with students.	3.83	Highly utilized
3. Encourage student participation in class by asking questions, allowing for small group discussions, and creating opportunities for students to share their work.	3.73	Utilized
4. Communicate the expectations for behavior and academic performance clearly in math classes.	3.67	Highly utilized
5. Use technology tools such as online games, interactive whiteboards, and other digital resources to engage students in the learning process.	3.73	Highly utilized
Composite mean	3.63	Highly utilized

The data in **Table 5** illustrates the teacher's integration of technology, a practice that has become increasingly prevalent, as it captures students' attention and fosters engagement. This practice is substantiated by a study conducted by Mosca *et al.*, which underscores the importance of creating a technologically enhanced classroom environment to sustain student interest and concentration on the topic or concept being taught [26].

Additionally, the table indicates a high utilization of student-centered learning, where students are encouraged to take an active role in their learning through participatory teaching. Praises, rewards, and feedback are thoughtfully applied to prioritize students' emotional well-being. Addressing students' emotions is crucial as it boosts their confidence and enhances their learning. This aligns with Ciobanu's findings, which emphasized that student-centered learning involves an active learning style, integrating learning programs tailored to each student's unique learning pace [23].

The computed mean indicates that teachers prioritize student-centered teaching and learning, always placing students' welfare at the forefront. Rewards and feedback serve as vital tools that teachers employ to promote positive behavior and enhance student learning. As Ciobanu affirmed, involving the child as an active participant in their learning process requires engaged thinking and the activation of all intellectual functions [23].

This underscores that teachers employ a range of classroom management techniques to highlight strengths and areas requiring improvement. Sieberer-Nagler's research emphasized the importance of teacher knowledge in various areas, such as feedback, handling mistakes, questioning, and structured lessons. Motivation, humor,

and dedicated learning time also play significant roles in effective teaching [22].

5.1.5. Preparation of instructional materials

The preparation of instructional materials is vital in promoting active involvement, critical thinking, and alignment with learning objectives. These materials must be appropriate for the intended audience.

Table 6. Respondent's assessment of the numeracy instruction in terms of instructional materials preparation

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Select materials that are appropriate for the grade level and learning objectives (textbooks, workbooks, manipulatives, or digital resources).	3.73	Highly utilized
2. Develop a lesson plan that outlines the sequence of activities, the learning objectives, and the materials that will be used.	3.70	Highly utilized
3. Use visual aids such as diagrams, graphs, and charts to help illustrate mathematical concepts, and manipulatives such as blocks, counters, and geometric shapes can help students visualize and understand mathematical concepts.	3.40	Utilized
4. Create materials in different languages, providing accommodations for students with disabilities or adapting materials for gifted students.	2.77	Utilized
5. Incorporate technology tools such as calculators, spreadsheets, or educational apps to help students engage with math concepts.	2.37	Slightly utilized
Composite mean	3.19	Utilized

The data in **Table 6** reveals that some teachers make slight use of educational mathematical apps. This limited usage is due to resource constraints in some public schools, which result in insufficient learning materials. In contrast, some teachers effectively utilize Google apps, enabling students to engage in more critical thinking, collaborative activities, and the application of mathematical practices. This approach aligns with modern math classes that leverage technology to enhance the teaching and learning process [27].

Furthermore, authentic learning materials are embraced by some teachers as readily available resources. Creative teachers provide these materials, which benefit both teachers and students. Visual representations facilitate knowledge transfer, helping students visualize and understand mathematical concepts. Manipulatives, as outlined in **Table 6**, enhance conceptual comprehension by allowing students to bridge formal and informal techniques and connect tangible and abstract ideas [30,31].

Moreover, creating lesson plans serves as a teacher's guide for daily lesson execution. Textbooks, selected in formats appropriate for lessons or activities, provide one of the key sources of knowledge. The quality of instructional aids is crucial to instructional improvement, as highlighted by Chingos and West [28]. Effective teachers, as Danielson emphasized, understand their students' backgrounds, interests, and skills, enabling them to plan instruction effectively for all learners [17].

The composite mean in **Table 6** suggests that teachers employ a variety of instructional materials. However, the limited accessibility of some learning materials is attributed to financial constraints. Najumba's research supported the idea that well-equipped schools with relevant educational facilities, including instructional materials such as textbooks, libraries, and laboratories, tend to perform better in standardized examinations [32]. This underscores the importance of considering students' needs, aligning materials with learning objectives, and ensuring accessibility and appropriateness in material selection.

5.1.6. Preparation of assessment tools

The process of creating and developing tools or techniques to assess students' knowledge, skills, and abilities is referred to as the preparation of assessment tools. **Table 7** provides an overview of the data gathered in the context of the preparation of assessment tools.

Table 7. Respondent's assessment of the numeracy instruction in terms of assessment tools preparation

Item statement	Mean	Verbal interpretation
The school teachers...		
1. Select assessment tools that are appropriate for the grade level and learning objectives (tests, quizzes, projects, or performance tasks).	4.00	Highly utilized
2. Include a variety of question types in the assessment (multiple-choice, short answer, essay, and problem-solving questions).	3.70	Highly utilized
3. Consider the accessibility of the assessment for all students.	3.70	Utilized
4. Develop guidelines for scoring the assessment.	3.10	Highly utilized
5. Conduct pilot testing before administering the assessment to students with a small group of students to identify any issues with the assessment and make necessary revisions.	2.73	Utilized
Composite mean	3.44	Utilized

The table highlights that teachers employ a variety of assessment tools, a critical aspect of effective teaching. This practice aligns with Alquraan's emphasis on utilizing efficient assessment techniques that enhance learning, as they have a positive impact on students' achievement [33].

