USING WORDS IN SOLVING MATHEMATICAL PROBLEMS FOR DEVELOPING GRADE-2 STUDENTS'MATHEMATICAL COMMUNICATION COMPETENCY

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Abstract

The development of mathematical communication competency for primary school students plays a very important role. The reality shows that grade-2 students face a lot of difficulties when solving Maths problems with words because their thinking is still limited to understand the words in the problems to express themselves. Those are problems of mathematics communication among grade-2 students. The article presents the current mathematical communication competency situation and suggests some development measures using mathematical problems using words.

Keywords: *Problems with words, mathematics communication competency, competency development, grade-2.*

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KHAI THÁC BÀI TOÁN CÓ LỜI VĂN GÓP PHẦN PHÁT TRIỂN NĂNG LỰC GIAO TIẾP TOÁN HỌC CHO HỌC SINH LỚP 2

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Tóm tắt

Việc phát triển năng lực giao tiếp toán học cho học sinh tiểu học đóng vai trò rất quan trọng. Trong thực tế cho thấy học sinh lớp 2 gặp rất nhiều khó khăn khi giải toán có lời văn bởi tư duy của các em còn nhiều hạn chế, khả năng hiểu các ngôn từ trong đề bài và khả năng diễn đạt, trình bày các ý tưởng toán học có nhiều trở ngại. Đó là những vấn đề thuộc về giao tiếp toán học. Bài viết đề cập thực trạng phát triển năng lực giao tiếp toán học để từ đó đưa ra một số biện pháp phát triển thông qua bài toán có lời văn.

Từ khóa: *Bài toán có lời văn, năng lực giao tiếp toán học, phát triển năng lực, lớp 2.*

1. Introduction

Primary school Mathematics is extremely important as it provides knowledge and develops necessary capabilities related to mathematics, including mathematical communication capabilities, for students. In the 2018 Vietnam General Education Mathematics Curriculum for Primary School, word problems play an important role as they are contents that span from grade-1 to grade-5. However, in reality, when solving word problems, students face many difficulties such as reading and understanding problem terms, not knowing how to express themselves, converting between natural language and mathematics, and analyzing the relationships between data in order to think of ways to solve problems. Grade-2 students are a suitable target group as it is not too early or too late for fostering their mathematical communication skills. This article proposes some measures to develop mathematical communication skills for grade-2 students through exploiting word problems.

2. Research content

2.1. Overview of communication capabilities, mathematical communication capabilities

2.1.1. Communication capabilities

There have been many studies on communication capabilities. American social scientist Dell Hymes (1960) was the first to mention the concept of "communication capabilities". He believed that communication capabilities are not just innate grammatical capabilities but the capabilities to use language in diverse communicative situations (Ministry of Education and Training, 2018). We agree that communication capabilities refer to the ability to clearly use language tools or body language to express one's thoughts, views, emotions, and desires in an appropriate manner based on specific contexts and situations.

2.1.2. Mathematical communication capabilities

According to the PISA definition, mathematical communication capabilities refer to "the ability to understand mathematical problems through communication via writing, speaking, or others' graphics, and the ability to express one's mathematical views in different ways" (Hà, 2021). Vu (2016) believes that "Mathematical communication is the communication that occurs between teachers-students and students-students in the teaching and learning of Mathematics, a process that uses mathematical language as an important and main tool for receiving, transmitting mathematical ideas, knowledge, making arguments, proofs, solving problems to achieve learning objectives of mathematics" (Vu, 2016).

Ministry of Education and Training (2018) clearly states the specific manifestations of mathematical communication capabilities through listening, reading and recording necessary mathematical information presented in mathematical texts or spoken or written by others; using mathematical language combined with natural language to express mathematical contents; presenting mathematical contents and ideas in interaction with others.

Ministry of Education and Training (2018) also outlines the requirements for mathematical communication capabilities that primary school students need to achieve, specifically:- Being able to present and express (speak or write) mathematical contents, ideas, solutions in interaction with others (with appropriate requirements for completeness, accuracy).

- Being able to effectively use mathematical language (numbers, letters, symbols, diagrams, graphs, logical connections, etc.) combined with common language or body language when presenting, explaining and evaluating mathematical ideas in interaction (discussion, debate) with others.

