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## DESIGNING EXERCISE BASED ON REAL- LIFE CONTEXTS: A PILOT STUDY ON TEACHING SCIENCE SUBJECT IN PRIMARY SCHOOL

Dr. Hang Nguyen Thi Thu<sup>1</sup>, Bui Thi Thanh Tu<sup>2</sup> and Tran Thi Huong<sup>3</sup>

<sup>1</sup>University of Education - Thai Nguyen University – Vietnam;

<sup>2,3</sup>K29 Post graduate student - University of Education - Thai Nguyen University – Vietnam

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### ABSTRACT

Teaching based on Real-life contexts is of significant importance as it greatly impacts students' problem-solving abilities and creativity. This article focuses on analyzing and evaluating the principles, processes, and effectiveness of designing exercises based on Real-life contexts in science education at the primary school level. The study emphasizes the connection between the content of science subjects and the daily life realities of students, with the aim of creating a meaningful and positive learning environment. Based on this approach, the article proposes several principles and processes for designing exercises based on Real-life contexts, provides examples, and conducts an initial survey on the appropriateness and effectiveness of the process with over 50 science teachers in primary schools. The results of the study provide an in-depth insight into the process of designing exercises that integrate Real-life contexts and using them in teaching, thereby enhancing the effectiveness of teaching science in primary schools.

**KEYWORDS:** exercises, science subjects, students, primary school, Real-life contexts.

### 1. INTRODUCTION

In education, learning based on Real-life contexts helps bridge the gap between scientific knowledge and practical life [1]. Instead of solely focusing on knowledge transmission, this approach creates a multidimensional learning environment where students can learn through direct experiences and interactions with the world around them [2].

Exercise or learning scenarios are an organizational approach to set learning objectives and lesson content for teachers to assign to students, containing requirements that demand students to apply what they have learned to solve theoretical or practical problems. Exercise can also be understood as stimulating situations that require students to provide an answer without a pre-existing solution at the time the task is assigned [3].

Science in the Vietnamese Primary school curriculum is built on the basic foundation of natural sciences and research areas in health education and environmental education. The subject emphasizes awakening scientific curiosity, initially creating opportunities for students to explore the natural world; apply learned knowledge and skills into practice; learn how to maintain health and behave appropriately in their surrounding environment [4].

In teaching science at the Primary school level, exercises are often activities designed for students to practice, exercise, and apply the knowledge they have learned through lectures or study programs. Exercises may include observational exercises, conducting experiments, problem-solving, group discussions, report writing, and harvesting, among others.

Exercises help students apply theoretical knowledge to reality, thereby creating a positive and engaging learning environment. They also help students develop self-learning skills, logical thinking, creativity, and problem-solving abilities. By participating in exercises, students have the opportunity to hone their independent and teamwork skills, as well as build confidence and patience in the learning process. Therefore, exercises play a crucial role in education, helping students progress and develop comprehensively.

When using exercises in teaching, students not only acquire knowledge but also learn how to apply it in real-life contexts, thereby reducing the gap between theory and practice. Additionally, employing this approach stimulates students' curiosity and creativity, thereby enhancing their learning process and personal development [1], [5], [6]. It also helps students develop self-learning skills, logical thinking, creativity, and problem-solving abilities. By engaging in exercises, students have the opportunity to practice independent and teamwork skills, as well as build confidence and patience in the learning process. Thus, organizing activities using exercises based on Real-life contexts helps students recognize the true value and significance of the knowledge they are learning, thereby providing strong motivation for their learning process [7].

## **2. RESEARCH QUESTIONS**

The purpose of the article is to analyze the principles and design process of exercises based on Real-life contexts, thereby conducting an initial survey on primary school science teachers in Vietnam.

Research questions:

- What are the principles of designing exercises based on Real-life contexts?
- How are exercises designed through practical experiences?
- How do teachers initially perceive and evaluate the designed exercises?

### **3.1. Principles of Designing Exercises Based on Real-life contexts**

#### **3.1.1. Ensuring Objectivity and Scientific Rigor**

When designing exercises based on Real-life contexts in teaching science, it is essential to carefully consider the content of the exercises to accurately reflect the knowledge and skills that students have acquired [8], [9]. This helps teachers assess the level of understanding and progress of their students according to the curriculum.

