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Common Challenges' Students Face When Learning Linear Equation

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ABSTRACT: Learning linear equation can be challenging for many students, especially those who are taking the MATATAG Curriculum. Its abstract nature makes it hard for them to connect concepts to real-life situations, which can lead to frustration and confusion. This study aims to identify the various difficulties that students face and how teachers can address these. The study's objective is to provide pragmatic suggestions that can enhance comprehension and teaching methods.

The goal of the study is to provide a comprehensive analysis of the various difficulties that students face when it comes to learning linear equations, a crucial part of their math curriculum. It will help teachers identify their students' struggles and develop effective teaching strategies. In addition to improving their confidence in math, the study also aims to boost the overall academic performance of the students.

The study looked into the difficulties that pupils encounter when they learn linear equations. Data was gathered through the use of a descriptive research design, which involved interviews with a sampling of 14 math teachers and three experienced math instructors. The qualitative insights were then analysed and used to develop the survey's quantitative phase. The data collected during the study was protected from unauthorized access and was handled with dignity and respect. A thematic analysis was then performed to identify the most common problems that students face while learning linear equations. According to the study, many students struggle with inequalities and linear equations due to their weak math foundations and how hard it is to visualize these concepts in real life. They also feel overwhelmed by the number of steps involved in solving problems and are intimidated by algebra. The other factors that can affect their learning of linear equations are the lack of understanding of symbols, variable relationships, and the methods used to solve them. These findings suggest that teachers should provide more explicit explanations and practice with real-world examples to improve the students' understanding of the concepts.

The results of the study revealed that many pupils encounter difficulties with linear equations due to their limited understanding of the subject and their inability to relate math concepts to real-world situations.

This is why it is important that teachers use effective teaching methods that are engaging and clear. Doing so can help pupils improve their confidence and knowledge of linear equations.

KEYWORDS: Abstraction, Challenge, Evaluation, Analysis, Strategies

I. INTRODUCTION

Background of the Study

Learning linear equations can be challenging for many students, especially those who are taking the MATATAG Curriculum. Its abstract nature makes it hard for them to connect concepts to real-life situations, which can lead to frustration and confusion (Smith, 2019).

This study aims to identify the various difficulties that students face and how teachers can address these. The study's objective is to provide pragmatic suggestions that can enhance comprehension and teaching methods. The study looked into the difficulties that pupils encounter when they learn linear equations. Data was gathered through the use of a descriptive research design, which involved interviews with a sampling of 14 math teachers and three experienced math instructors (Jones & Lee, 2021).

The qualitative insights were then analysed and used to develop the survey's quantitative phase. The data collected during the study was protected from unauthorized access and was handled with dignity and respect (Brown, 2020).

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A thematic analysis was then performed to identify the most common problems that students face while learning linear equations. According to the study, many students struggle with inequalities and linear equations due to their weak math foundations and how hard it is to visualize these concepts in real life (Carter & Green, 2022).

They also feel overwhelmed by the number of steps involved in solving problems and are intimidated by algebra (Harris, 2018). The other factors that can affect their learning of linear equations are the lack of understanding of symbols, variable relationships, and the methods used to solve them (O'Neill, 2020).

These findings suggest that teachers should provide more explicit explanations and practice with real-world examples to improve the students' understanding of the concepts (Davis, 2021).

The results of the study revealed that many pupils encounter difficulties with linear equations due to their limited understanding of the subject and their inability to relate math concepts to real-world situations (Riley, 2019).

This is why it is important that teachers use effective teaching methods that are engaging and clear (Walker & Hayes, 2021).

Doing so can help pupils improve their confidence and knowledge of linear equations. Learning math can be challenging for most students, especially those who are not fluent in the subject's linear equations (Singh, 2019).

In the MATATAG Curriculum, which is part of the Department of Education's comprehensive program for grades 8, students are introduced to several key competencies. These include the use of graphs and symbols to solve inequalities and linear equations, the understanding of systems of equations, and the application of linear inequalities to two variables (Department of Education, 2020).

Although these skills are crucial for building a strong algebra foundation, many learners struggle along the way (Brown & Wright, 2021). Some students find it hard to understand the rules and symbols used in the course, while others struggle when trying to apply what they've learned (Garcia, 2021).

In addition, learners may lose interest in the lessons when they become too fast-paced or abstract (Lee & Taylor, 2018). These difficulties can lead to gaps in their knowledge, which can affect their performance in other subjects (Stewart, 2019).

Besides these, teachers also face various challenges when it comes to delivering effective lessons. They have to adapt their methods to meet the varying needs of their students and the classroom (Adams, 2020).

They must make sure that everyone is engaged and that they are able to keep up with the material. To be more creative and flexible, teachers are required to follow the MATATAG Curriculum's emphasis on mastery and deeper understanding (Department of Education, 2020).

Given the various factors that affect the success of students, it is important that the teachers are aware of the various difficulties that they encounter when it comes to teaching the key competencies in the MATATAG curriculum (Smith, 2019). This study aims to provide a comprehensive analysis of the problems that can affect the learning of these skills. The findings of this study can help improve the teaching methods and provide better support to the students.