- Being able to confidently present, express, raise questions, discuss, debate mathematical contents and ideas.

The specific manifestations of mathematical communication capabilities for primary education are shown as follows (see Table 1):

Table 1. Specific manifestations of mathematical communication capacity at elementary school level

STT	Capacity components	Primary
1	Listen, understand, read, and record essential mathematical information presented in mathematical text or spoken or written by others.	Listen, read, understand and take notes (summarize) the key mathematical information in the text or reported by others (at a simple level), thereby identifying the problem that needs to be solved.
2	Present and express (oral or written) mathematical content, ideas, and solutions in interaction with others (with appropriate requirements for completeness and accuracy).	Present and express (speaking or writing) mathematical content, ideas, and solutions in interaction with others (not required to express fully and accurately). Ask and answer questions when reasoning and solving problems.
3	Can effectively use mathematical language (numbers, letters, symbols, charts, graphs, logical connections, etc.) combined with common language or physical movements when presenting, explaining and evaluate mathematical ideas in interaction (discussion, debate) with others.	Use mathematical language combined with ordinary language and physical movements to express mathematical content in simple situations.
4	Demonstrate confidence when presenting, expressing, asking questions, discussing, and debating content and ideas related to mathematics.	Demonstrate confidence when answering questions, presenting, and discussing mathematical content in simple situations.

2.2. Problem-solving with Verbal Context

2.2.1. At the Primary School Level

In the 2018 elementary school Mathematics curriculum, problem-solving with verbal context plays a significant role and is integrated throughout grades 1 to 5. Although it does not explicitly specify "word problems" as a dedicated learning topic, as was the case in the 2006 education program, the format of solving problems with verbal context still holds an important position in the elementary school Mathematics curriculum. This is because this content thread contributes to the systematization and reinforcement of knowledge about natural numbers, fractions, quantities and measurement, geometric elements, statistics, and the four arithmetic operations (+, -, ×, ÷) using the previously learned numbers as a foundation for progressing to grade 6 and laying the groundwork for further education at higher levels. It helps students sharpen and consolidate their calculation skills, recognize quantity relationships, spatial shapes, and fosters interest in learning, as well as the development of intellectual qualities, contributing to the development of intelligence, independent thinking, flexibility, and creativity (Đặng, 2021).

The content of problem-solving with verbal context is intertwined with geometry content (area, perimeter of squares, rectangles, etc.) and measurement units to align with the program's objectives. Word problems demonstrate the correlation and interdependence of various issues, showing practical applications in real-life situations. Teaching problem-solving with verbal context at the elementary school level helps students:

- Through solving word problems, students discover and address problems, enhance their critical thinking skills, reasoning abilities, creative thinking, and apply mathematical knowledge to real-life situations.

- It provides opportunities for students to present, express, and argue their understanding and problem-solving approaches in various forms, such as oral and written communication. This helps students develop their speaking and writing skills.

- Students develop creative thinking as they explore different ways and ideas to solve problems.

- Word problems are integrated into real-life application problems, reinforcing students' mathematical knowledge and enhancing their ability to relate and solve real-life issues.

- Through word problem-solving, teachers have the basis to assess students' mastery of knowledge and their ability to apply knowledge, intellectual level, and the development of communication skills.

- Solving word problems helps cultivate qualities and attributes in students for the modern society, such as being careful, working systematically with a plan and basis, and developing the habit of self-assessment of work results. It nurtures independent thinking, a love for exploration, and the ability to tackle issues ranging from simple to complex.

2.2.2. At Grade 2

The 2018-Mathematics curriculum for grade 2 defines three fundamental knowledge contents: Numbers and Operations; Geometry and Measurement; Some Elements of Statistics and Probability. In contrast, the Mathematics curriculum for grade 2 (2006) specified four basic knowledge strands. This change is specifically reflected as follows:

Grade 2 Math program year 2006	**Grade 2 Math program year 2018**
Four basic strands of knowledge: - Numerals; - Geometric elements; - Quantity and quantity measurement; - Solve word problems.	Three basic knowledge contents: - Numbers and Calculations; - Geometry and Measurement; - Some elements of Statistics and Probability.

