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A Process for Designing and Using Contexts in Teaching Numbers and Operations in Grade 3

Huong Le Thi Thu[1], Hang Tran Thi Thu[2]

[1]Faculty of Primary Education, Thai Nguyen University of Education, Vietnam

[2]Bai Chay Primary School, Quang Ninh City, Vietnam

ABSTRACT: Context-based teaching creates opportunities for students to connect mathematical knowledge with meaningful situations, thereby contributing to the development of problem-solving abilities and the application of mathematics in practice. However, the use of contexts in primary school mathematics teaching sometimes remains limited to creating stories or illustrative images and does not genuinely support students in identifying, representing, and solving mathematical problems. This study seeks to answer two questions: What principles should be ensured in designing and using contexts in teaching the Grade 3 topic of Numbers and Operations? How should the process of designing and using contexts be implemented so that a context becomes an environment for organising learning activities? The study used document analysis, analysis of the 2018 General Education Curriculum for Mathematics, an exploratory survey of 20 primary school teachers, and pedagogical design. The findings identify four principles and propose a four-step process: identifying intended learning outcomes and core mathematical relationships; selecting and examining the context and defining the problem; constructing the situation and a sequence of learning tasks; and implementing, assessing, and refining. The process is illustrated through a task applying division with a remainder. The findings provide a reference framework that helps teachers select and use appropriate contexts in Grade 3 mathematics teaching.

KEYWORDS: context-based teaching; Numbers and Operations; Grade 3 mathematics; learning activity design; primary education.

1. INTRODUCTION

The 2018 General Education Curriculum for Mathematics is oriented towards developing the components of students' mathematical competence, including mathematical problem-solving competence and mathematical modelling competence. At primary level, students need gradually to learn to use mathematical knowledge and skills to solve simple problems that are familiar in learning and everyday life (Ministry of Education and Training, 2018). This orientation requires the teaching process not only to help students remember rules and perform calculations, but also to create opportunities for them to recognise when, why, and how mathematical knowledge can be used.

In the Grade 3 mathematics curriculum, the topic of Numbers and Operations holds an important position, including content such as reading, writing, comparing, and rounding numbers; performing addition, subtraction, multiplication, and division; determining unknown components of operations; and solving word problems. This knowledge and these skills have considerable potential for connection with familiar activities in the family, school, and community. Therefore, organising teaching through appropriate situations can help students recognise the meaning of numbers and operations, instead of merely performing mathematical procedures separated from the circumstances in which they are used.

The situated cognition perspective holds that knowledge is formed and used in relation to the activity, circumstances, and culture in which learners participate (Brown et al., 1989). In context-based education, learning content is connected with meaningful situations to enable learners to draw on experience, participate in problem solving, and recognise the usefulness of knowledge (Ngô Vũ Thu Hằng, 2016). In mathematics, contextual problems can help students begin with informal understandings or representations and then gradually move towards more appropriate mathematical relationships and representations (Gravemeijer & Doorman, 1999).

However, the presence of a story, character, or image from everyday life is not sufficient to turn a task into a context-based learning activity. Students may disregard the situation and perform an operation on the basis of familiar cues; conversely, a lengthy or implausible situation may increase reading-comprehension demands without supporting the identification of mathematical relationships. Kintsch and Greeno (1985) show that solving word problems requires learners to construct a representation of the situation, rather than merely process the numbers appearing in the problem. Widjaja (2013) also notes that

contextual problems do not automatically lead to meaningful learning; teachers need to organise opportunities for students to explain the situation and establish explicit connections between the context and the mathematical idea.

The results of an exploratory survey of 20 Grade 3 teachers at two primary schools in Quang Ninh Province reveal a noteworthy gap between awareness and practice. Seventeen of the 20 teachers considered the application of context-based teaching to be very necessary, and 3 of the 20 considered it necessary. However, only 6 of the 20 teachers reported that they regularly used contexts in teaching the topic of Numbers and Operations; 14 of the 20 did so only occasionally. Regarding difficulties, 9 of the 20 teachers stated that they had not received adequate professional development in the theoretical foundations, skills, and design process; 6 of the 20 had difficulty selecting and adapting contexts to students' levels and experiences; and 5 of the 20 still relied heavily on textbooks and familiar lesson-design approaches. Although these results are not representative of primary school teachers in general, the initial data indicate a need for a sufficiently specific process to support teachers in designing and using contexts.