Moreover, the table illustrates that teachers make use of pilot testing and the development of scoring guidelines. These steps are essential to ensure that assessments cater to the diverse learning abilities of students and undergo necessary revisions to enhance reliability. Pilot testing plays an indispensable role in conducting large-scale surveys, ultimately bolstering the reliability, validity, and practicability of the questionnaire, as stated in the study by Wadood *et al.* [34].

The composite mean in **Table 7** indicates the importance of conducting reliability testing and making revisions as needed to cater to students' learning abilities. Additionally, modifying test questions ensures adaptability to different students, allowing teachers to assess students' acquired knowledge. Reliability, encompassing aspects like equivalent test forms, test-retest equivalency, and maintaining consistent test difficulty from year to year, ensures the quality and consistency of assessments [35].

This underscores the technical nature of assessing assessment tools' validity and reliability, extending beyond merely aligning test questions with state standards to address the specific needs and skills of students. Using appropriate assessment methods, in line with the grade level and learning objectives, allows teachers to effectively gauge student comprehension and provide feedback to enhance learning.

5.2. Issues in numeracy instruction encountered by teachers

Effective development of students' mathematical skills and conceptual knowledge is heavily reliant on numeracy instruction. Nevertheless, teachers often encounter various challenges when utilizing numeracy instruction.

5.2.1. Lack of content knowledge

The continuous development of math content knowledge is an ongoing process that requires a growth mindset,

receptiveness to new information, and an active pursuit of improved comprehension of mathematical concepts and effective teaching methods. A deficiency in subject understanding can impede students' academic progress.

Table 8. Issues of numeracy instruction in terms of lacking content knowledge

Issues in numeracy instruction	Teacher's experience
Lack of Content Knowledge	"Mastery of basic concepts in numbers, recognizing, and analyzing the concept of addition and subtraction"
	"Readiness of the students in acquiring numeracy skills"

Table 8 underscores the issues faced by teachers concerning content knowledge. Teachers often grapple with the challenge of nurturing students' numeracy skills. This challenge stems from a myriad of factors, particularly during the early stages of education. Mulwa's research highlights the difficulties students face when using mathematical terms and understanding their related concepts [37].

5.2.2. Insufficient resources and materials

Teachers rely on a wide array of resources and materials to support their instruction and address students' gaps in content knowledge. These resources are indispensable in making learning productive and meaningful. Insufficient materials can hinder students from receiving the quality education they deserve.

Table 9. Issues in numeracy instruction in terms of insufficient resources and materials

Issues in numeracy instruction	Teacher's experience
Insufficient resources and materials	"Lack of instructional materials that are appropriate in the level of learning of the students"
	"Failed to use different mathematical processes in modeling"
	"Unavailability of teacher resource materials that will serve as guide and basis for teaching"

Table 9 demonstrates the difficulties teachers encounter due to insufficient resources and materials. Teachers may face challenges accessing adequate materials, limiting their ability to engage students in interactive learning activities and hands-on learning experiences. Najumba's studies on school achievement revealed that schools equipped with sufficient resources such as textbooks, libraries, and laboratories consistently outperform those lacking such resources in standardized tests [33].

5.2.3. Inadequate Internet connection

In today's digital age, where technology plays a pivotal role in education, the availability of adequate Internet connectivity is crucial for effective teaching and learning. Inadequate Internet connections can significantly impact the learning process.

Table 10. Issues in numeracy instruction in terms of inadequate Internet connection

Issues in numeracy instruction	Teacher's experience
Inadequate Internet connection	"Cannot use e-games because of lack of internet connection"
	"Lack of technology tools"
	"Unstable Internet connection"
	"Failed to use technology tools such as online games and other digital resources"
	"Failed to incorporate technology tools as learning materials for students"

Table 10 illustrates the problems teachers experience due to inadequate Internet connections. Respondents have expressed their inability to utilize online games and other digital learning materials due to inadequate Internet access near their schools. While temporary solutions may alleviate the challenges stemming from poor Internet connections, a long-term commitment to improved infrastructure and connectivity is essential to ensure equal access to high-quality education. It is worth noting that adult literacy, as well as other forms of lifelong learning for adults, along with continuing education, are integral components of Internet-enabled education [13].

Addressing these challenges requires a multifaceted approach, including ongoing professional development, collaborative planning and reflection, access to high-quality materials, differentiated instruction, and the creation of a positive learning environment in schools. By tackling these issues, teachers can enhance their numeracy instruction and better support their students' mathematical learning.

6. Conclusions and recommendations

6.1. Conclusion

The study's key findings have led to the following conclusions:

(1) Elementary mathematics teachers exhibit effective management skills in numeracy instruction.
(2) The teachers demonstrate a strong command of knowledge content and employ pedagogical approaches that are well-suited to the diverse learning capacities of their students.
(3) The use of instructional materials, classroom management strategies, and assessment techniques varies significantly based on students' learning abilities.
(4) Insufficient Internet connectivity and limited access to learning materials have hampered the effective integration of technology into the teaching and learning processes.
(5) A numeracy management program can serve as a valuable tool for enhancing teachers' numeracy management skills.

6.2. Recommendations

Building upon the study's conclusions, the following recommendations are put forth:

(1) The proposed numeracy management program should serve as a foundation for the continuous enhancement of teacher's numeracy management skills.
(2) Elementary schools should consider implementing additional initiatives and support for mathematics teachers, focusing on improving their proficiency in managing numeracy instruction, particularly concerning ICT-related skills, preparation of instructional materials, content knowledge, and pedagogical approaches.
(3) Educational institutions should allocate adequate funding to support the integration of technology as a highly effective teaching tool.
(4) Similar sets of variables should be utilized in further research in other educational divisions to expand the understanding of educational management.

Disclosure statement

The author declares no conflict of interest.

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