The Interpretation of Thai Kindergarten Students’ Making Sense of Speed and Velocity

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Abstract. This paper aimed to examine some issues of kindergarten students’ learning about Physics. Students’ making sense of speed and velocity will be interpreted. Participants included twenty kindergarten students (4-5 years old) who were studying in Khon Kaen University Kindergarten Demonstration School, Khon Kaen, Thailand. Methodology regarded interpretive paradigm. The goal of kindergarten schools includes development of motor, emotion and mind, social, and cognitive skills. On the way of development of these skills, they may also make sense of science concepts. The students’ making sense of speed and velocity will be interpreted during students’ on activities for development of gross motor skills. Tools of interpretation included participant observation and informal interview when students were participating on the activities for development of gross motor skills as playing with the ball. The activity was carried out for two months. Students’ activities of playing with the ball indicated that some of students made sense of the speed and velocity concept when they showed that they play well on the ball as their perception of the relation of hand, eye, and moving of the ball. It could be mentioned that they not only developed on gross motor skills but also concept of ball moving as speed and velocity. This study may have implications for enhancing kindergarten students to learn science.

1. Introduction

The goal of kindergarten education in Thailand aims to support children’s development of body, mind, emotion, and intellectual skills. These aims included having a healthy body; healthy mind and being happy, being ethical with high standards of moral behaviour and also appreciating art, music, movement, and exercise. Further it involves having the ability to work independently; love and preserve nature, the environment, and culture and also to be respectful and promote Thai identity. The ability to communicate; thinking skills and solving problems; imagination and creativity; and positive attitude toward learning and inquiring are also very important goals [4].

The goal of science is to understand the natural world through a process known as scientific inquiry. Scientific knowledge helps us explain the world around us, such as why water evaporates and plants grow in particular locations, what causes disease, and how electricity works. Many jobs involve science, such as electrician, horticulturalist, architect, and car mechanic. And people of all ages learn about the world through actions that begin to approximate scientific practice. Many activities, by scientists and nonscientists, whether happening in the laboratory, in the field, or at home, have in common the active use of the basic tools of inquiry in the service of understanding how the world
works. Children and adults, experts and beginners, all share the need to have these tools at hand as they build their understanding of the world [5].

Enhancing early childhood under the natural world as way of knowing could support them develop scientific habit of mind in future [6]. [5] suggested some ways of science learning for young children as engaging in the practice of science. These included (1) doing science is a natural and critical part of children’s early learning; (2) children’s curiosity about the natural world is a powerful catalyst for their work and play; (3) with the appropriate guidance, this natural curiosity and need to make sense of the world become the foundation for beginning to use skills of inquiry to explore basic phenomena and materials of the world surrounding children; and (4) this early science exploration can be a rich context in which children can use and develop other important skills, including working with one another, basic large- and small-motor control, language, and early mathematical understanding.

The content of science for young children is a sophisticated interplay among concepts, scientific reasoning, the nature of science, and doing science. It is not primarily a science of information. While facts are important, children need to begin to build an understanding of basic concepts and how they connect and apply to the world in which they live [1]. Some study provided kindergarten students to construct meaning of the world from explaining the nature around students. For example, [3] organized kindergarten school student learning unit about the trees around us. Knowledge about the tree could be constructed meaning by young children. The unit provided students chance to clarify the part of the tree, classify of the tree, and find advantage of the tree. Students communicated their information of these activities through drawing. These activities allowed children learning scientific concepts and skills. There are many kinds of activities in early childhood which may allow kindergarten students to build up their understanding of basics concepts of science such as drawing, playing the ball, slider, and so on. This study aimed to examine kindergarten students’ learning about Physics when they playing with the ball. To playing the ball, students need to practice their muscle for playing and perceive the space and time of moving ball. This activity may allow them to make sense of speed and velocity.

Speed is defined as the rate of change in distance with respect to time. Velocity is defined as the rate of change in displacement with respect to time [2]. For the world of language using in everyday life, we understand motion as a change in position in the space over a certain period of time. Lengths and time periods are conditions for the quantification of such motions. On this basis, the (average) velocity is defined as the quotient of the distance travelled over the time required. However, time depends on a movement and vice versa, because time is measured using motion. In the hourglass sand runs through, in an analogous clock the pointer moves, and for the period of a year, we follow the cycle of the earth around the sun. This could be mentioned that the idea of space is connected to motion, for only through movement we perceive the space (Möller, 2015).

2. Methodology
The paper regarded the interpretive paradigm to understand kindergarten constructing meaning about the speed and velocity through students’ playing on the ball. Interpretation of students’ making sense about speed and velocity could be observed through students’ developing skills of knocking the ball.

2.1. Participants and setting
Participants were 20 kindergarten students (4–5 years old students). All participants’ family stays in downtown Khon Kaen. Sixty percents of their parents work in Khon Kaen University. The others work for companies and their own business in downtown of Khon Kaen.

2.2. Method of Inquiry
Normally, Khon Kaen University Kindergarten School organized many kinds of activities in order to develop motor, emotion and mind, social, and cognitive skills. Playing with the ball is one of activities which allow students to develop motor skills. This activity has enhanced students to be fun and develop skills of knocking the ball for 4 weeks. The activity aimed to gain students’ gross motor
development and relationship between eyes and hands. However, students’ developing skills of knocking the ball will be also interpreted how students’ making sense about speed and velocity. The improving of controlling the ball could be view as gross motor development and relationship between eyes and hands which could be interpreted that students perceived the sense of speed and velocity. To examine students’ making sense of speed and velocity, students’ skills of knocking the ball will be categorized.

3. Findings and discussion
The first week of students’ controlling the ball revealed that many of them could not control the ball. However, students’ skills have been improved for the following. This indicated that they make sense of speed and velocity. Students’ developing skills of knocking the ball could be seen as their improving on controlling the ball during four weeks as the Table 1.

3.1. Controlling the ball with no confidences
There are some students who control the ball with no confidences. This could be interpreted that they may weak on gross motor development. Their skill of relation between eyes and hand is low which reflect that they do not make sense of speed and velocity.

3.2. Well controlling the ball by moving their hands under level they are
Students could control the ball which represents their good gross motor development. However, students control the ball by moving their hands under level they are. This indicates that they could not perceive the distance of moving the ball depending on the time going by. It could be mentioned that this category of students could not well make sense of speed and velocity.

3.3. Well controlling the ball by moving their hands higher level they are
Students could control the ball which represents their good gross motor development. However, students control the ball by moving their hands higher level they are. This indicates that they could not perceive the distance of moving the ball depending on the time going by. It could be mentioned that this category of students could not well make sense of speed and velocity.

3.4. Well controlling the ball with their hand on level they are
Students could control the ball which represents their good gross motor development. And, students control the ball by moving their hands on level they are. This indicates that they could perceive the distance of moving the ball depending on the time going by. It could be mentioned that this category of students could well make sense of speed and velocity.

4. Conclusion
Students’ playing with the ball showed that they understand the space and time when they could wait the ball to move to their hands. This indicated that they make sense speed and velocity.
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