Theoretical Framework

The study features three learning theories that can explain how students tend to struggle with linear equations. One of the theories that explains how students tend to struggle with linear algebra is the theory of cognitive development, which states that children from 13 to 15 are developing an abstract thinking capacity (Piaget, 1972).

However, due to the use of graphs and symbols, some students may not be ready for this type of thinking (Miller, 2018). The Sociocultural Theory of Vygotsky is also related to this concept. According to him, students tend to learn best if they are supported by their peers and teachers. This is because proper guidance can help them develop their skills and avoid feeling frustrated or lost (Vygotsky, 1978).

The Meaningful Learning Theory by Ausubel states that students tend to understand concepts that are connected to their existing knowledge. If teachers fail to provide adequate support and guidance, they might not be able to help students grasp the lessons (Ausubel, 1968).

The learning theories presented in this study can help explain the various difficulties that students encounter when it comes to learning linear algebra. They also emphasize the importance of providing developmentally appropriate and well-supported instruction (Miller, 2018; Piaget, 1972).

Conceptual Framework

The study's goal is to explain how difficult it is to learn linear equations for most students, especially when the method used doesn't meet their needs. In the MATATAG Curriculum, students are introduced to various topics such as inequalities and linear equations. These topics are very important for developing their mathematical thinking skills (Department of Education, 2023). Unfortunately, many students can't grasp these concepts without the proper support and guidance. According to Phuntsho and

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Wangmo (2023), misconceptions about linear equations persist due to insufficient support systems, poor instructional delivery, and existing cognitive gaps.

Aside from the content itself, other factors such as the presentation and the use of learning materials can also contribute to the difficulties that students encounter when trying to learn linear algebra. Hafizah et al. (2025) emphasized that ineffective teaching methods and inappropriate instructional resources significantly hinder students' problem-solving abilities. This is because teaching methods that are not aligned with the learning styles of students might lead to poor performance (Quinio & Cuarto, 2023).

The goal of this study is to investigate the various factors that can contribute to the difficulties encountered by students and teachers when it comes to the learning of linear algebra. Through a combination of classroom observations, interviews, and comprehensive curriculum analysis, the researchers were able to gather insights into the various learning challenges that affect the students' progress. These insights are aligned with findings from Villanca (2023), who noted that transitions in learning modalities, insufficient student engagement, and lack of motivation further complicate students' grasp of algebraic concepts.

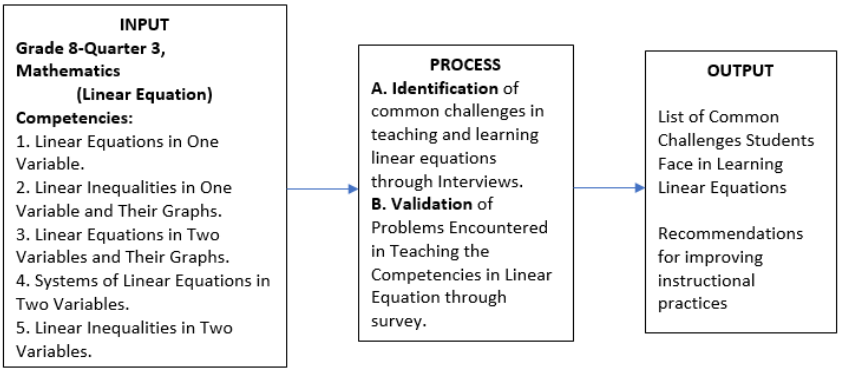

Figure I. Research Paradigm

The study uses an input-output framework to explore the various learning difficulties that students face when it comes to mastering linear equations in the third quarter of their mathematics studies. This topic is covered in the Department of Education's comprehensive curriculum entitled MATATAG, which emphasizes the development of foundational mathematical competencies (Department of Education, 2023). Core competencies in this subject include the use of linear equations in different variables, inequalities in various graphs, and systems of linear equations.

Research shows that students often struggle with linear equations due to conceptual misunderstandings, lack of prior knowledge, and ineffective instructional strategies (Phuntsho & Wangmo, 2023; Quinio & Cuarto, 2023). The study also looks into the difficulties educators face when teaching linear algebra in the classroom, especially when transitioning from abstract to practical applications (Hafizah et al., 2025). Through a combination of surveys and interviews, the researcher was able to collect data that will help in understanding the various factors that can contribute to the difficulties students encounter when learning linear algebra. According to Fruto et al. (2024), student engagement, clarity of instruction, and contextual learning are essential for improving performance in algebraic topics.

The researcher expects to come up with an output that clearly states the most common difficulties that students experience when trying to learn various types of linear equations. In addition, the study aims to offer actionable suggestions on how to improve teaching methods so that these topics become more accessible to students. These insights can also help educators develop effective teaching strategies that cater to diverse learners and promote deeper conceptual understanding (Villanca, 2023; Wired, 2016).

Statement of the Problem

The study focused on the Common Challenges Students Faced

when Learning Linear Equations

This study aims to answer the following questions:

1. What are the difficulties educators encounter teaching the competencies related to the linear equation

2. What is the Assessment of the surveyed Math Teachers on the common challenges' students faced when learning the Competencies?

1. linear equations in one variable?

2. linear inequalities in one variable and their graphs?