Research on Realistic Mathematics Education has clarified the role of meaningful situations in students' progression from informal solution methods to more generalised mathematical representations and knowledge (Gravemeijer & Doorman, 1999). Recent research on task design also emphasises requirements such as correctness, authenticity, task progression, diversity of representations, and the extent of student participation in decision-making (Marco & Palatnik, 2024). Nevertheless, applying these perspectives to the Grade 3 topic of Numbers and Operations requires adaptation to the curriculum requirements, lived experience, language competence, and cognitive characteristics of primary school students.

On the basis of the foregoing analysis, the article focuses on answering two research questions:

1. What principles should the design and use of contexts in teaching the Grade 3 topic of Numbers and Operations ensure in order both to meet curriculum requirements and to suit students' characteristics?
2. How should the process of designing and using contexts be implemented so that the context becomes an environment for organising learning activities, rather than merely a story or an illustrative image?

2. RESEARCH METHODS

The study was conducted with a pedagogical design orientation, using three main groups of methods.

First, literature analysis and synthesis were used to clarify the conceptions of context and context-based teaching, and the role of contextual problems in mathematics education. The selected sources focused on situated cognition, Realistic Mathematics Education, task authenticity, and the design of contextual mathematical tasks. The study did not apply the entire theoretical system of Realistic Mathematics Education, but drew only on selected relevant propositions concerning meaningful situations, mathematical representations, and the transition from informal solution methods to mathematical knowledge.

Second, the study analysed the 2018 General Education Curriculum for Mathematics and the Grade 3 content of Numbers and Operations to identify intended learning outcomes, core mathematical relationships, and possibilities for connecting them with familiar situations. The curriculum analysis provided a basis for delimiting the content, level of difficulty, and requirements of the learning activities, ensuring that the designed tasks did not exceed Grade 3 students' capabilities.

Third, an exploratory survey was conducted with 20 Grade 3 teachers at Bai Chay Primary School and Ly Thuong Kiet Primary School in Quang Ninh Province. The survey focused on teachers' awareness, the frequency with which they used contexts, and the difficulties they encountered in designing and organising context-based learning activities. The data were processed using frequencies and percentages. Because the sample was small and selected by convenience, the survey results were used only to identify several practical issues and were not intended to be generalised to all primary school teachers.

On the basis of the results of the theoretical, curriculum, and survey analyses, the study developed principles and proposed a process for designing and using contexts. The appropriateness of the process was analysed through the alignment among intended learning outcomes, mathematical content, context, tasks, student activities, and assessment evidence. A task involving division with a remainder was used to illustrate how the process is applied.

3. RESEARCH FINDINGS

3.1. Conceptions of context and context-based teaching in mathematics

In ordinary language, context may be understood as the circumstances or environment in which an event occurs. In teaching, a context does not merely provide a backdrop for an activity but also supplies meaning, data, and relationships through which learners identify a problem. Ngô Vũ Thu Hằng (2016) views context-based education as an approach that connects learning content with real-life situations, thereby helping learners participate in meaningful activities. In mathematics education, Gravemeijer and Doorman (1999) emphasise that a situation needs to be realistic in relation to learners' experiences; this does not mean that every context must be an event that has actually occurred in life, but that students must be able to imagine, explain, and act within the situation.

From the above approach, this study defines a context in mathematics teaching as a situation that is meaningful to students and contains data, problems, or relationships that can be identified, represented, and addressed using mathematical knowledge and

skills. A context may originate from personal, family, school, or community life; it may be a plausible simulated situation or a mathematical situation that students have sufficient experience to understand.

Accordingly, context-based teaching in mathematics is a process in which teachers select, design, and organise students to solve mathematical tasks arising from meaningful situations; by exploring the situation, using representations, carrying out mathematical activity, and interpreting results, students gradually develop or apply mathematical knowledge and skills.