Thus, in the 2018 Math Curriculum, solving math problems with words in grade 2 is not divided into a separate circuit but is integrated and interwoven with the contents of Numbers and calculations, Geometry and Measurement, Some elements of Statistics and Probability, are mentioned in the practice section to solve real-life situations in all knowledge content. This change is made in the direction of streamlining the way of teaching math problems, not doing exercises according to tricks or tips, but focusing on forming students' ability to solve problems in real-life situations. Thus, math problems with text are spread throughout the entire Grade 2 Math curriculum in the form of practical problems to evaluate the level of students' practical problem solving.The content of math problems with text in grade 2 is different between the 2006 program and the 2018 program. Specifically, as follows:

Table 2. Comparison of differences in the content of math solutions with text in the 2006 Grade 2 Math curriculum and the 2018 Mathematics Curriculum

Grade 2 2006-Math program year	**Grade 2 2018-Math program**
- Math problems have one calculation step related to addition and subtraction. Including: + The problem is about more + The problem of less - Math problems have one calculation step related to multiplication and division. - Math problems with geometric content (calculating length and perimeter of shapes) - Math problems related to calculations with learned units of measurement (cm, m, dm, kg, g,...)	- Math problems have one calculation step related to addition and subtraction. Including: + How much better or worse is the problem? + Problems about adding and subtracting a number of units. + Math problems about more or less than a number of units. - Math problems have one calculation step related to multiplication and division. - Math problems with geometric content (calculating length and perimeter of shapes) - Math problems related to calculations with learned units of measurement (cm, m, dm, kg, g, liter,...) - Math problems have elements of statistics and probability.

Therefore, most of the types of word problems in the 2018 Mathematics curriculum for general education are similar to those in the 2006 Mathematics curriculum. However, the 2018 curriculum includes additional word problems with elements of statistics and probability.

Regarding the teaching requirements for word problem-solving in grade 2, students in grade 2 are expected to:

- Understand the problem statement, identify what the problem is asking, and what information is provided.

- Summarize the problem in various forms: verbal, diagrams, or drawings.

- Solve the problems with a single step involving addition, subtraction, multiplication, division, geometry content, previously learned measurement units, and problems with elements of statistics and probability.

- Present the solution, including explanations, calculations, and answers.

- Develop mathematical communication skills, creative thinking, and the ability to identify and solve problems.

2.3. Overview of the Current State of Mathematical Communication Skills and the Development of Mathematical Communication Skills in Grade 2 Students through Word Problems

2.3.1. The Current State of Mathematical Communication Skills in Grade 2 Students

As we have previously mentioned our perspective on mathematical communication skills and relied on specific manifestations of mathematical communication components according to the 2018 Mathematics curriculum (Ministry of Education and Training, 2018) to assess the current state of mathematical communication skills in grade 2 students.

We conducted an assessment of the current state of mathematical communication skills in 240 grade 2 students from four elementary schools (each school selected two classes for the survey): Tran Cao Van Elementary School, Huynh Ngoc Hue Elementary School (Thanh Khe district), Nguyen Van Troi Elementary School (Lien Chieu district), and Hung Vuong Elementary School (Hai Chau district) using a pre-designed questionnaire.

After collecting and analyzing the data, we found that the current state of mathematical communication skills in grade 2 students can be categorized into four groups as follows:

- Group 1: Students have difficulty in listening and understanding, reading and understanding mathematical information, and cannot take notes on mathematical information presented in written or spoken form by others. Their ability to express mathematical content and ideas is low, and they lack logical thinking. They tend to be timid and hesitant and are not confident when discussing with others.

- Group 2: Students have the ability to listen and understand, read and understand mathematical information at a basic level, such as partially understanding a problem statement and taking notes on essential information, although this information is limited and not entirely accurate. They can present and express mathematical content and ideas in simple situations, but not completely, accurately, or logically. They have started to actively communicate and interact with others.

- Group 3: Students can listen and understand, read and understand, take notes, and provide relatively complete and accurate mathematical information. They can use mathematical notation (numbers, letters, symbols, charts, etc.) to present, summarize, and explain mathematical ideas to teachers and peers. They have a relatively good ability to express and argue mathematical content and ideas, and they are proactive and confident in communicating and discussing with others.

