

DEVELOPMENT OF BASIC MOVEMENT LEARNING MODEL INTEGRATED WITH MATH SKILL FOR THE PRIMARY SCHOOL STUDENT GRADE I

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The main objective of the paper is to draft of basic movement learning model integrated with math skill for the primary school student grade 1.

The paper uses some research and development methods that aims to test how basic movement learning model integrated with math skill for the primary school student grade 1, which are (1) creating the physical education learning model, particularly basic movement integrated with math skill for the primary student grade 1, and (2) testing the physical education learning model especially basic movement integrated with math skill for the primary student grade 1 in the small scale. The research is multiple-stage process, which stages are an exploration and validation test. The exploration stage refers to development of physical education learning model, particularly basic movement integrated to enhance math skill for the primary student grade 1 and will be validated by the variety of instruments to obtain the purpose of the model. The next stage is a validation test. A validation test is described as doing product test on main subject by using rules of research and development based on Borg and Gall method.

The final result of our goal is to provide guide books containing basic movement learning model integrated with math skill for the primary school student that has been validated by academics and also get through trial test in both small and large scales to establish how far the effectivity of the model.

Keywords: Learning, basic movement, math skill

INTRODUCTION

Education is one of efforts recognized to prepare the younger generation so that able in problem solving. To be able to deal with this, education requires some process. However, most people assume that the success of an educational process, usually known as learning achievement criteria, is indicated by good grades in final results. Therefore, parents suggest to their children into private course to add more lessons that relevant with the subject on the final exam.

Moreover, student activities directly focus on the primary subjects in national final exam. Remarkably, despite avowed sometimes insignificance of additional lessons, the demand of private course remain growing up to help well prepare in national exam. In contrast, the other activities such as physical activity, that are not include the core subjects will be less interest. Society argued that physical activity is not line with the children's achievement. Children's activities such as playing something using physical will be judged as doing useless and making be lazier that impacts on non-competitiveness in academic achievement.

Physical education is a compulsory subject in the basic curriculum. In general, physical education intentions to grow and develop individual optimally. It has significant impact to overall education goals. It can be seen that physical education through well planning has ability to improve fundamental movement integrated with math skill. In this education learning case, some education methods will be designed to advance ability in math skill for the primary school student grade 1. To make simpler, this first step of this study includes the part of two-stage studies planned. It covers two activity: (1) the exploration stage for development of physical education learning model, particularly basic movement integrated to enhance math skill for the primary student grade 1 and will be validated by the variety of instruments to obtain the purpose of the model and (2) a validation test is described as doing product test on main subject by using rules of research and development based on Borg and Gall method.

A. The Essence of Basic Movement Learning

Schmidt (1988: 346), defines motor learning as a set of processes related to the training or experience that leads towards permanent change in skilled behavior. This definition obviously is known as general concept of synthesis learning involving four aspects.

Piaget cited by Gabbard, LeBlance, and Lowy (1987: 35) states that the motor activity particularly in playing form can help intellectual development, as stated by Dewey, and Montesory. Furthermore, Zaichkowsky, and Martinek in Gabbard, LeBlance, and Lowy (1987: 36) notes that if a teacher wants to improve cognitive skills by motion experience, it should be structured to develop perception, to encourage social interaction, and to stimulate cognitive. The lists of motion experience are:

- 1) The using game or other motion activities should encourage their ability in problem solving, opportunity of children to look for creativity and logical thinking, and development in sense of attention and memory.
- 2) The basis of child cognitive development is perception. Motion activity stimulates the body's mechanisms perception, it seems to progress body awareness to the environment, space, time, and also strength ability.
- 3) Participation in exercise programs can improve self-concept. To make it clearly, teachers must know how the characteristics of the child both in physically and emotionally.
- 4) Improving academics achievement means that strengthen in academic skill.

The statement by Leukel (1968: 364) states that: *If it can be shown that learning changes occur at synapses between nerve cells (whatever parts of brain are involved), what is the nature of synaptic changes? "Molar" changes are discussed first.* Furthermore, Ganong (1999: 106), describes that long-term changing in synapses function is a result of synapses impulse history. It implies that delivering synapestic can be strengthen or weaken based on the past experience. These changes are very fascinating for some reasons clearly represent a variety of forms and processes of learning and memory. These changes consist of post tetanic potentiation, habituation, and sensitization.