To ensure that exercises are suitable for the age and level of primary school students, it is important to use simple and clear language in the exercises. This helps students understand and perform exercises effectively. Diversifying the forms and content of exercises is also crucial. Using various types of exercises such as multiple-choice questions, fill-in-the-blanks, or free-form writing exercises stimulates students' creativity and exploration, creating a rich learning environment.

Special attention should be paid to the time and feasibility of exercises when designing them. The time required to complete exercise should be appropriate, not creating excessive pressure on students and ensuring the feasibility of the exercises.

#### **3.1.2. Ensuring Practicality**

In designing exercises based on Real-life contexts in science education, exercises should reflect real-life contexts that students may encounter in their daily lives. This helps them apply knowledge and skills to specific situations. Additionally, exercises should directly relate to the content taught in class, combining knowledge and skills in real-life contexts, helping students recognize their applications in daily life.

Another approach to ensuring practicality in task design is to use diverse resources and materials that reflect everyday situations authentically and vividly. This helps students experience and apply knowledge flexibly and creatively. Ensuring practicality in task design offers many benefits to students not only in understanding the subject matter but also in developing life skills and behaviors in daily life.

For example, a science task may require students to research caring for and protecting plants. Engaging in activities such as research, discussions, and solving real-world problems helps students develop problem-solving skills, creative thinking, teamwork, and apply knowledge to daily life, helping them realize the importance of the subject and the significance of learning. This creates higher interest and motivation in the learning process, promoting the comprehensive development of students not only academically but also in life.

### **3.1.3. Meeting Competency Indicators in Teaching Science**

When designing exercises, it is important to ensure that the content of the exercises fully reflects the knowledge and skills that students have learned in the subject curriculum. Exercises should focus on specific skills and knowledge that have been taught, evaluating students' ability to apply these knowledge and skills to new and practical situations.

In the Vietnamese science curriculum, the ability to apply learned knowledge and skills is demonstrated through requirements such as:

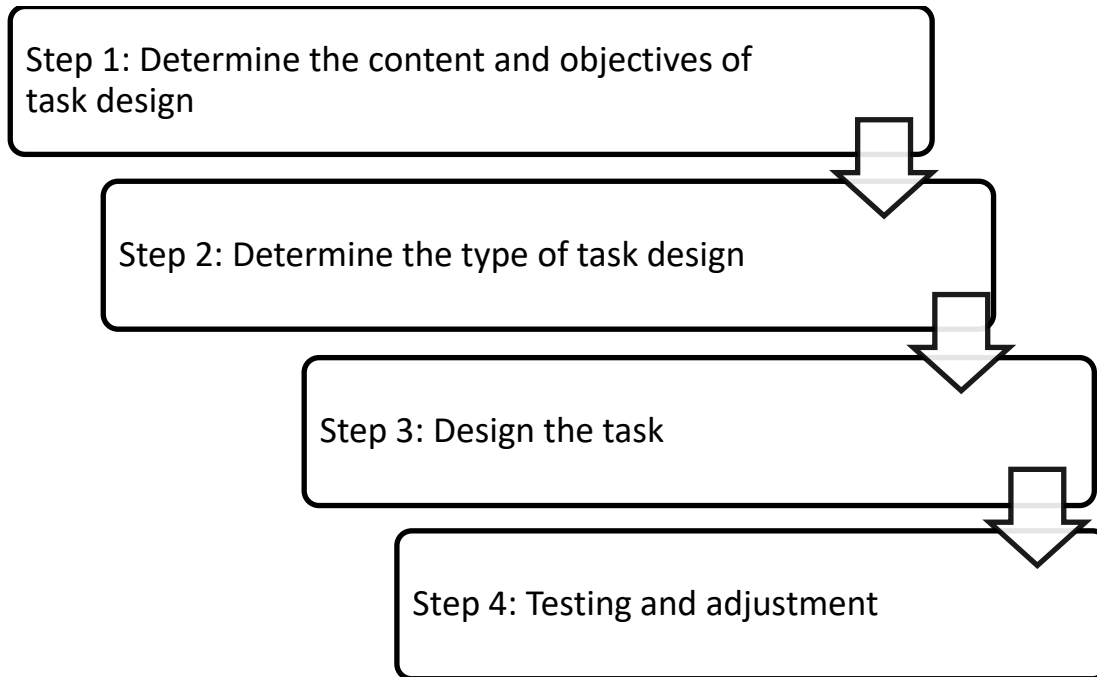
- "Explain, at a simple level, some objects, phenomena, and relationships in nature and society.
- Analyze situations related to personal safety, health of oneself, others, and the living environment; Analyze situations related to personal safety, health of oneself, others, and the living environment around" [9].