This conception entails three requirements. First, the context must be directly related to the mathematical content, rather than being used merely to make the lesson appear familiar. Second, students must participate in exploring and representing the situation; the teacher should not separate out all the data in advance and immediately provide the operation. Finally, the mathematical result needs to be interpreted back in the context in order to answer the initial problem. If any one of these three requirements is absent, the context may become an external wrapper around a calculation exercise.

3.2. Principles for designing and using contexts

The research findings identify four principles that guide the selection, design, and use of contexts in teaching the Grade 3 topic of Numbers and Operations.

Principle 1. Ensure alignment with intended learning outcomes and mathematical content. The lesson's intended learning outcomes must be the starting point of the design process. The teacher needs to determine what students must know or be able to do, which mathematical relationship needs to be clarified, and whether the context is used to develop, consolidate, or apply knowledge.

A context should not be selected solely because it is appealing, novel, or easy to illustrate. Each situation must contain a problem or mathematical relationship directly connected with the lesson content. For example, a situation involving the arrangement of books is meaningful for a lesson on division with a remainder only when students use the remainder to explain the books left over or to decide how many containers need to be prepared. If students merely perform a pre-specified division operation without using the result to address the situation, the role of the context remains limited.

Principle 2. Ensure suitability for Grade 3 students' lived experience and cognitive characteristics. Grade 3 students are well able to engage with concrete situations, clear language, and data that they can imagine. Contexts should therefore be selected from familiar activities such as learning, playing, arranging materials, reading books, caring for plants, purchasing simple items, or participating in class activities.

Familiarity does not mean that every student must have experienced the situation directly. A simulated context can still be appropriate if students understand its purpose, objects, and relationships. Conversely, situations that use excessively large numbers, unfamiliar occupations, or too much unnecessary information can increase the reading-comprehension burden and make it difficult for students to recognise the task's mathematical structure. Teachers therefore need to control the length, wording, amount of data, and reasoning demands of the situation.

Principle 3. Ensure the plausibility of the context and its potential for mathematical exploration. The authenticity of a task depends not only on whether the situation is real, but also on the plausibility of its data, questions, solution methods, and the meaning of its result (Palm, 2008; Vos, 2018). Even a situation labelled "real-life" will have difficulty creating a meaningful connection if it uses implausible data or requires an inappropriate action.

The context needs to create a need to use mathematics. Questions should help students explain, select, compare, or make a decision on the basis of calculation results, rather than merely require them to find an answer predetermined by keywords. The study by Marco and Palatnik (2024) also shows that many teacher-designed contextual tasks still mainly require numerical, exact, and closed answers and provide few opportunities for students to participate in decision-making. Therefore, when appropriate to Grade 3 content, tasks need to allow students a certain degree of choice and interpretation.

Principle 4. Ensure feasibility and coherence in the teaching process. The context and activity must be appropriate to the lesson time, classroom conditions, available learning materials, and the teacher's organisational capacity. Manipulatives, images, diagrams, tables, or worksheets should be used only when they support students in recognising the mathematical relationship; they should not increase the complexity of the activity without adding learning value.

The context also needs to be sustained and used purposefully throughout the teaching process. If the situation appears only in the opening activity to generate interest and all subsequent activity shifts to calculations no longer related to the situation, the context has not genuinely served as a learning environment. After solving the problem, students need opportunities to compare the result with the data, check its plausibility, and interpret the meaning of the result in the initial situation.