- Group 4: Students have a quick and accurate ability to listen and understand, read and understand, take notes, and provide feedback on mathematical information. They use mathematical language and common language effectively to argue, express, and present mathematical content in a clear and coherent manner. They have strong analytical and debating skills in various situations and are active and confident in mathematical communication. They are also confident in evaluating ideas and asking questions of others.

The majority of students fall into Groups 1 and 2, while some students are in Group 3, and very few students are in Group 4.

In summary, based on the survey results and quantitative analysis of the current state of mathematical communication skills in grade 2 students, we have identified several advantages and challenges:

Advantages:

- Many students have a basic ability to read and understand mathematical information.

- Some students can start to present and express their mathematical ideas, although not entirely accurately, comprehensively, or logically.

- Some students have good language skills, creating a foundation for them to receive and use mathematical notation combined with common language during the process of expression and argumentation.

- Some students are proactive and confident in their interactions with teachers and peers.

Challenges:

- Many students still face difficulties in reading comprehension, listening comprehension, and taking notes.

- Their ability to use mathematical notation combined with common language is still low.

- Their ability to argue is lacking in rigor, and they may feel hesitant when discussing or providing feedback.

- They tend to be passive in mathematical communication.

These issues pose challenges to students in their learning and absorption of mathematical knowledge.

2.3.2. The Current State of Developing Mathematical Communication Skills for Grade 2 Students through Word Problems

In practical mathematics learning, students often struggle with solving word problems compared to other types of exercises. Word problems not only require mastery of mathematical rules but also demand the ability to identify and solve new mathematical problems that students have not encountered before. Therefore, the exchange of information between teachers and students, as well as among students themselves, is crucial for students to share their understanding of how to solve problems and express the difficulties and challenges they are facing. The process of sharing information during math class is an essential need for every student to secure a firm grasp of mathematical knowledge.

To evaluate the current state of developing mathematical communication skills in grade 2 students through word problems, we conducted interviews with 12 administrators and 20 teachers who directly teach grade 2 mathematics. After analysis, we identified several advantages and challenges in developing mathematical communication skills as follows:

Advantages:

- The implementation of innovative teaching methods that focus on developing students' capabilities has been well-received by schools and teachers who have a correct understanding of the importance of developing mathematical communication skills for grade 2 students in mathematics classes.

- The adoption of the new curriculum and textbooks has provided opportunities for students to develop the necessary mathematical skills in math classes, particularly mathematical communication skills.

- Teachers recognize the importance of teaching word problems in developing mathematical communication, reasoning, and presentation skills to solve real-life situations.

- Some students enjoy exploring and discovering various ways to solve word problems.

- Some students are brave and confident in proposing problem-solving ideas during interactions with teachers and peers.

Challenges:

- Some administrators and teachers still have reservations and do not focus enough on addressing difficulties in teaching word problems and developing mathematical communication skills for students through this type of problem.

- Students face difficulties when solving word problems because their second-grade thinking is limited, and their language usage and expression encounter obstacles due to a limited vocabulary.

- Students have difficulty reading and understanding the words in the problem statement, often passively or slowly understanding the problem (What does the problem state? What does it ask for?).

- Some students understand the problem but do not know how to express their understanding, and their reasoning is not rigorous. They may feel hesitant when proposing a solution or use inappropriate language in their solutions that does not align with the problem's requirements.

- Students lack confidence when presenting and expressing their ideas and rarely interact or ask questions of teachers and peers.

- Many students do not have a strong interest in exploring different problem-solving methods, and the majority are satisfied with just one approach.

To address these challenges, teachers need to implement measures to develop mathematical communication skills for grade 2 students through teaching word problems.

2.4. Measures to Develop Mathematical Communication Skills in Grade 2 Students through Word Problems

2.4.1. Developing Listening Comprehension Skills for Understanding Information in Word Problem Statements

Listening comprehension of information in word problem statements is the first skill that needs to be developed for students. Listening comprehension is not merely hearing and receiving sounds; it involves students receiving information accurately from sounds, enabling them to understand the problem statement and thereby determine the problem's requirements and find a solution. Listening comprehension skills are developed through activities where students listen to problem statements and analyze them with guidance from teachers and peers.