3. linear equations in two variables and their graphs?
4. systems of linear equations in two variables?
5. linear inequalities in two variables?

Hypothesis

Math teachers identify significant challenges students face in learning linear equations in the following competencies:

1. Linear equations in one variable
2. Linear inequalities in one variable and their graphs
3. Linear equations in two variables and their graphs
4. Systems of linear equations in two variables
5. Linear inequalities in two variables

The Importance of the study

The study is vital as it aims to pinpoint the difficulties that learners encounter when it comes to acquiring the skills related to linear equations, as it shapes the foundation for other math competencies and critical thinking. Grasping this concept can boost students' academic performance and confidence.

The study looked into the experiences of teachers and students, focusing on the difficulties that learners encounter when it comes to learning the required competencies related to linear algebra. The objective of the research is to provide helpful suggestions on how to make the learning process more accessible.

Scope and Limitations of the Study

Through the observations and experiences of teachers, the study revealed that the difficulties that students encounter when learning linear equations are common. It tackled key topics like linear inequalities in a variable, linear equations with two variables, linear inequalities with one variable, and linear equations with systems of two variables.

The study sought to identify the difficulties that pupils encounter when it came to comprehending these concepts. It was limited to math instructors who are actively teaching such topics.

Although the findings of the study provide valuable insight into the various difficulties that students face when it comes to learning linear equations, it does not provide a comprehensive view of the learning challenges. Also, the study was conducted in a specific school group, which means the results may not reflect the experiences of students in other educational institutions.

Also, the study only looked into the difficulties that students encounter when it came to learning the required competencies related to linear equations. It does not take into account other areas of mathematics. Also, the responses of the teachers may vary depending on the teaching methods and the environment.

Definition of Terms

Challenges – These refer to the issues that students encounter when it comes to comprehending the concepts of linear equations. These can range from problems with application to comprehension.

Linear Equations – This refers to algebra's first-degree linear equations. It can be used to describe various types of linear equations that are taught in junior high schools.

Linear Equations in One Variable – A type of linear equation that is composed of a single variable. It can be expressed in the form $ax + b = 0$.

Linear Inequalities in One Variable and Their Graphs – A linear inequality or inequality can be expressed as a type of mathematical representation that shows the relationship between a variable and another variable. It typically appears in graphs that are arranged in a sequence.

Linear Equations in Two Variables and Their Graphs – These equations are usually expressed in terms of $ax + by = c$. Their solutions can be represented as straight lines on the Cartesian plane.

Systems of Linear Equations in Two Variables – A set of linear equations with two identical variables. The solutions of these systems can be obtained by using various methods such as elimination, graphing, or substitution.

Linear Inequalities in Two Variables – The inequality between two variables is referred to as a linear inequality. It can be expressed by either expressing it in terms of $ax + by < c$ or $ax + by \geq c$, and its solutions can be seen as shaded regions on a plane.

Mathematics Competencies – These are the specific knowledge, skills, and goals that learners should have in order to excel in the study of linear equations.

Assessment – In this study, the assessment is a judgment or evaluation made by a mathematics teacher regarding the extent of the difficulties that students experience when it comes to learning the identified mathematics competencies.

Math Teachers – These individuals are responsible for instructing junior high school students. They are also participating in the study and providing their observations based on their experiences.

Review of Literature

The findings of this study support the assertions made by Wangmo and Phuntsho (2023), who claimed that a lack of teacher training and students' misconceptions are among the major barriers preventing effective learning of linear equations. In the present study, learners similarly struggled with multi-step equations and grasping foundational concepts. These difficulties are further exacerbated by students' inability to relate mathematical content to real-world contexts, as the abstract nature of the subject becomes more challenging to internalize.

Cuarto and Quinio (2023) also observed that students frequently encounter conceptual misunderstandings and procedural errors, particularly in the incorrect application of formulas. This aligns with the present findings, where students had difficulty distinguishing between inequality symbols and linear equations, as well as comprehending variable relationships in systems of equations. Additionally, the study revealed that learners often misinterpret inequality symbols and lack an understanding of graphical solutions or ranges. As a result, Cuarto and Quinio advocated for more engaging and structured lessons to help bridge these gaps.

The work of Hafizah et al. (2025) is also relevant, as it highlights the difficulties students face in terms of time management and problem-solving skills during assessments. Their study found that students struggled to choose the appropriate method for solving linear equations and graphing solutions. According to Hafizah et al., these challenges indicate not only a lack of conceptual understanding but also a need for more effective strategies when approaching problem-solving tasks.

Furthermore, studies by Villanca and Fruto (2025) provided valuable insights into student motivation and engagement. Their findings suggested that the transition to hybrid and online learning environments had negatively impacted students' academic performance. According to their research, these environmental factors likely contributed to the struggles students face when dealing with abstract concepts, multi-step equations, and graphing activities. Fruto and Villanca emphasized the importance of consistent instruction and active learning to support student understanding.

The present study's findings also resonate with themes emphasized in the Common Core's focus on conceptual understanding, particularly the challenge students face when connecting mathematical lessons to real-life situations (Common Core State Standards Initiative, 2010). These insights reinforce the importance of contextualizing mathematical concepts to make them more accessible and meaningful.