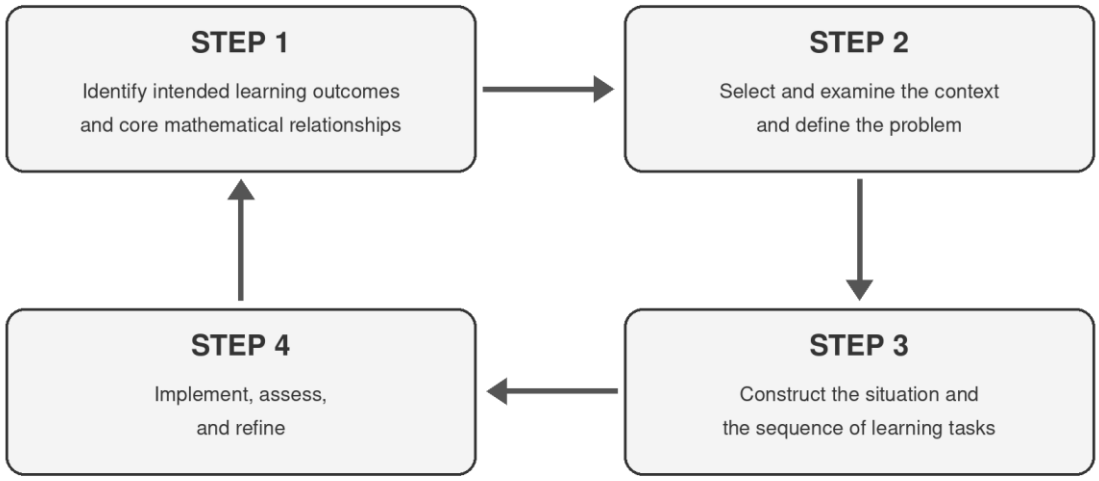
Table 1. Principles and criteria for examining learning contexts

Principle	Review questions
Alignment with intended learning outcomes	What knowledge and skills does the context serve? What is the core mathematical relationship?
Suitability for students	Do Grade 3 students understand the situation, language, and data?
Plausibility and potential for mathematical exploration	Are the data plausible? Does the problem create a need to use mathematics?
Feasibility and coherence	Can the activity be organised under classroom conditions? Is the result interpreted back in the context?

3.3. A process for designing and using contexts

On the basis of the above principles, the study proposes a four-step process. The process is cyclical: the results of implementation and assessment in Step 4 may lead to adjustments to the objectives, context, or task sequence in the preceding steps.

Figure 1. A process for designing and using contexts in teaching the Grade 3 topic of Numbers and Operations



Step 1. Identify intended learning outcomes and core mathematical relationships

The teacher consults the curriculum to identify the lesson's intended learning outcomes and then specifies them as observable indicators. Identifying the objectives should not stop at naming the knowledge content, such as "division with a remainder", but should state clearly what students will be able to do and explain.

Next, the teacher identifies the mathematical structure or relationship to be highlighted. In a lesson on division with a remainder, the core relationships may include the following: the dividend is partitioned into equal groups; the part remaining is smaller than the divisor; and the remainder has different meanings depending on the requirements of the situation. Clarifying the mathematical relationship helps the teacher avoid selecting an appealing context that does not support the learning objective.

At this step, the teacher also needs to identify the intended function of the context: to create a need to learn new knowledge; to support students in exploring a mathematical relationship; or to provide an opportunity to apply knowledge to solve a problem. A context may serve multiple functions, but it does not necessarily have to appear in every activity of the lesson.

Step 2. Select and examine the context and define the problem

On the basis of the identified objective, the teacher seeks a context from personal, family, school, or community activities. The selection needs to consider two aspects simultaneously: whether the context is meaningful to students and whether it can bring forth the mathematical relationship to be explored.

The selected context needs to be examined for plausibility. The teacher may use the following questions:

- Could the situation occur, or could students plausibly imagine it?
- Are the numbers appropriate to the stated people, objects, and scale?

- Is every item of data necessary for solving the problem?
- Does the problem require students to use mathematical knowledge?
- What does the calculation result mean in relation to the situation?
- If the entire story is removed, does the task change in terms of the thinking or decision-making required?

The final question helps identify a merely decorative context. If students need only take the given numbers and perform an operation according to keywords, without understanding the situation, the teacher needs to revise the task.

Step 3. Construct the situation and a sequence of learning tasks

From the selected context, the teacher constructs the situation using concise, clear language appropriate for Grade 3 students. The situation needs to provide sufficient information for students to understand the problem, but should not explain the entire thinking process for them.

The task sequence should provide opportunities for students to carry out the following activities in order:

1. Explore the situation and identify the problem to be solved;
2. Select the necessary data;
3. Use objects, drawings, diagrams, tables, verbal statements, or operations to represent the relationship;
4. Carry out mathematical activity and discuss solution methods;
5. Check the result;
6. Interpret the result in accordance with the requirements of the situation.