Based on this principle, when designing exercises based on Real-life contexts, teachers can divide and design exercises into the following groups:

- Exercises explaining objects, phenomena, and relationships in nature and society;
- Exercises analyzing situations;
- Problem-solving exercises and proposing behavioral solutions.

### **3.2. Process of Designing Exercise Based on Real-life contexts**

The process of designing exercises based on Real-life contexts in teaching science at Primary school can be carried out following the steps outlined in the diagram below:



**Diagram 1: Process of Designing Exercises Based on Real-life contexts**

Step 1: Determine the content and objectives of task design: To identify the content and objectives of the task, teachers need to study the learning requirements of the science curriculum to clearly define what students need to achieve and determine the content, objectives selected to design the task. Consequently, express the objectives clearly using action verbs that students can achieve and teachers can measure and evaluate.

Step 2: Determine the type of task design: Each type of task has its own advantages and limitations. Based on the task design objectives, teachers select the appropriate type of task design such as problem-solving exercises, situation handling exercises, investigative exercises, project exercises, etc.

Step 3: Design the task: After determining the objectives, content, and presentation format of the task, teachers will choose the language and expression to build exercises based on Real-life contexts. Choosing the language and expression in the task helps demonstrate the diversity and richness of the knowledge learned in the subject. This helps students understand deeper aspects of a topic and develop the ability to apply knowledge in practice.

Step 4: Testing and adjustment: Through testing the task, teachers have the opportunity to check the accuracy and suitability of the task with the set objectives and content. This helps them identify the strengths and weaknesses of the task to adjust it to be the most appropriate and effective. Testing the task also helps teachers evaluate the level of cognitive understanding and the ability to apply the task in solving practical problems. This helps them adjust the task to be suitable for the level and learning needs of each student as well as the entire class. Through the testing and adjustment process, the task

can be improved and adjusted flexibly based on feedback from students and results from previous tests, creating diverse learning environments that adapt to the desires and levels of students.

### 3.3. Some Illustrative Exercises

Lesson Name: Some Properties of Water  
(Grade 4 Science)

Exercise Objective: Apply the properties of water to explain some phenomena.

Exercise Content: There is a water wheel on the stream next to Dinh's house. It brings water from below up to high to irrigate the fields. In your opinion, what properties of water have the people in Dinh's area applied to achieve this?



Lesson Name: The Diversity of Fungi  
(Grade 4 Science)

Exercise Objective: Apply the living environment characteristics of fungi to explain practical phenomena.

Exercise Content: After several rainy days, Nam stepped out into the backyard and saw many mushrooms growing. Nam wondered: "Why is it that after a while of rain, many mushrooms grow in the garden?" Please help Nam explain the phenomenon.



Exercise 3: Balanced Diet (Grade 4 Science)

Objective: Evaluate whether the school lunch is balanced and healthy.

Exercise Content: Record the names of the foods and drinks in the school lunch and state your observations and suggestions.

*Survey Form*

Exercise: .....

Name of the participant: .....

Date	Menu	Observations

**3.4. Feasibility Survey Results of the Principles and Design Process of Real-life Based Exercises**

We conducted interviews with teachers participating in the experiment to gather information on the feasibility and significance of the principles, design process, and content of exercises based on real-life contexts.

We conducted a survey with 50 school administrators and Primary school teachers. All the surveyed administrators and teachers had at least a university degree and more than 8 years of teaching experience. The survey collected opinions, comments, and evaluations from the administrators and teachers regarding the effectiveness and utilization of the proposed methods and processes based on their experiences.