Overall, the findings underline the need for a comprehensive approach to addressing the learning difficulties related to linear equations. This includes the development of more effective instructional strategies, the integration of real-world applications, and the continuous professional development of teachers.

II. METHODOLOGY

Research Design

The study, which utilized a qualitative research approach, looked into the difficulties that students faced when it came to learning linear equations, which were observed by math teachers. The descriptive design allowed the researchers to collect data about what teachers experienced in their classrooms, which would allow them to gain a deeper understanding of their students' struggles.

The researchers conducted interviews with a number of math instructors to gather their thoughts on the difficulties that their students encountered when it came to mastering key algebra topics, including inequalities and linear equations.

Through the use of surveys and interviews, the researchers were able to gather data that highlighted the most common obstacles that students face when it comes learning linear equations, as well as the effects of teaching methods on their understanding. The descriptive approach helped the researchers provide a more accurate picture of the problems that they encountered, which could lead to improvements in the instruction of mathematics.

Population and Locale of the Study

The researcher conducted an interview with Math Teachers in the Abra State Institute of Sciences and Technology and reaches its saturation level after interviewing 3 respondents. The data was transcript from the audio recording and Thematic analysis was used to identify patterns in the interview data.

The population for the Validation of Problems Encountered in Teaching the Competencies (challenges students may face when learning Linear Equations) are 14 teachers coming from the following schools: 9 from Abra High School, 4 from the Abra State Institute of Sciences and Technology, and 1 from the Abra Valley Colleges.

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Teachers with Experienced Teaching Linear Equation

School	*Math Teacher*
Abra State Institute of Science and Technology	4
Abra High School	9
Abra Valley Colleges	1
TOTAL	14

Data Gathering Procedure

The data collected during the study pertains to the difficulties that students encounter when it comes to learning linear equations. The interviews were conducted with three ASIST math instructors.

1. Qualitative Phase- The investigation was conducted on the experiences of a particular instructor who taught linear equations at the secondary and tertiary levels. Data was gathered through in-person and online interviews, and the participant was asked to give consent for the transcribed answers.

The researcher stopped collecting data after reaching the saturation point, as no new insights or information were found in the responses. The researcher then looked for recurring themes and difficulties in the data, focusing more on the students' issues and the strategies they used.

A report with recommendations was produced after analysing the findings, and a follow-up questionnaire was also created based on the submitted information.

2. Quantitative phase-To validate the common problems students face in learning linear equations, the researcher conducted a survey involving 14 mathematics teachers who have experience teaching the topic. These teachers came from three different schools: nine from Abra High School, four from the Abra State Institute of Sciences and Technology (ASIST), and one from Abra Valley Colleges. The survey questionnaire was carefully developed based on the themes gathered from earlier interviews with selected math teachers. It aimed to assess the challenges students encounter when learning the different competencies under linear equations. The researcher personally distributed the questionnaires to the participants or sent them electronically, depending on what was more convenient for each teacher. Participants were given enough time to answer the survey at their own pace. Their responses were treated with confidentiality and used solely for the purpose of the study. The information collected helped the researcher identify the most common learning difficulties students face, as observed and experienced by their teachers.

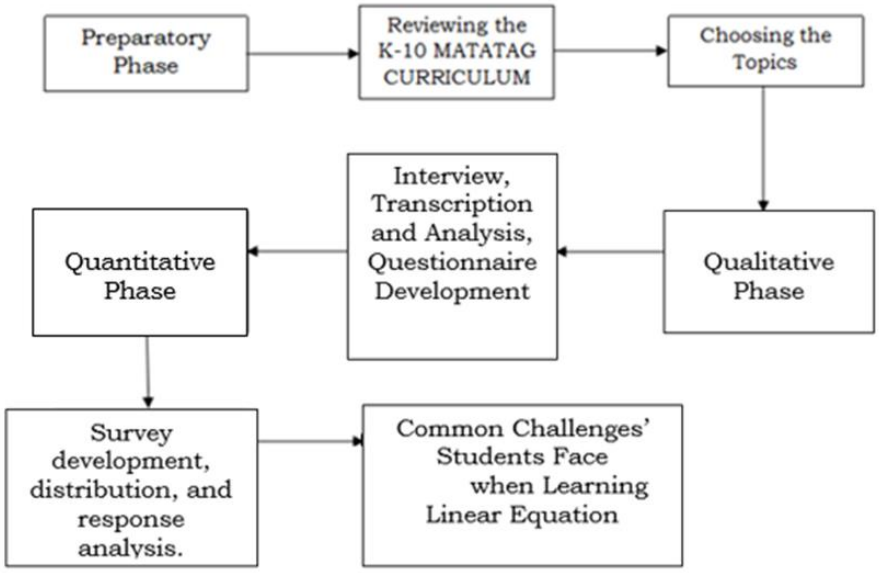

Figure II: Data Gathering Flowchart

Research Instrument

The qualitative part of the study focused on the difficulties that students faced when learning linear equations. Using an interview guide, the participant was able to share insights on various teaching strategies, challenges, and misconceptions encountered in class. The use of a semi-structured approach allowed the researcher to explore the participant's deeper insights while ensuring that the key topics were covered. This method also created a conducive environment for the participant, and

audio-recorded interviews were used to ensure that the data was accurately transcribed and analyzed. The researcher then conducted a thematic analysis of the findings, drawing on expertise in mathematics education.