The teacher needs to anticipate possible understandings or difficulties. The system of prompting questions should focus on the mathematical relationship, for example: “How many are in each group?”, “What does the number left over indicate?”, and “If this option is selected, has the requirement been met?”, rather than asking too many questions that merely repeat the data.

Representations serve to connect the situation and mathematical knowledge. Duval (2006) argues that mathematical understanding is associated with the ability to use and convert between systems of representation. With Grade 3 students, the teacher may begin with concrete objects, images, or diagrams and then guide students to move towards operations and mathematical language. However, a representation has value only when it helps students recognise the relationship; images should not be added merely to make the activity more lively.

Step 4. Implement, assess, and refine

During implementation, the teacher provides opportunities for students to read or observe the situation, discuss their understanding, select representations, and present solutions. The teacher’s role is to guide through questions, provide support when necessary, and formalise the mathematical knowledge after the students’ activity.

Assessment should not be based solely on the answer. The teacher needs to observe whether students correctly identify the problem, select appropriate data and operations, explain the meaning of the result, and check its plausibility. In knowledge-construction activities, consideration should be given to how students move from concrete representations to mathematical knowledge. In application activities, attention should be paid to their ability to use the result to answer, select, or make a decision in the situation.

After the activity, the teacher analyses students’ work and responses in order to make adjustments. If students focus on the story without recognising the mathematical relationship, the context may contain too many details. If students immediately perform the operation but cannot explain the result, the task may not require them to return to the situation. If many students interpret the data differently, the teacher needs to revise the wording, images, or conditions of the problem.

3.4. Using contexts at different stages of a lesson

The proposed process can be applied flexibly at three stages of the teaching process.

First, in the opening activity, the context is used to bring forth a problem or a cognitive need. The situation needs to be concise, directly related to the lesson content, and to create a question that students cannot yet solve fully with their existing knowledge. The purpose is not merely to create an enjoyable atmosphere, but also to help students recognise why they need to learn the new knowledge.

Second, in exploration and knowledge-construction activities, the context becomes an environment in which students identify relationships, use representations, try solution methods, and gradually develop knowledge. This use is close to the perspective of Realistic Mathematics Education, in which meaningful situations serve as the starting point for a progression from informal solution methods to more generalised mathematics (Gravemeijer & Doorman, 1999). At Grade 3, however, this process needs appropriate guidance from the teacher; students’ ability to discover every rule or algorithm independently should not be treated as absolute.

Third, in application activities, the context provides opportunities for students to use the knowledge they have learned to solve a specific problem. Application tasks should require students to explain the meaning of the result, select an option, or make a decision. The study by Wijaya et al. (2018) shows that providing regular opportunities for students to solve contextual tasks, together with questions that promote explanation and reflection, can improve their ability to understand and address such tasks.

A lesson does not necessarily have to use contexts at all three stages. The teacher needs to make a selection on the basis of the objective and characteristics of the content. Attempting to create a context for every activity can make the lesson lengthy, disperse its focus, or render the context contrived.

3.5. Illustration of the process through an application task involving division with a remainder

The example below illustrates the application of the proposed process to design a learning task from an actual school activity. The data for the situation were drawn from the registration list for the "Keep Bai Chay Green" activity organised by the Bai Chay Primary School Young Pioneer Organisation. During the mathematics lesson, Grade 3 students use these data to help the Organising Committee determine the number of groups to be formed.

Step 1. Identify intended learning outcomes and core mathematical relationships

The task is intended to provide opportunities for students to:

Recognise and perform division with a remainder;

Understand the meaning of the quotient and remainder in a specific situation;

Use the result of a division operation to solve a simple real-life problem;

Present their method and explain their conclusion.

The core mathematical relationship of the task is:

$$68 : 10 = 6 \text{ (remainder 8)}.$$

Here, the quotient 6 indicates that six groups of 10 students can be formed; the remainder 8 indicates that eight students have not yet been assigned to a group. Because all students must be able to participate, one more group needs to be formed. Therefore, the minimum number of groups required is 7.

The context is used in the application activity, helping students recognise that the answer to division with a remainder is not always the quotient. Depending on the requirements of the situation, the remaining part may create a need to add one more unit.

