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## DEVELOPING SCIENTIFIC COMPETENCE FOR PRIMARY SCHOOL STUDENTS THROUGH EXPERIENTIAL LEARNING

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### ABSTRACT

We research and analyze Vietnam's approaches to teaching Natural and Social Science through experiential learning to give explanations about the influence of teaching activities through designed experiences. Experiential learning activities built from real life contexts have a great influence on the scientific competence of primary school students, such as cognitive ability of scientific issues, ability to understand the surrounding natural and social environment, ability to apply acquired knowledge and skills. The article analyzes the expression of scientific competence of Vietnamese students in Natural and Social subject, Science subject at primary school level, practical context of curriculum innovation in Vietnam and illustrations suggest some experiential learning activities to provide an additional approach when designing teaching plans towards developing scientific competence for primary school students.

**KEYWORDS:** context, teaching, scientific competence, primary school students, Vietnam, Natural and Social subject, Science subject

### 1. INTRODUCTION

Experiential learning is one of the oldest teaching theories in European and North American countries (Boud and Miller 1996; Miettinen 2000). The basis of experiential learning comes from some of John Dewey's activity theories and especially David Kolb's experiential learning theory. Experiential learning focuses on helping learners reflect on their experiences when participating in a specific activity, so that they can draw concepts as well as professional knowledge and skills associated with practice.

Experiential learning helps learners to apply what they have learned to solving real-life situations and problems (D. A. Kolb 2015; David A Kolb n.d.; Mayoh and Knutton 1997). This helps the process of keeping information longer and the ability to solve problems is formed and developed. Besides, experiential learning is often organized in groups or teams. When studying in this environment, students can express their personal opinions, assign work, interact actively with classmates to

complete learning tasks, thereby promoting teamwork, forming and developing communication and cooperation competence, improving and enhancing learning excitement and motivation. Experiential learning is often associated with the organization of experimental activities, solving practical situations and problems, creating a fun and interactive environment, thereby stimulating learners' interest and passion for learning (Campbell, Lubben, and Dlamini 2000; Mayoh and Knutton 1997; Thi, Hang, and Van Thiet n.d.; Thu Hang, Hien, and Van Tinh 2022). In the process of solving practical tasks, learners have the opportunity to discover and search for new problems, which can stimulate learners to think on their own. They can think about what they've been through and what they've learned, wonder about new problems and questions.

## **2. RESEARCH QUESTIONS**

The purpose of the article is to analyze David Kolb's experiential learning model and its application in teaching Natural and Social subject, Science subject in Vietnam to answer the following questions: What stages does the experiential learning process include? What are the main characteristics of each stage? Why is experiential teaching suitable for teaching Natural and Social Science subjects, Science and developing science competence for Vietnamese students? What are some illustrative examples of applying experiential learning to form and develop students' scientific competence in teaching Natural and Social subject, Science subject.

## **3. RESEARCH CONTENT**

### **3.1. David Kolb's experiential learning model**

According to Kolb, learning is a process in which learners' knowledge is created through transformation of experience. Knowledge results from a combination of capturing and transforming experience. Each person living in a social environment always goes through a learning path, always receives stimuli from the environment and learns to adapt and develop. Activity is both a condition and a mode of implementation of learning and "do", "practice", "experience" are all forms of activities and effective learning methods. Experiential learning is the process of building and capturing knowledge directly from an individual's experience. Kolb's model of experiential learning proposes four stages of the learning process: (1) Concrete experience (2) Reflective observation; (3) Abstract conceptualization; (4) Active experimentation (D. Kolb 1976; D. A. Kolb 2015; David A Kolb n.d.). Of these, the first two involve capturing an experience, the latter two focusing on transforming an experience:

+ Concrete experience: Learners learn through specific activities, behaviors, and manipulations, directly associated with real contexts. Learners participate in a new experience or interpret past experiences in another way. This is where the learning cycle data is generated.