The results of the interviews guided the creation of the questionnaire for the quantitative phase, ensuring that it reflected the themes that emerged from the qualitative data. The questionnaire covered key topics such as inequalities and linear equations. It included an open-ended section for educators to provide additional feedback and was thoroughly reviewed before being distributed. Statistical tools were then used by the researcher to interpret and condense the collected information.

1. Thematic analysis allowed the researcher to systematically identify, analyze, and interpret patterns or recurring themes within the transcribed responses.

2. Mean described the level of assessment of the surveyed math teachers on the Common Challenges' Students Face when Learning Linear Equation.

Data Categorization

The level of assessment of the design workbook employed the following Criteria and the corresponding option:

Range	Description Rating
4.20 - 5.00	5 - Always (A)
3.40 - 4.19	4 - Often (O)
2.60 - 3.39	3 – Sometimes (ST)
1.80 - 2.59	2 – Seldom (S)
1.00 – 1.79	1 – Never (N)

Ethical Considerations

The goal of the study was to provide a comprehensive analysis of the difficulties that students encounter when trying to learn linear equations. To ensure that they are fully aware of the study's scope and purpose, the participants were informed of its voluntary nature and were asked to provide written or verbal consent.

The data collected during the study will be protected from unauthorized access and use. Only the information that was gathered will be used for the analysis, and it will not be shared with other parties.

The study is conducted entirely on a voluntary basis, and the participants are free to opt out at any point without repercussions. They will be notified of their right to do so.

The researchers will ensure that the participation of all eligible teachers is fair. In addition, they will not discriminate based on their school affiliation or personal characteristics.

The results of the study will be presented transparently and honestly. The data will be reported and analysed in a way that is both transparent and honest. The conclusions will be drawn from the available evidence without any manipulation.

III. RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of the gathered data on the development and validation of workbook in teaching grade 8 students in linear equation.

The presentation, analysis and interpretation of data consist of; the common challenges students may face when learning Linear Equations that is observed by teachers, and validation results of the group of evaluators in terms of content and instructional characteristics of the developed workbook. The content characteristics were evaluated in terms of workbook's, objectives, clarity and relevance while on instructional characteristic was evaluated in terms of design, suitability, and task/activities.

Table I outlines the difficulties students often experience when learning linear equations in one variable. Many come to class without a solid understanding of basic math concepts, which makes it hard for them to keep up—especially when equations involve multiple steps, fractions, or decimals. Some students also feel anxious or unmotivated, viewing math as too hard or unrelatable. Because the spiral curriculum revisits topics before students fully grasp them, this can lead to even more confusion, leaving them overwhelmed and unsure of how to move forward.

For linear inequalities in one variable, students often mix up inequality symbols and fail to distinguish between strict and inclusive types. Many expect a single solution, so understanding ranges or graphing solutions becomes confusing. They also find it hard to relate inequalities to real-life situations, making the topic seem abstract and unrelatable.

When dealing with linear equations in two variables, students find methods like substitution and elimination confusing, especially without enough practice. They struggle with understanding slopes, graphing lines, and switching between equation

forms. A weak grasp of dependent and independent variables adds to their difficulties, and without real-world connections, interest remains low.

In systems of linear equations, students often don't know which method to use and make mistakes in solving due to unclear steps and weak basics. They also have trouble interpreting graphical solutions and get confused with related math symbols. Many find it hard to apply these concepts in practical contexts.

Finally, with linear inequalities in two variables, students struggle with graphing—especially in choosing between dashed or solid lines and shading the correct region. They often misinterpret inequality symbols and don't understand that these represent a range of solutions. Without real-life examples, these concepts feel even more difficult to grasp.

Table 1-a shows that math teachers often observe common challenges students face when learning linear equations in one variable, with an overall mean rating of 3.96. The most frequent issue was students feeling intimidated by algebra or hesitant to participate (mean = 4.21), followed closely by struggles with solving multi-step equations involving operations like distribution and handling fractions or decimals (mean = 4.14). Teachers also noted difficulties in interpreting equations and applying inverse operations (mean = 3.93), as well as a general lack of interest or failure to see real-world relevance (mean = 3.86). Lastly, students' lack of prerequisite knowledge, such as operations with integers and basic equation solving, was observed with a mean of 3.64, indicating the need to reinforce foundational math skills.

Table 1-b shows that math teachers often observe students struggling with linear inequalities in one variable. The biggest challenge, rated 4.36, was students finding graphing unengaging or hard to connect to real life. Other frequent issues included confusion with inequality symbols (4.07), difficulty telling apart strict and inclusive inequalities (4.14), trouble understanding infinite solutions (4.00), and shading number lines correctly (4.07). With an overall mean of 4.13, these challenges clearly need more attention in teaching.

Table 1-c highlights the challenges math teachers notice when students are learning linear equations in two variables. The biggest struggle, with a mean of 4.43, was understanding the roles of dependent (y) and independent (x) variables. Students also had difficulty switching between different forms of linear equations (4.29). Other common issues included accurately plotting points (3.93), confusing different types of slopes (3.57), and not seeing the real-world relevance of linear equations (4.07). With an overall mean of 4.06, these challenges appear regularly, suggesting that clearer explanations and more practical examples are needed.