Step 2. Select and examine the context and define the problem

The selected context is the "Keep Bai Chay Green" activity organised by the Bai Chay Primary School Young Pioneer Organisation. This is an actual school activity associated with educating students to care for the environment and protect the local landscape.

According to the actual registration list, 68 Grade 5 students are participating. To facilitate organisation and ensure that every group has a supervisor, the school stipulates that each group may have no more than 10 students. The data used in the task arise from the organisational requirements of the activity and were not created solely to serve the calculation.

The situation is presented as follows:

The Bai Chay Primary School Young Pioneer Organisation is organising the "Keep Bai Chay Green" activity for students. According to the actual registration list, 68 Grade 5 students are participating. To facilitate organisation and ensure that every group has a supervisor, the school stipulates that each group may have no more than 10 students.

What is the minimum number of groups into which the Organising Committee needs to divide the students so that all 68 students can participate? Why?

The situation contains a problem that needs to be solved in practice. Students must not only determine the result of the division, but also explain the meaning of the remainder in order to decide how many groups need to be formed. If they stop at the result "6 remainder 8", the Organising Committee's requirement has not yet been fully addressed.

Step 3. Construct the situation and a sequence of learning tasks

The learning activity is organised through the following three tasks:

Task 1. Explore the situation

Students read the situation and identify that:

There are 68 students registered to participate;

Each group may have no more than 10 students;

All 68 students must be assigned to groups;

The minimum number of groups needs to be found.

The teacher may use several prompting questions:

What does the number 68 indicate?

What is the greatest number of students allowed in each group?

What does the Organising Committee need to determine?

Why does the problem ask for the "minimum" number of groups?

Task 2. Select and perform the operation

To minimise the number of groups to be formed, students determine that a maximum of 10 students can be assigned to each group and perform the following operation:

$$68 : 10 = 6 \text{ (remainder 8)}.$$

The teacher asks students to state the result of the division and prepare to explain the meaning of the quotient and remainder in the situation.

Task 3. Interpret the result and draw a conclusion

The teacher uses the following questions:

What does the quotient 6 indicate?

What does the remainder 8 indicate?

If only six groups are formed, have all 68 students been assigned?

How many groups does the Organising Committee need to form?

Students reason as follows:

Six groups of 10 students accommodate only 60 students; eight students still have no group, so one more group must be formed. Therefore, the Organising Committee needs to divide the students into at least seven groups so that all 68 students can participate.

The relationship among the numbers can be checked using the equality:

$$68 = 6 \times 10 + 8.$$

The conclusion needs to be stated fully in relation to the context:

The Organising Committee needs to form at least seven groups.

The above task sequence does not require students to try multiple ways of grouping the students. The focus of the activity is on selecting the operation, explaining the meaning of the remainder, and using the result to answer the real-life problem correctly.

Step 4. Implement, assess, and refine

The teacher may briefly introduce the announcement or summary of the number of students registered for the Young Pioneer Organisation's activity. Students work individually to identify the operation and then discuss the meaning of the quotient and remainder in pairs before presenting their conclusion to the class.

During implementation, the teacher does not need to require students to use cards, draw grouping diagrams, or find multiple specific grouping arrangements. Such activities may increase the time required but do not provide additional evidence necessary for the task objective. The teacher's questions need to focus on helping students connect the result of the division with the requirements of the situation.

Assessment is based on the following indicators:

- The student correctly identifies the data and requirements of the situation;
- Selects and correctly performs the operation;
- Explains that the quotient 6 represents six full groups of 10 students;
- Explains that the remainder 8 represents eight students who have not yet been assigned;
- Recognises that one more group needs to be formed;
- Correctly concludes that the Organising Committee needs at least seven groups.

Some students may answer "6 groups, with 8 students remaining" without concluding that seven groups are needed. In that case, the teacher may ask: "Where will the remaining eight students be assigned?" Other students may take the remainder 8 to be the number of groups that need to be formed; the teacher needs to guide them in distinguishing the meaning of the quotient, the remainder, and the number of groups to be found in the situation.

After the activity, if students perform the operation correctly but cannot explain the conclusion, the teacher needs to increase the use of questions requiring them to interpret the meaning of the result. If students have explained it clearly, the teacher may generalise that, in some situations, when a division has a remainder and all objects must be accommodated, one more group or container needs to be added.