Understanding the word problem is also influenced by students' vocabulary. Therefore, students often face difficulties when listening to teachers or peers read and analyze the problem statement. Some students hear the problem statement clearly but still do not understand what it says or what it asks for. This is the reason students often feel uncertain when answering questions to understand the problem, leading to difficulty in choosing a problem-solving approach.

Objective: This measure aims to develop listening comprehension skills for understanding information in word problem statements for grade 2 students. Teachers provide students with mathematical vocabulary necessary for listening, understanding, and using it to solve word problems.

Procedure: To understand the problem statement and determine the problem-solving direction, students need to comprehend mathematical terms in the problem statement to establish the conditions and requirements of the problem. Teachers often guide students through the following steps:

Step 1: The teacher reads the problem statement, and students are required to listen to the problem statement.

This step only requires students to listen to the problem statement, receiving auditory input without the need to understand the entire problem statement.

Step 2: The teacher (or one student) reads the problem statement again and asks students to pay attention and listen carefully to the information in the problem statement.

In this step, before students listen to the problem statement, the teacher or a student will read the problem statement aloud, emphasizing that students should pay attention and listen carefully to the information in the problem statement.

The teacher can also ask some questions before students listen to the problem statement to help them focus on important information in the problem:

- What does the problem statement tell you?

- What does the problem require you to find?

- Are there any keywords that you need to pay attention to?

For example:

Example 1: There are 6 friends playing jump rope, and then 2 more friends join in to play. How many friends are playing jump rope now?

The teacher can ask questions before students listen to the problem, so students know which information to pay attention to:

- How many friends are playing jump rope according to the problem? How many more friends joined?

- What does the problem ask you to find?

- Are there any words you need to pay attention to in order to determine the problem type?

Example 2: Mai can fold 9 paper boats, and An can fold more than Mai by 4 paper boats. Ask how many paper boats An can fold?

The teacher can ask questions like:

- What does the problem tell you? (Or more specifically: How many paper boats can Mai fold? How many more paper boats can An fold than Mai?)

- What does the problem require you to find? (How many paper boats An can fold?)

- What type of problem is this? Why do you think so?

Step 3: Identify the conditions, requirements of the problem, terminology, and keywords containing information from the problem statement.

This step requires students to understand the mathematical terms and the role of these terms in the problem statement to grasp the main idea, determine the problem type, and develop a solution method. These terms can be familiar or unfamiliar words. For instance, students need to understand terms like "add," "subtract," "more than", "less than", "fewer than", etc. To help students understand these mathematical terms, the teacher should not only explain them in a traditional question-and-answer style but should also use various methods such as providing illustrative examples or combining them with visual aids or real objects. Furthermore, the teacher should systematize and generalize mathematical terms, concepts, and rules for students by designing questions that gradually lead them to understand.

Once the important keywords are identified, students need to determine what the problem statement says and what it asks for. The teacher should pose appropriate questions to guide students.

Example 3: In the morning, the store sold 15 bags of rice, and in the afternoon, the store sold 3 bags of rice less than in the morning. Ask how many bags of rice the store sold in the afternoon.

The teacher can ask questions like:

- What does the problem tell you? (Or more specifically: How many bags of rice were sold in the morning? How many bags of rice were sold in the afternoon?)

- What does the problem require you to find? (How many bags of rice the store sold in the afternoon?)

- What type of problem is this? How do you know?

Example 4: Uncle Hòa made drinking straws from bamboo instead of plastic ones. He made 5 straws from each bamboo segment. Ask how many straws Uncle Hòa made with 5 bamboo segments like that?

Example 5: In her garden, Grandma planted many apple and loquat trees, including 151 apple trees. Ask how many loquat trees Grandma has in her garden, knowing that she has 39 more loquat trees than apple trees?

Step 4: Require students to express the problem statement.

This step helps the teacher assess the level of listening comprehension of students after they have gone through the process of listening to the teacher and peers read the problem statement, analyzing the problem statement, and determining whether students truly understand the problem statement. Expressing the problem statement also helps students develop speaking skills, the ability to use mathematical language for expression and presentation.