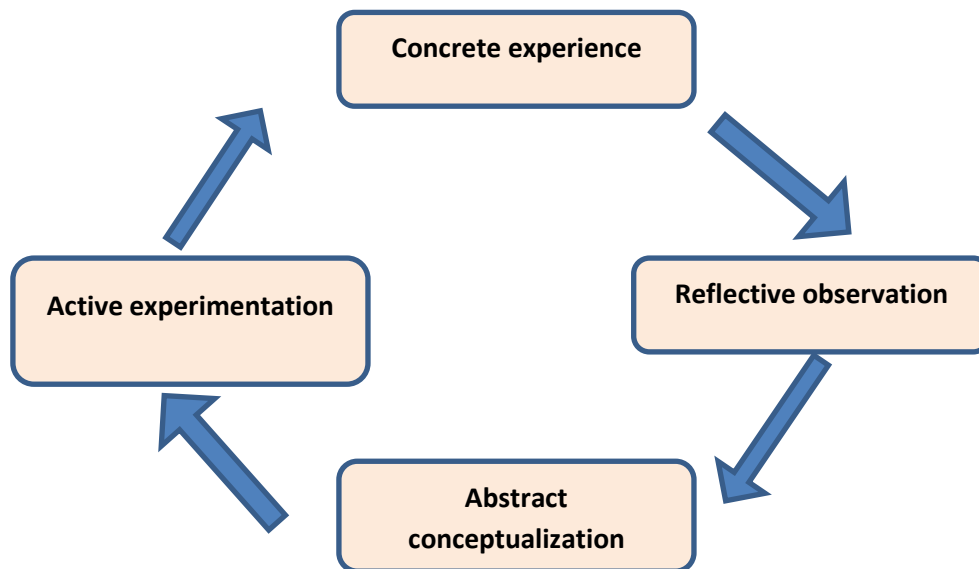
+ Reflective observation: Learners reflect on their own experiences, use the lens of their own experiences and knowledge to think about the activities they have gone through and examine the

experiences they have had, thereby discovering the characteristics and meaning of this learning experience for themselves.

+ Abstract conceptualization: Learner's form, construct new concepts or adjust their thinking based on experiences and reflections on what they have experienced or observed.

+ Active experimentation: Learners apply new concepts to the world around them and identify and evaluate changes that occur in practice. This process can take place in a short or long time to create products and apply to solve practical problems.

Kolb's experiential learning cycle can be described in the following diagram:



**Diagram 1: Kolb's Learning Cycle**

According to Kolb, learning needs to follow the correct sequence of steps in the cycle, but does not have to start from a specific step. It depends on the personality of each person to choose the starting step (for example, some people like to do first and then read the theory, others like to read the theory first and then practice). It is important that in the learning process, learners will base on their previous experiences, reflect on the topic being studied, to understand, to generalize, to derive core concepts. Then they apply new knowledge in practice to test the truth and falsehood and decide whether to accept this knowledge as new experience, starting a new learning cycle or not. This process continues until the learner achieves the goal.

### **3.2. Experiential learning to develop scientific competence in Vietnam's 2018 General Education Program**

### **3.2.1. Orientation to the organization of experiential learning in the 2018 General Education Program**

In Vietnam, “Experience” is going through and contemplating after a process. Experience is action, the result of the action is that the participant gains “experience” (Hoang Phe, 2012). In Vietnam's 2018 General Education Program, "Experience" is described as "a process of activities to acquire experiences, thereby effectively applying them to real life" (Ministry of Education and Training 2018b). The concept of "experiential learning" is a broad category, including a system of elements in terms of objectives, content, methods, forms of teaching organization and assessment of learning outcomes, towards ensuring opportunities for learners to participate in real activities or simulate reality through their own contemplation.

In 2018, Vietnam issued a new General Education Program which focuses on the formation and development of qualities and competencies for students. The basic orientation of the educational method is to apply methods to actively engage learners' activities, create a friendly learning environment and problem situations to encourage students to actively participate in learning activities. Students' learning activities include problem discovery and practice (applying what they have learned to detect and solve real-life problems). Thus, the common feature of the educational methods applied in the 2018 General Education Program is to actively engage students' activities, in which teachers play the role of organizing and guiding activities for students. A friendly learning environment is created to encourage students to actively participate in learning activities, discover their own abilities and aspirations, practice habits and abilities, self-study, promote their potential and accumulated knowledge and skills for development.

The educational process for primary school students in the 2018 General Education Program is carried out through two basic ways: Through teaching subjects and through organizing experiential activities for students (Thu Hang, Hien, and Van Tinh 2022; Thu Hang and Tu Quyen 2022). Thus, with the orientations and goals of teaching and developing competence, the organization of experiential learning can be approached with two paths corresponding to two different levels:

Experiential learning in subjects: Learning activities are organized on and off campus through a number of main forms such as investigation, training, exercises, scientific experiments, games, role-playing, research projects, seminars, tours, projects, depending on the specific goals and nature of the activities, students are organized to work independently, in groups or as a whole class. Whether working independently, in groups or in class units, students are given the opportunity to carry out their own learning tasks and real-world experiences.