The key point of the task lies not in the complexity of the operation, but in requiring students to interpret the result according to the real-life condition. If the question asks only students to calculate $68:10$, they may stop at the quotient and remainder. When asked to determine the minimum number of groups, students must use the meaning of the eight students left over to conclude that one more group needs to be formed. In this way, the mathematical result becomes the basis for carrying out a specific school task.

4. DISCUSSION

The research findings show that designing a context in mathematics teaching needs to begin with the intended learning outcomes and mathematical relationships, rather than with a search for an appealing story. This approach helps maintain the mathematical focus and limits the possibility that the context becomes an external decorative element of the exercise.

The four proposed principles simultaneously address the content, the learner, plausibility, and organisational conditions. Of these, the requirement for a plausible context with potential for mathematical exploration is particularly significant. A familiar situation that does not create a need for reasoning, representation, or use of the result does not necessarily have pedagogical value. Conversely, a simulated situation can still be meaningful if students can understand it, the data are plausible, and the mathematical result helps solve the problem.

The four-step process creates a coherent progression from objectives to assessment: the intended learning outcomes and mathematical relationships guide context selection; the context is transformed into a situation and a task sequence; and students' activities produce evidence for the teacher to assess and make adjustments. This structure is consistent with Widjaja's (2013) observation that the effectiveness of contextual problems depends substantially on how the teacher organises opportunities for students to explain the situation and connect it with mathematical ideas. The process is also compatible with the task-design criteria of correctness, authenticity, task progression, and level of student participation proposed by Marco and Palatnik (2024).

Compared with a full application of Realistic Mathematics Education, the process in this study has a more modest scope. It draws on the perspective of using meaningful situations and intermediate representations, but does not assume that Grade 3 students can independently discover every rule in its entirety. The teacher continues to play the role of selecting the context, designing the task sequence, using prompting questions, and formalising the knowledge. This delineation helps avoid equating every task with everyday-life content with a complete mathematical modelling activity, an issue that has also been noted in the application of Realistic Mathematics Education in Vietnam (Lê et al., 2021).

The exploratory survey results show that teachers hold positive views about the necessity of context-based teaching, but lack a process and encounter difficulties in selecting and adapting situations. The proposed process can be used as a guide or checklist in professional learning meetings. Teachers can jointly analyse a task by asking: What is the mathematical objective? Is the context plausible? At what point must students genuinely think? How is the result interpreted back in the situation? What product demonstrates that students have understood the problem?

The study has several limitations. The survey was conducted with only 20 teachers at two schools, so the results are primarily exploratory. The process has so far been analysed and illustrated within the Grade 3 topic of Numbers and Operations and has not been tested as an independent intervention model on a large scale. Further research needs to seek expert opinion, trial the process with more teachers, and analyse students' work across different content areas, grade levels, and localities. Comparing versions of tasks before and after teachers revise them may also provide more direct evidence of the usefulness of the process.

5. CONCLUSION

Context-based teaching in mathematics does not simply mean incorporating stories, characters, or images from everyday life into exercises. A context has genuine value only when it helps students identify the problem, select data, use mathematical representations, carry out problem-solving activity, and interpret the result according to the requirements of the situation.

The study has identified four principles for designing and using contexts: alignment with intended learning outcomes and mathematical content; suitability for students' lived experience and cognitive characteristics; assurance of the plausibility of the context and its potential for mathematical exploration; and assurance of feasibility and coherence in the teaching process. On this basis, a four-step process is proposed, comprising: identifying intended learning outcomes and core mathematical relationships; selecting and examining the context and defining the problem; constructing the situation and a sequence of learning tasks; and implementing, assessing, and refining.

The example involving division with a remainder shows that the process can support teachers in designing tasks in which students not only perform an operation but also use the meaning of the remainder to make a decision. The process can be regarded as a reference framework for teachers and professional groups when designing, analysing, and refining teaching activities for the Grade 3 topic of Numbers and Operations. However, the process needs to be tested further under diverse teaching conditions in order to evaluate its appropriateness and effectiveness more fully.

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