2.4.2. Developing Reading Comprehension Skills for Understanding Information in Word Problem Statements

Alongside listening comprehension, reading comprehension of information in word problem statements is also a crucial skill for students. Reading comprehension involves using the eyes to recognize symbols and written words and using the brain to think and detect connections between received information. Reading comprehension skills are developed when students study problems by reading problem statements from printed materials (textbooks), handwritten texts, or other learning materials.

Similar to listening comprehension, reading comprehension is influenced by students' vocabulary and their ability to use language. In many cases, students read the problem but proceed to solve it without truly understanding the problem statement or whether they are providing the correct solution.

Some students read the problem statement carefully but still struggle to understand mathematical terms and vocabulary within the problem statement. This hinders students from investigating and analyzing the problem statement and generating problem-solving ideas.

Objective: This measure aims to help students develop reading comprehension skills for understanding information in word problem statements.

Procedure: The teacher should organize activities for students as follows:

Step 1: Ask students to read the problem statement (either aloud or silently, with the purpose of grasping the problem's content).

Step 2: Ask students to read the problem statement again silently and identify the conditions and requirements of the problem. The teacher should ask questions to guide students in focusing on the essential information in the problem statement (What does the problem statement tell you? What does the problem require you to find?). For example:

Example 3: In the morning, the store sold 15 bags of rice, and in the afternoon, the store sold 3 bags of rice less than in the morning. How many bags of rice did the store sell in the afternoon?

The teacher can pose questions like:

- What does the problem statement tell you? (In the morning, 15 bags of rice were sold, and in the afternoon, 3 bags of rice less than in the morning were sold).

- What does the problem require you to find? (The number of bags of rice the store sold in the afternoon?)

Step 3: Have students underline key words, terminology, and information-containing terms from the problem statement.

This step is crucial for students to identify the elements given and needed to solve the problem. Regarding difficult or unfamiliar words, the teacher should provide explanations or use various methods and aids to help students understand these words.

Example 4: Students should underline important words when analyzing the problem, such as "In the morning, the store sold 15 bags of rice, and in the afternoon, the store sold 3 bags of rice less than in the morning. Ask how many bags of rice the store sold in the afternoon?"

In second-grade programs, most students can determine the given and needed elements in the problem based on cues within the text. For instance, the given elements usually appear in the first sentence of the problem, before the words "ask", "find", "calculate", etc. The needed elements are usually framed as questions, appearing after the words "ask", "find", "calculate", etc. However, in some real-life word problems, the given element might be embedded within the needed element.

Example 5: Uncle Hòa made drinking straws from bamboo instead of plastic ones. He made 5 straws from each bamboo segment. Ask how many ??

2.4.3. Developing Note-Taking Skills for Information in Word Problem Statements

Note-taking skills, also known as summarizing skills for information in word problem statements, help identify the core content within the problem statement. Summarizing information in problem statements involves students flexibly using natural language and mathematical language, as well as transferring between the two. This skill needs to be regularly practiced with second-grade students during math problem-solving lessons.

Objective: This measure aims to train students in summarizing information in problem statements to identify the core content.

Procedure: For a word problem with a narrative, the teacher should encourage students to express what is given and what needs to be found in various ways. Regardless of how students choose to summarize, the teacher should guide them to focus on essential information, key terms, and use symbols, diagrams, or linear diagrams to summarize.

There are several ways to summarize a problem, but with the abilities of second-grade students, the teacher should instruct them to summarize verbally or using linear diagrams.

- Summarizing in words: When summarizing in words, it's important to develop the habit of writing the values of a quantity in a column, with the questions from the problem placed in the last row and in the right column.

Example 8: The first can holds 112 liters of oil,

the second can holds 38 liters of oil. How many liters of oil do both cans hold?

Summary:

The first can: 112 liters of oil

The second can: 38 liters of oil

Both cans: … liters of oil?

Example 9: Divide 8 oranges evenly into 2 baskets. How many oranges are there in each basket?

For this problem, students can summarize as follows:

8 oranges: 2 baskets

Each basket: … oranges?