Experiential activities as an educational activity are organized in parallel with teaching subjects, combining many different modes of experience: discovery, interaction, dedication and research. These methods are expressed through four main types of activities: Activities under the flag, Class activities, Thematic educational activities and Club activities (Hang, 2022).

### **3.2.2. Experiential learning to develop scientific competence**

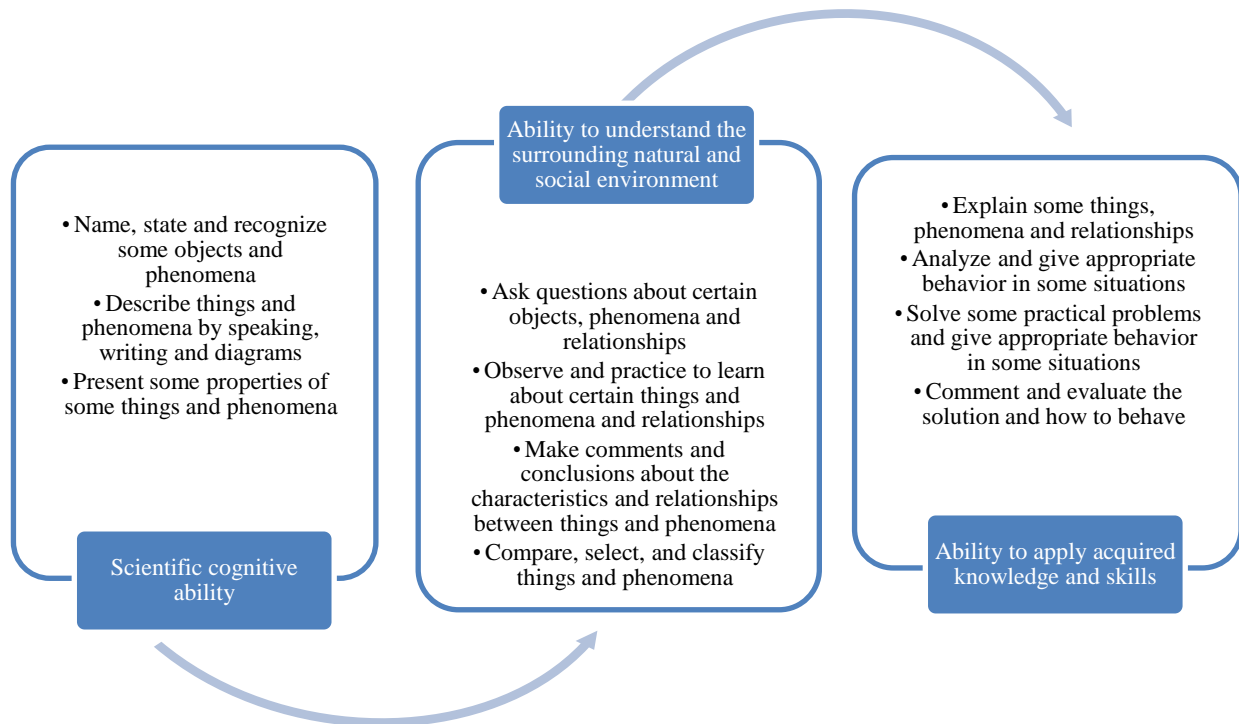
In Vietnam's 2018 General Education program, scientific competence is formed and developed mainly through Natural and Social subject, Science subject, including the following components: Scientific cognitive competence, ability to understand the surrounding natural and social environment, ability to apply acquired knowledge and skills (Ministry of Education and Training 2018b, 2018a). The manifestations of scientific competence in Natural and Social subject are described as follows:

**Scientific cognitive ability:** Students state and recognize at a simple level a number of things, phenomena and relationships commonly encountered in the surrounding natural and social environment, such as health and safety, relationships with their families, schools, communities, and the natural world. Students can describe a number of things, natural and social phenomena around them by means of expressions such as speaking, writing and drawing. They can present some characteristics and roles of some common objects and phenomena in the surrounding natural and social environment, compare, select, and classify simple things and phenomena in nature and society according to a number of criteria.