Learning movement also called motor learning, Schmidt (1998: 346), defines motor learning is *"a set of processes associated with practice or experience leading to are relatively permanent changes in the capability for responding"*. Rusli (1988: 122), classifies theory based on psychological study of motion approach and divides it into two main categories: group associations' stimulus-response theory and gestalt-field theory or cognitive theory. According to Oxendine (1999: 83) there are three important things from the learning activities process that stimuli received. Firstly, to connect one stimulus with the others; secondly, to formulate a moment link between the way (tool) and goals; thirdly, to behave in order to achieve the goal. Learning motion according to this theory, is also defined as a skill sport performed overall in the sport.

According to Schmidt (1998: 479) main concepts of Adams theory are right or wrong references. Response movement that learner has been done will be compared with a specific criteria. Referral mechanism takes place in a closed system and next step is as opened system transfer all the necessary information to begin a movement. The next information based on Adam explanation, quoted by Schmidt (1998: 480), if person carry out the task of the motion, it will result in the intrinsic excitatory feedback. This excitatory leaves a trace in the nervous system called the perceptual trace. Each response produces the longer trail closer to the desired target. Every time learners do exercises or experiment a movement, the stronger trace perceptual and less meaning sometimes occurs in errors.

Robb (1992: 24), learning theories are classified into three broad categories. This categories are: (1) association, (2) cognitive, and (3) cybernetic. Robb defines association as theorist stress the significance of responses the organism makes and the association or connection of the response to the stimuli. Similar with Robb, Oxendine (1996: 90) expressed the opinion that cybernetic theory based on the concept that information, or feedback received during motion appearance influences the behaviour change in that specific motion task.

Singer (1980: 1.8), has different statement in learning. He argue that there are three components of motion learning and dynamic operation, named as learners, activities, and situations or environmental conditions which each other will interact to produce behavior change. Learning is as impacts of individual change and always reflects in observable behaviour. As a result of learning change, these are relatively permanent as a consequence of experience or training.

B. Fundamental of Math Skill

Guberman, Ainat in the journal *The Development of Children's Counting Ability* states that based on cognitive theory, the basics of arithmetic are innateness. Meanwhile, the social-culture is more learn of the child's linguistic and educational environment. The child's ability to identify the basics of arithmetic have been tested to distinguish between true and false in math. While counting, the children adhere the fundamentals of the subject more than some

other basis. Nevertheless, the successful in calculation is influenced by issues of age, social status and economic environment (<http://cat.inist.fr.com>, 2009).

The purpose of the mathematics in Education Unit Level Curriculum (SBC) or “*Kurikulum Tingkat Satuan Pendidikan*” (KTSP) in SD / MI suggests that Mathematics aims to encourage student with the following capabilities: (1) Understanding concepts of mathematics, especially able to describe the relationship between concepts and application of algorithms, (2) using the pattern and way of thinking, (3) Solving the problem, (4) Communicating ideas with symbols, tables, diagrams or other media, (5) Having respect for the practicality of mathematics in the daily life (Ministry of Education and Culture: 2007).

Standard of competence and basic mathematics competencies are organized as a foundation of learning to develop children in math skills. In addition, it is also intended to develop the ability to use mathematics in solving problems and communicating ideas using symbols, tables, diagrams, and other media.

Ministry of Education and Culture (2007) stated that Mathematics have goals for students such as the following capabilities:

- 1) Understand the concepts of mathematics, describes the relationship between concepts and apply the concepts of algorithms, flexibly, accurately, efficiently, and appropriately, as a problem solving;
- 2) Use the pattern and nature of reasoning, mathematical manipulation in making generalizations, compile evidence, or explain mathematical ideas and statements;
- 3) Solve problems that include the ability to understand the problem, devised a mathematical model, solve the model and interpret the obtained solution;
- 4) Communicate ideas with symbols, tables, diagrams, or other media to clarify the situation or problem;
- 5) Have respect for the usefulness of mathematics in daily life, namely to have curiosity, attention, and interest in studying math, and tenacious attitude and confidence in solving problems.

Mathematics in elementary education (SD / MI) include the following aspects: numeral, geometry and measurement, and processing data. Standards of competence and basic competences became the foundation for developing the direction and subject matter, learning activities, and achievement indicators for assessment.

Kahfi (2004: 18) argues that the learning environment based on point of view of the constructivist mathematics include such as:

- 1) Providing a learning experience that can associate the knowledge already students known so that teachers are not only source of knowledge but also as a facilitator.
- 2) Providing a variety of alternative learning experience.
- 3) Interpreting realistic and relevan learning environment involving the concrete experience.
- 4) Designing interaction and cooperative learning by discussion, such as in a small group-work, group discussion, and frequently asking and aswer activities.
- 5) Using a variety of media to be more effective learning.
- 6) Involving the emotional and social to interest students have willingness to learn.