**3.4.1. Appropriateness of Exercise Design Principles**

We surveyed teachers' opinions on the appropriateness of the proposed exercises design principles. The survey results are presented in the following table:



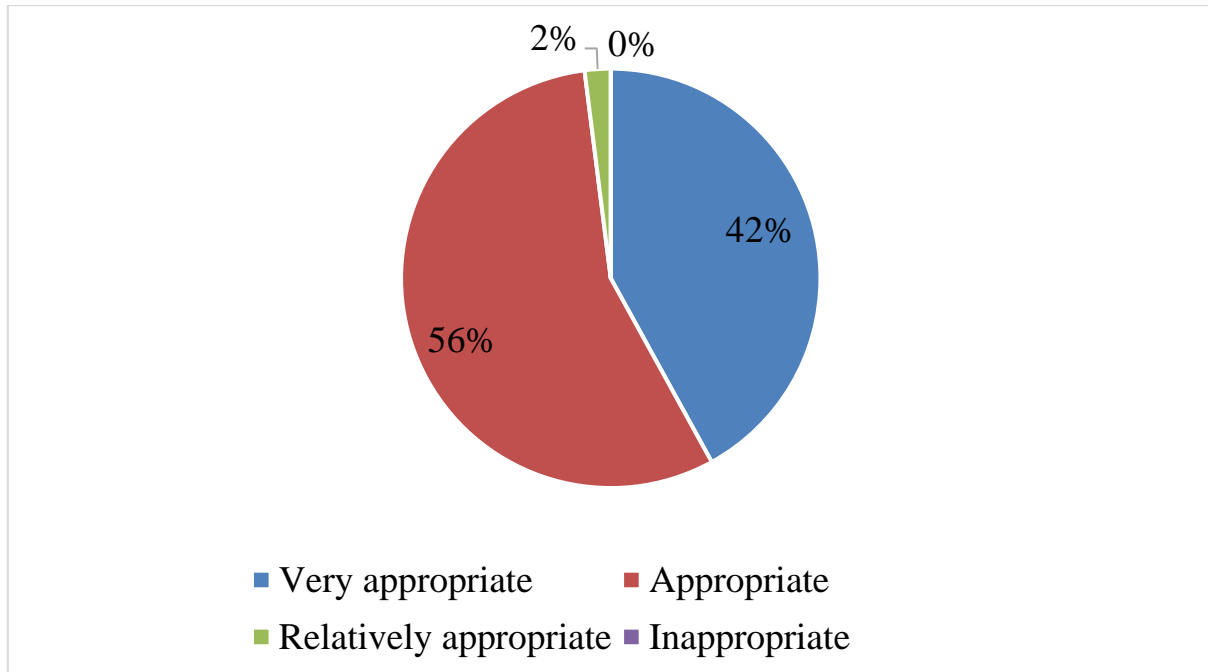
**Table 1. Appropriateness Level of Exercise Design Principles Based on Real-life contexts**

Principles	Assessment Levels							
	Very appropriate		Appropriate		Relatively appropriate		Inappropriate	
	Number	%	Number	%	Number	%	Number	%
Principle 1: Ensure objectivity and scientific rigor	46	92	4	8	0	0	0	0
Principle 2: Ensure practicality	38	76	12	24	0	0	0	0
Principle 3: Ensure alignment with the requirements of the Science subject	49	98	1	2	0	0	0	0

From the table above, it can be seen that teachers highly appreciate the appropriateness of the three proposed principles. Among the three principles, the principle of ensuring compliance with the requirements of the Science subject received the highest rating of 98%. Next is the principle of objectivity and scientific, followed by the principle of practicality. The majority of teachers rated the rationality of these three principles highly, with no opinions indicating that these principles are not appropriate.