Table 1-d shows the challenges students face when learning systems of linear equations in two variables, based on teachers' assessments. The biggest struggle, with a mean of 4.36, was students having trouble selecting the right method or mixing up the steps. Many also found substitution tricky, especially with fractions, or struggled with elimination when the coefficients didn't match (4.14). Other issues included not understanding the different types of solutions (3.93), lacking fluency due to not enough practice (4.21), and finding the problems tedious or hard to relate to real life (4.00). With an overall mean of 4.13, these challenges occur frequently, indicating that more practice and clearer real-life examples could help students.

Table 1-e highlights the common challenges students face when learning linear inequalities in two variables, according to math teachers. The most significant difficulties, with scores of 4.36 and 4.29, were shading the correct regions and understanding that inequalities represent a range of solutions rather than just a single point. Students also struggled with treating inequality symbols like equal signs (3.71) and mixing up strict and inclusive inequalities. Other challenges included identifying overlapping solution regions when graphing multiple inequalities (4.21) and rearranging inequalities into slope-intercept form (4.21). With an overall score of 4.16, these issues are frequent but considered manageable, suggesting the need for more focused teaching and practice.

Discussion as a Whole

The results show that students often struggle with linear equations and inequalities, with ratings above 4.00 indicating frequent challenges. In Table 1a, issues like feeling intimidated by algebra (mean = 4.21) and difficulty with multi-step equations (mean = 4.14) suggest the need for more engaging lessons and better reinforcement of foundational skills. Additionally, students often fail to see the real-world relevance of equations (mean = 3.86), which points to the importance of making math more relatable and applicable to daily life.

In Table 1b, students face difficulties with graphing linear inequalities (mean = 4.36) and often confuse inequality symbols (mean = 4.07), showing a need for clearer explanations and more hands-on practice. Table 1c highlights struggles with understanding the roles of dependent and independent variables (mean = 4.43) and switching between equation forms (mean = 4.29), suggesting that more practical examples and better conceptual clarity are essential. These findings underline the importance of making abstract concepts more tangible and understandable.

Lastly, Table 1d and Table 1e show that students struggle with selecting the right method for solving systems of equations (mean = 4.36) and have difficulty graphing inequalities or understanding that they represent a range of solutions (mean = 4.36 and

4.29). These challenges indicate that more practice, especially with real-life problems, and clearer instruction are necessary to improve student comprehension. Overall, these findings suggest that improving teaching strategies, offering more opportunities for practice, and connecting lessons to everyday situations will help students grasp these topics more effectively.

IV.TABLE

Result of Interview (Problems Encountered in Teaching the Competencies in Linear Equation)

Table I. Challenges on the following Competencies on Linear Equations.

Topics	Thematic Statement
A. Linear Equations in One Variable	Weak Foundational Skills Teachers shared that many students come into class without a strong grasp of basic skills, especially in arithmetic operations and algebraic manipulation. This lack of foundation makes it tough for them to follow new lessons. Difficulty Interpreting and Solving Equations Students often struggle to make sense of linear equations. They get stuck when the problems involve several steps, fractions, or decimals, making the process confusing and frustrating for them. Low Motivation and Interest Some teachers observed that students aren't always motivated to learn math. Many see it as a difficult subject, which makes them lose interest even before trying to engage with the lesson. Curricular Structure and Instructional Challenges One teacher mentioned that the spiral curriculum might be adding to the confusion. Since topics are revisited without full mastery, students can feel overwhelmed and unsure about what they're supposed to understand. Confidence and Anxiety Issues It was also noted that students often lack confidence in their abilities. This can lead to anxiety, especially during problem-solving activities, which affects how they perform in class. Challenges Students lacked prerequisite knowledge (e.g., operations on integers, fractions, and solving basic equations). Students struggled to interpret equations, identify variables, and apply inverse operations correctly. Students felt intimidated by algebra or hesitated to participate in solving equations. Students found the topic uninteresting or failed to see its real-world applications. Students struggled to solve equations that involved multiple operations, such as distributing, combining like terms, or handling fractions and decimals.
B. Linear Inequalities in One Variable and Their Graphs	Confusion with Inequality Symbols All participants pointed out that many students get confused with the inequality symbols—often mixing up greater than, less than, and their inclusive counterparts. This basic