Piaget (1950) concludes that every child at the early grade, age of 5-8 years has its own way to interpret and adapt their environment (the theory of cognitive development). Moreover,

each students have the cognitive ability of structures called schemata, the system concept in mind as a result of an understanding of the existing objects in the environment. An understanding of the object takes place through a process of assimilation (object linking with existing concepts in the mind) and accommodation (the process of utilizing concepts to interpret the object in mind).

Both processes if doing continuously will balance between the old knowledge and new knowledge. In this way, the child can gradually build up knowledge through interaction with its environment. The children's behaviour is strongly influenced by the aspects of himself and his environment. Both of these may not be separated because the process of learning occurs in the context of child interaction with their environment.

Elementary students are belonging the stage of concrete operations. In the range age, children begin to show learning behavior as follows: (1) start looking at the world objectively, shifting from one aspect to another aspect and observed reflective elements simultaneously, (2) start thinking operationally, (3) use operational thinking to classify objects, (4) establish and utilize connectivity rules, a simple scientific principle, and use the causal relationship, and (5) understand the concept of substance, liquid volume, length, width, area, and weight.

Taking into the development of paradigm stages, the tendency of elementary school children to learn lower class has three characteristics, namely: (1) Concrete, (2) Integrative, (3) Hierarchical. Concrete learning process implies moving from concrete things that can be seen, heard, smelled, touched, and brain tinkers, with emphasis on the point of the environment as a learning resource.

Rukki, Santoso (2002: 12) states that thinking involves subconscious or supra-conscious, thinking in the two sides and the two patterns including the non-verbal right brain and the left brain is rational. Sometimes, the process of thinking is only considered as something that happens because of rationality, however the process of thought pass a long process in recognizing knowledge.

In this elementary, children also learn how to gradually develop ranging from simple into more complex things. In this relation, it is necessary to note about the logical sequence, the material linkage, and the width and depth of the material.

Thus, the meaning of math skill in this study is a child's ability to think about mathematics. Learning of mathematics covers the curriculum goals and objectives learning. Curriculum in mathematics consists of several components, including the method and content of the curriculum that expecting children to competent learning. Basic competence in mathematics is a compulsory subject that student absolutely learn in primary school. In spite of a must subject, student should have basic characteristics of low grade. Gabbard, LeBlance, and Lowy (1987: 7), Dauer, Pangrazi (1986: 18), suggest some of opinions that can be summarized as follows, physical education has an influence on the development of cognitive abilities. Active children show signs of a deeper areas of language, mathematics, and science. Mechanisms of motor skill learning is a part of the cognitive process. Learning and moving can offer good motivation and encourage willingness to study. Aspects of cognitive development include the concepts of perception and development motoric and the reinforcement of academic concepts. Although the direct effect of physical activity on academic ability has been no strong evidence, indirect implications have been widely shown. Most of the teachers believed that the motor activity plays an important role in the development of cognitive and perceptual. Through perceptual motor activity, it can be a good influence on the development of cognitive abilities.

According to Gabbard, LeBlance, and Lowy, (1987: 6), cognitive development is defined as, “primarily composed of the thought processes, such as problem solving, comprehension, and creativity”. Cognitive ability is described as a thought process such as problem solving, understanding, evaluation, and creativity. While, Monks, Knoers, and Siti Rahayu Haditono (1992: 202), states that the cognitive is a wide-understanding of the thinking and observing, so the behavior that resulted in the gain understanding or understanding needed to use. According to Wuest and Bucher (1995: 40-41), the development of knowledge and understanding is an important goal of physical education and sport. Learning in physical activity involves cognitive processes. Student must learn to analyze their performance, synthesize information, and apply them in new situations.

Based on Piaget's theory written back by Wadsworth (1984: 9-17), cognitive action is an action and adaptation to environmental organizations. The basic principle of cognitive development is the same as the process of biological development. Both of adaptation process and organization are process that can not be seen in isolation. In biological observations, the organization is a part of the adaptation process which are two complementary processes in the mechanism. Organization is the internal aspect of a cycle in which adaptation is an external aspects constituting it. To understand the process of intellectual organization and intellectual adaptation, there are four concepts that need to be understood, namely, schema, assimilation, accommodation, and equilibration. These concept is to explain why and how the mental development occurs.

A schema is a cognitive structure in the process of adapting and organizing the environment. For example, the students make the concept in their mind against an object such as cows, then making cow scheme has four legs, bigger than a cat, tame animal, and so on.