### 3.4.2. Appropriateness of Exercise Design Process

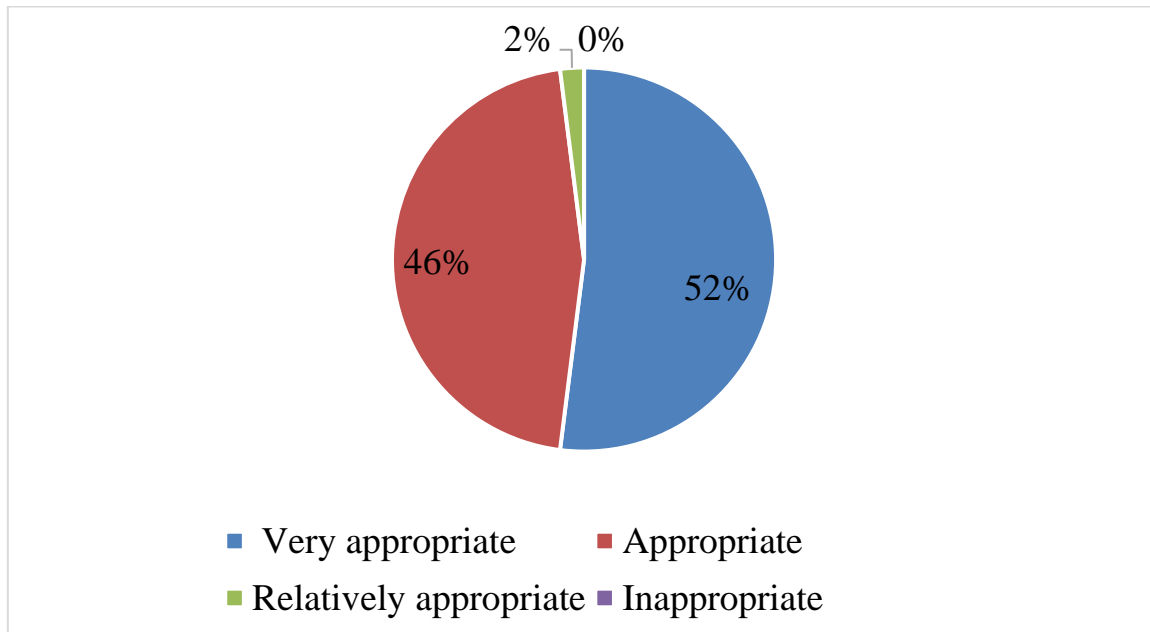


**Chart 1. Appropriateness of Exercise Design Process**

Looking at the results above, it shows that the majority of teachers (98%) evaluated the development of exercise design processes based on real-life contexts for students in teaching Science as highly appropriate (42%) and appropriate (56%). Only 2% of teachers had opinions that were not significant. This result confirms that researching and developing exercise design processes based on real-life contexts in teaching Science is important and shows initial feasibility when applied.

### 3.4.3. Appropriateness of Exercise Design

We conducted a survey to gather teachers' opinions on the appropriateness of the content of some designed exercises. The survey results are shown in the chart below:



**Chart 2. Appropriateness Level of Exercises**

From the results above, it is evident that 98% of teachers rated the level of appropriateness of the designed exercises in teaching Science as very appropriate or appropriate. Only 2% of teachers chose relatively appropriate, and no teachers found them inappropriate. This result indicates that, based on teaching experience, teachers highly value the relevance of exercises based on real-life contexts in teaching Science. Additionally, all interviewed teachers stated that they would use these exercises in teaching Science at Primary schools in the future. This initial affirmation provides a basis for implementing the designed exercises in the practical teaching of science.

The analysis results from the initial survey of 50 teachers showed that the principles and processes of constructing exercises were evaluated as scientific and suitable for students' understanding and teachers' guidance. Teachers assessed and indicated that these exercises are easy to apply in the process of teaching Science at Primary schools. The exercise design process demonstrates feasibility and importance for developing students' capabilities.

#### **4. CONCLUSION**

The article has analyzed and evaluated the principles, processes, and effectiveness of exercise design, while also providing illustrative examples and surveying the appropriateness and effectiveness of the process among a group of teachers. The research results have offered an in-depth insight into the process of designing exercises integrating real-life contexts and using them in teaching Science at Primary schools, thereby enhancing the effectiveness of teaching and developing students' capabilities. However, it is important to note that the research only surveyed teachers and did not conduct

experiments on students, which is a limitation of the study. Therefore, in the future, experiments should be conducted on students to assess the real effectiveness of applying real-life based exercise design in the teaching process.

Some potential research directions for the future include expanding the scope of research on exercise design in various subjects, not just limited to science. Furthermore, comparative studies can be conducted to compare the effectiveness of applying real-life based exercise design with exercise reenactments and lesson content analysis. These research directions can provide valuable information to improve the teaching process and enhance the effectiveness of learning.

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