However, the teacher should guide students to write the values of each quantity in a column to make it clear and understandable:

Summary:

2 baskets: 8 oranges

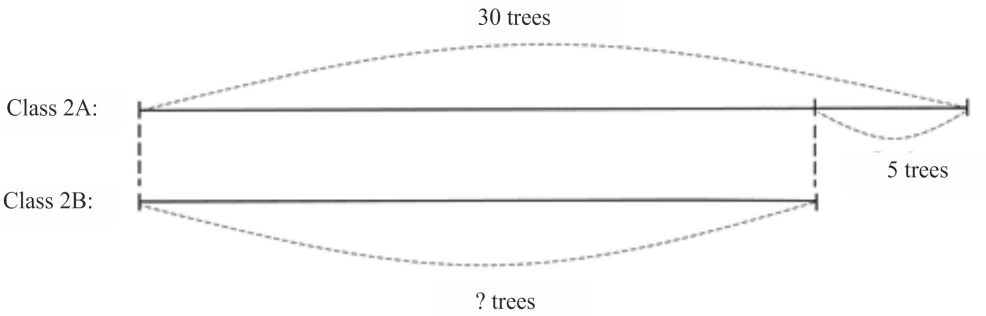
1 basket: … oranges?

Developing the habit of summarizing and representing quantities scientifically and clearly is essential. If students encounter difficulties, the teacher should provide open-ended questions to help them learn how to summarize. This habit of summarizing problems will make it easier for students to analyze problems with multiple quantities in higher grades.

- Summarizing with a linear diagram: When summarizing with a linear diagram, the teacher should emphasize that the starting point of each line segment must align vertically to facilitate comparing the data in the problem. The teacher should also note that each line segment representing a value in a problem must have a corresponding and appropriate length. This ensures the accuracy of the linear diagram when summarizing the problem. For example, a line segment representing 30 liters of oil cannot be the same length as half a line segment representing 40 liters of oil.

Example 10: Class 2A planted 30 trees, while class 2B planted 5 fewer trees than class 2A. How many trees did class 2B plant?

Summary using a linear diagram:



In summary, the article emphasizes the importance of developing mathematical communication skills for second-grade students through solving word problems. It highlights that summarizing the content of word problems is a crucial skill in this process, enabling students to transition between natural language and mathematical language fluently. To effectively achieve this, teachers should have a deep understanding of mathematical terminology, symbols, and concepts, as well as organize diverse activities to reinforce and consolidate these rules and concepts for students.

3. Conclusion

The article concludes that mathematical communication skills are vital for second-grade students in learning mathematics. Solving word problems provides an opportunity to develop their mathematical vocabulary, concepts, and communication skills. Based on theoretical research and the evaluation of the current state of mathematical communication, the article proposes three methods to enhance mathematical communication skills for second-grade students through word problems. These proposed methods are closely related, ensuring logical consistency and complementing each other. They contribute to the development of mathematical communication skills for second-grade students, ultimately improving the effectiveness of teaching mathematics at the primary school level./.

References

Dang, T. T. (2021). *Developing mathematical communication competence for primary school seniors through teaching Maths Word Problems Solving*. Doctoral Dissertation. University of Education - Thai Nguyen University.

Ha, H. K. (Editor-in-chief). *Mathematics 2 textbook (volume 1, volume 2)*. Connecting knowledge to life. Vietnam Education Publishing House.

Kieu, M. H. (2020). *Contributing to the development of mathematical language for pre-university students in the Central Highlands region*. Doctoral Dissertation. Vinh University.

Ministry of Education and Training. (2018). *Mathematics Education Program. Issued together with Circular No. 32/2018/TT-BGDDT dated December 26, 2018 of the Minister of Education and Training*. Hanoi.

Pham, T. K. C. (2023). Developing 4th grade students' mathematical reasoning competencies through teaching Mathematics. *Dong Thap University Journal of Science, 12*(01S), 46-55. https://doi.org/10.52714/dthu.12.01S.2023.1005

Tran, N. B.. (2013). *Some measures to help first grades students in primary schools effectively use the language of mathematics.* Doctoral Dissertation. Vietnam Institute of Education Sciences.

Vu, T. B. (2016). *Fostering mathematical representation and mathematical communication competencies for students in teaching grade 6 and 7 Mathematics*. Doctoral Dissertation. Vietnam Institute of Education Sciences.