**Ability to understand the surrounding natural and social environment:** Students can ask simple questions about some objects, phenomena, relationships in nature and surrounding society. They can observe and practice to learn about things, phenomena, relationships in nature and surrounding society. They can comment on the external characteristics, compare the similarities and differences between the surrounding objects and phenomena and their change over time simply through the results of observation and practice.

**Ability to apply acquired knowledge and skills:** Students can explain at a simple level some objects, phenomena, relationships in nature and surrounding society. They can analyze situations related to safety and health, others and the surrounding environment. They can solve problems, come up with appropriate behavior in relevant situations (at a simple level), exchange and share with people around to do the same, comment on how to behave in each situation.

A brief description of the manifestation of scientific competence in the primary school curriculum can be seen through the following diagram:



**Diagram 2. Manifestations of scientific competency in Vietnam's Primary Education Program**

With the above manifestations of scientific competence, experiential learning can be organized regularly through diverse learning activities, such as:

Learning about the living environment of animals and plants, teachers can organize for students to observe and learn about school gardens and zoos. For example, with grade 1 students, when learning about trees and animals around, they can learn about the outstanding features of some important plants or animals. Teachers organize for students to observe the school garden - where there are vegetables, flowers and ornamental plants, some small animals such as ants, worms, insects... to exchange and discuss with each other on the following questions: What plants and animals do you see? Where can you see them? What characteristics do they have? After students exchange and share with each other, teachers organize for students to draw a tree (or an animal) that has been observed, talk about the color, shape, characteristics of the tree (or animal) then report and share it in front of the class. The process of organizing teaching as above not only stimulates curiosity and scientific discovery for students, but also arouses curiosity, research, understanding the natural world and applying the acquired knowledge to shape into positive emotions, love nature, the surrounding environment and consciously protect animals and take care of trees.

In addition to being held in the school garden and school yard, experiential learning can be held in areas outside the school, such as factories, workshops, etc. of the locality. For example, when learning



about local production activities (grade 3), students in an ethnic minority area who are the Mong people, where brocade weaving is still preserved, teachers can raise issues for the class to discuss. Learn from the following situations:

Every time Liu wears a brocade dress, she wonders: *Why can such a beautiful shirt be made from a rough “lanh” tree?* Please collect information about local brocade making and answer Liu’s question in the above situation.



To learn about handicraft production - brocade weaving, teachers organize for students to visit a brocade making family near the school (if any) or investigate where they live, collect information and record the process of creating products and the benefits of brocade production to people's lives. At the same time, students analyze and comment on the preservation and protection of traditional craft and local culture.

Experiential learning is not only shown through visits and surveys, but can also be associated with the process of organizing teaching in the classroom through experimental and practical activities. For example, when teaching students to learn about the reproductive organs of flowering plants, teachers can organize for students to draw any flower and annotate the parts of that flower. The purpose of this activity is to discover the knowledge and experience of learners about new concepts to be learned. On the basis of the flower and the parts drawn by the students, teachers organize for students to practice observing and dissecting real flowers, comparing with the diagram of the parts of the flower drawn initially. From there, students realize the knowledge they need to adjust. Teachers generalize and correct scientific terms so that students can draw new knowledge about the parts of flowers by themselves. Finally, students themselves will once again draw the flower and annotate its parts with the scientific terms and knowledge they have just learned in their workbooks.

Through the process of directly observing objects and phenomena, listening to instructions, watching videos, etc., students form specific experiences about the surrounding natural and social world, creating the beginning of the learning process. With specific learning situations associated with real-life contexts, students reflect, think, and connect learned concepts, observed objects, and implemented experiences to analyze and summarize. They collect new concepts, draw conclusions for themselves about the issues being studied, from which to apply in real life. In addition, through experiential

learning, learners can also self-test the true/false, benefits of new concepts, creating input materials for their next learning cycle.

### 3. CONCLUSION

Kolb's Experiential Learning Theory is still highly appreciated and oriented for teaching competence development at primary school level in Vietnam. The application of experiential learning theory to the organization of learning activities Natural and Social subject, Science subject in primary school can be flexible. It is necessary to emphasize on the selection of appropriate content and diverse implementation methods to create opportunities for learners to operate through many different learning forms, such as observation, investigation, information gathering, survey, experiment and practice. The learning process can be held in the classroom or outside the classroom with the active role of students. Teachers organize, guide, control and draw new knowledge and skills for themselves.

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