	confusion makes it hard for them to even start solving problems correctly. Difficulty Distinguishing Strict and Inclusive Inequalities Students also struggle to understand the difference between strict (<, >) and inclusive (≤, ≥) inequalities, which affects both how they solve and how they graph the solutions. Misunderstanding Infinite Solution Sets Several students expect only one answer—just like in equations. So when it comes to infinite solution sets, they find it hard to grasp the concept of ranges of values being correct solutions. Problems with Graphing on the Number Line Students often struggle with shading the correct region on the number line or identifying the boundary points correctly. This shows a disconnect between solving the inequality and visually representing it. Difficulty Relating to Real-Life Context Some students can't see how these abstract math ideas apply outside the classroom. They have a hard time connecting the concept of inequalities to real-world situations, which makes the topic feel even more confusing and unrelatable. Challenges Students lacked prerequisite knowledge (e.g., operations on integers, fractions, and solving basic equations). Students struggled to interpret equations, identify variables, and apply inverse operations correctly. Students felt intimidated by algebra or hesitated to participate in solving equations. Students found the topic uninteresting or failed to see its real-world applications. Students struggled to solve equations that involved multiple operations, such as distributing, combining like terms, or handling fractions and decimals.
C. Linear Equations in Two Variables and Their Graphs	Confusion with Methods Students often struggle with methods like substitution and elimination when solving systems of linear equations. This confusion, along with a lack of practice, makes it harder for them to fully understand the solutions. Difficulty Understanding Dependent and Independent Variables Some students face challenges distinguishing between dependent and independent variables, which leads to confusion when setting up and solving equations. Issues with Plotting and Graphing Another common problem is difficulty plotting points accurately and drawing precise lines on the graph. This can also extend to confusion about what the graph is showing—whether it's a rising line, falling line, or even horizontal or vertical lines. Struggles with Slopes and Equation Forms Many students misunderstand the concept of slope, not

	fully grasping the meaning behind positive, negative, zero, or undefined slopes. Additionally, they often struggle switching between different equation forms, like standard form and slope-intercept form, and fail to understand why these forms are useful. Lack of Real-World Connections Finally, students often find it hard to connect the topic to real-world applications, which further reduces their motivation and understanding. Challenges Students struggled to grasp the concept of dependent (y) and independent (x) variables. Students struggled with plotting points accurately and drawing straight lines. Students often confused positive, negative, zero, and undefined slopes. Students had difficulty switching between different forms of linear equations. Students did not see the relevance of linear equations in daily life.
D. Systems of Linear Equations in Two Variables	Difficulty in Identifying and Applying Appropriate Methods Students often struggle to determine which method (graphing, substitution, or elimination) to use when solving systems of linear equations in two variables, leading to confusion and errors in their work. Challenges with Basic Mathematical Procedures Students face difficulties in following the correct steps, such as isolating variables in substitution and multiplying equations in elimination, due to lack of foundational understanding and inadequate practice. Confusion in Interpreting and Visualizing Solutions: A common challenge is the inability to understand the significance of the solution, particularly when interpreting the graphical meaning of intersecting, parallel, or coincident lines in the context of real-life problems. Mixing Up Mathematical Concepts Students often confuse different mathematical symbols and concepts, such as inequality symbols and solution ranges, which complicates their ability to solve linear inequalities and systems of equations. Struggles with Real-Life Application Many students have difficulty relating the mathematical concepts of systems of linear equations to real-world scenarios, making it harder for them to see the relevance and practical applications of what they are learning. Challenges Students struggled to choose the appropriate method or mixed up steps. Students found substitution complicated when dealing with fractions or struggled with elimination when coefficients didn't

	match. Students did not understand the meaning of different types of solutions. Students lacked fluency in solving systems because of insufficient practice. Students found solving systems tedious or difficult to relate to real-life situations.
E. linear inequalities in two variables	Confusion in Graphing Techniques Students struggle with understanding the differences between graphing linear equations and linear inequalities, particularly in determining whether to use solid or dashed lines and how to properly shade the correct regions. Challenges with Understanding Inequality Symbols and Boundary Conditions Many students have difficulty interpreting the meaning of inequality symbols (e.g., "≤" or ">") and understanding whether the boundary should be included in the solution, leading to errors in graphing. Difficulty in Shading the Correct Region Students often have trouble identifying which side of the boundary line to shade, especially when the inequality is in standard form, resulting in incorrect graphs and solutions. Problems with Using Test Points Some students struggle with using test points to verify whether a point satisfies the inequality, which leads to confusion and mistakes in determining the correct solution region. Challenges Students struggled with shading the correct region and distinguishing between dashed and solid boundary lines. Students did not understand why inequalities represented a range of solutions rather than a single point. Students treated inequality symbols like equal signs or mixed up strict and inclusive inequalities. Students struggled with identifying overlapping solution regions when graphing multiple inequalities. Students struggled with rearranging inequalities into slope-intercept form (y = mx + b).

Common Challenges' Students Face When Learning Linear Equation

Validation of Problems Encountered in Teaching the Competencies in Linear Equation

Table 1-a. Assessment of the surveyed math teachers on the common challenges' students may face when learning linear equations in one variable.

No.	Indicators	Mean	DR
1.	Students lacked prerequisite knowledge (e.g., operations on integers, fractions, and solving basic equations).	3.64	O
2.	Students struggled to interpret equations, identify variables, and apply inverse operations correctly.	3.93	O
3.	Students felt intimidated by algebra or hesitated to participate in solving equations.	4.21	A
4.	Students found the topic uninteresting or failed to see its real-world applications.	3.86	O
5.	Students struggled to solve equations that involved multiple operations, such as distributing, combining like terms, or handling fractions and decimals.	4.14	O
	Overall Mean	3.96	O

Legend: (3.40 – 4.19) Often

Table 1-b. Assessment of the surveyed math teachers on the common challenges' students may face when learning linear inequalities in one variable and their graphs.