Assimilation refers to a cognitive process in which individuals integrate perceptual, motoric, or new concepts into the existing scheme or behaviour pattern. The example of this activity is individual observes something new or old longer existing object in his mind-scheme. Next, it will be adjusted between observation result and existing scheme in their paradigm.

Accommodation is known as the opposite process with new stimulus. Individuals can create a new schema to the new stimulus or individuals can modify the new stimulus. Thus, accommodation is described as the creation of a new scheme or modification of the long scheme results.

Equilibration is a balancing process between assimilation and accommodation. This is essential for efficient interaction in environment. Balance is stability condition between assimilation and accommodation. To change condition from unbalance to balance process, equilibration process is needed.

Besides, the cognitive development of Piaget's theory divided that intelligence has three components: content, function, and structure. The contents are what is known of the child's behavior, motor sensory and conceptual observation by reflection of intellectual activities. The function is characteristics of assimilation and accommodation process that is permanent and continuous. Meanwhile, the structure is related to the process of structuring and organizing in making the scheme.

Similar with Piaget's statement, through the sensory exercises, the adaptation process can be carried out, it summarize that motor sensory stimulation impacts on cognitive development to work well. Therefore, the step of growth and development of children should be given the stimuli in the form of motoric sensory in which they are included in physical activities.

Furthermore, Zaichkowsky, and Martinek in Gabbard, LeBlance, and Lowy (1987: 36) notes that if a teacher wants to improve cognitive skills through experience-motion, it must be specific structured to develop perception, encourage social interaction, and stimulate cognitive.

Research Methods

This research development has several phases. (1) The exploration phase is preparing a model / product obtained from the library research and field studies through the test and questionnaire surveys. The tests were conducted to obtain profile data of the basic motor skills for elementary school students in DIY. This profile is used to develop a draft model further validated with a variety of instruments and to obtain a model that is fit for purpose. (2) Testing / validation phase is to test the product on a subject with small-scale research development according to the rules set by Borg and Gall. As the result is to provide a guidebook integrated with math skill for the primary school students grade I tested in a small scale.

Subjects of Research: grade 1 of primary school students

In the exploration phase, the collecting of descriptive data is the results of focus group discussion that will be analyzed to get feedback based on the model concepts that has been developed. The first result at this phase is a basic learning model integrated with math skill for primary school grade 1 and their guide instruments.

RESULTS

Gross motor ability test results in calculation, including 50-foot run, jump without prefix, throwing the target ball, control the ball, and balancing about 290 elementary school students in grade 1 are as follows: average about 250; 247.59 in median, and standard deviation (SD) about 23.8283. Table 1 presents the distribution of gross motor skill for elementary students in DIY.

Table 1. The Frequency Distribution of Gross Motor Skill for Primary Student Grade 1 in DIY

No	Interval	Chategories	Frequency	Percentage (%)
1	X > 285,75	Excellent	20	6,89
2	261,92 < X 285,74	Good	80	27,59
3	238,10 < X 261,91	Enough	60	20,69
4	214,26 < X 238,09	Poor	120	41,38
5	X 214,25	Poorest	10	3,45
Total			290	100%

Meanwhile, table 2 showed the comparison result in calibration of physical education between experts and teachers. The top score implies have appropriate classification.

Table 2. The Calibration Results between Experts and Teachers in Physical Education

Calibration	Classification								Score
Expert in "Penas" Learning	4	3	4	3	4	3	4	4	29/91
Expert in "Penas" Learning	4	3	4	3	4	4	4	4	30/94

Master in Material	4	4	4	3	4	4	4	3	30/94
Master in Material	4	3	4	3	4	4	4	3	30/94
Physical Education Teacher in Elementary School	4	4	4	4	3	4	4	4	31/97
Physical Education Teacher in Elementary School	4	3	4	4	3	4	4	4	30/91
Physical Education Teacher in Elementary School	4	4	4	4	3	4	4	3	29/91

Specification:

1. If symptom or element in the data content is very appropriate classification, it gets four-value (4),
2. If the value declared in accordance so getting three-value (3),
3. If the value declared fit enough, the value of two (2),
4. If the value found not suitable so one-value (1).

The next stage for the first year is completing the draft with math skill. Furthermore, the draft model will be validated by experts and conducted in Focus Group Discussion (FGD). After validating draft model, test in small-scale are tried in all of elementary school in Sleman, DIY.

CONCLUSIONS AND RECOMMENDATIONS

As a progress result, this research has outcome in development of basic movement learning model integrated with math skill for the primary school student and then will be validated by academics, discuss in FGD, try out in a small-scale testing, and revise this product in this current year (2014).

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