No.	Indicators	Mean	DR
1.	Students mixed up inequality symbols (<, >, ≤, ≥) and treated them like equal signs.	4.07	O
2.	Students struggled to understand the difference between strict inequalities (<, >) and inclusive inequalities (≤, ≥).	4.14	O
3.	Students had difficulty understanding infinite solution sets and why inequalities did not have a single number as an answer.	4.00	O
4.	Students struggled with correctly shading solution sets on a number line.	4.07	O
5.	Students found graphing inequalities dull or struggled to connect it to real life.	4.36	A
	Overall Mean	4.13	O

Legend: (3.40 – 4.19) Often

Table 1-c. Assessment of the surveyed math teachers on the common challenges' students may face when learning linear equations in two variables and their graphs.

No.	Indicators	Mean	DR
1.	Students struggled to grasp the concept of dependent (y) and independent (x) variables.	4.43	A
2.	Students struggled with plotting points accurately and drawing straight lines.	3.93	O
3.	Students often confused positive, negative, zero, and undefined slopes.	3.57	O
4.	Students had difficulty switching between different forms of linear equations.	4.29	A
5.	Students did not see the relevance of linear equations in daily life.	4.07	O
	Overall Mean	4.06	O

Legend: (3.40 – 4.19) Often

Common Challenges' Students Face When Learning Linear Equation

Table 1-d. Assessment of the surveyed math teachers on the common challenges' students may face when learning systems of linear equations in two variables.

No.	Indicators	Mean	DR
1.	Students struggled to choose the appropriate method or mixed up steps.	4.36	A
2.	Students found substitution complicated when dealing with fractions or struggled with elimination when coefficients didn't match.	4.14	O
3.	Students did not understand the meaning of different types of solutions.	3.93	O
4.	Students lacked fluency in solving systems because of insufficient practice.	4.21	A
5.	Students found solving systems tedious or difficult to relate to real-life situations.	4.00	O
	Overall Mean	4.13	O

Legend: (3.40 – 4.19) Often (4.20 – 5.0) Always

Table 1-e Assessment of the surveyed math teachers on the common challenges' students may face when learning linear inequalities in two variables.

No.	Indicators	Mean	DR
1.	Students struggled with shading the correct region and distinguishing between dashed and solid boundary lines.	4.36	A
2.	Students did not understand why inequalities represented a range of solutions rather than a single point.	4.29	A
3.	Students treated inequality symbols like equal signs or mixed up strict and inclusive inequalities.	3.71	0
4.	Students struggled with identifying overlapping solution regions when graphing multiple inequalities.	4.21	A
5.	Students struggled with rearranging inequalities into slope-intercept form (y = mx + b).	4.21	A
	Overall Mean	4.16	O

Legend: (3.40 – 4.19) Often (4.20 – 5.0) Always

V. CONCLUSIONS

1. What are the difficulties educators encounter teaching the competencies related to the linear equation?

Many students struggle with linear equations and inequalities because of weak foundational skills, confusion with math symbols, and a lack of real-life connections. These challenges often leave them feeling overwhelmed, frustrated, or unmotivated. The fast pace of the curriculum and limited opportunities for practice make it even harder for them to fully grasp key concepts. To support their learning, it's important to provide clearer explanations, connect lessons to real-world situations, and give them time to build both confidence and understanding.

2. What is the Assessment of the surveyed Math Teachers on the common challenges' students faced when learning the Competencies?

The findings reveal that many students consistently struggle with linear equations and inequalities, with ratings above 4.00 across different areas. They often face challenges in solving multi-step problems, understanding variables, graphing accurately, and distinguishing between important math symbols. These struggles are made harder when lessons feel disconnected from real life or when basic math foundations are weak. To help students better grasp these concepts, teachers need to focus on strengthening essential skills, using clearer explanations, and making lessons more relatable and practical.

RECOMMENDATIONS

1. Strengthen Basic Skills:

Common Challenges' Students Face When Learning Linear Equation

Start by focusing on building up students' foundational knowledge in areas like fractions and basic math operations. This will help them feel more confident when tackling linear equations.

2. Connect Math to Everyday Life:

To make lessons more engaging, try showing students how linear equations apply to real-world situations. This can help them see the relevance of math beyond the classroom.

3. Simplify Math Symbols and Concepts:

Break down complex symbols and equations with clear explanations and visual aids. This will make abstract ideas easier for students to understand.

4. Use Hands-On Learning Tools:

Incorporating interactive elements, like graphs and activities, can help students grasp difficult concepts and make learning more engaging.

5. Develop and Test a Workbook:

Create a workbook filled with easy-to-follow steps and real-life examples. Testing it in class will help you see if it truly supports student learning.

6. Provide More Practice Opportunities:

Give students plenty of practice through worksheets, group activities, and problem-solving exercises. Repetition will help solidify their understanding.

7. Cater to Different Learning Styles:

Recognize that every student learns differently. Offering a mix of teaching methods can help meet diverse learning needs.

8. Create a Supportive Classroom Environment:

Encourage a classroom atmosphere where students feel comfortable asking questions, making mistakes, and learning from them.

9. Foster Teacher Collaboration:

Teachers should collaborate and share ideas to refine their teaching methods and learn from each other's experiences.

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