THINKING ANALYSIS AND PROBLEM SOLVING

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Abstract

This article uses references from related literature studies to discuss the analysis of thinking and problem solving, where the concept of thinking and problem solving is a higher or highest level of cognitive behavior, namely thinking. The ability to think is only possible if you already have some concepts with strong reasoning skills. The essence of thinking and problem solving includes general forms of problem solving, the stages of problem solving, namely understanding and explaining (explaining) the problem, proposing various options, determining solutions and implementing options, and checking whether the problem is successful. This article is designed to explain some problems, especially the nature of thinking and problem solving, general forms of problem-solving tasks, stages of problem solving, theories of thinking and problem solving, Piaget's theory of cognitive development, and some practical suggestions. As an introduction to education thinking about drawing conclusions, and problem solving is a way for people to reach conclusions about a particular problem or problem. In other words, problem solving is a situation that requires a person to find solutions to various problems.

Keywords– Thinking, Problem Solving, Strong reasoning skills

1. Introduction

In everyday life, individuals often face problems that require creative thinking to solve them. The thinking process is a job that aims to acquire various abilities and problem skills, usually called difficulties, obstacles, distractions, obstacles or non-conformities (Suharnan, 2005: 283). In lessons,pthe process of thinking is very important. Through thinking, can improve the quality of life. In the problem-solving process, individuals may use convergent or divergent thinking processes. Solving problems can be said to be a fusion of thinking, which is being able to provide correct answers to problems that do not require a lot of creativity. Whereas divergent is a process or method of thinking that is used to explore many new ideas to generate creativity by exploring many possible solutions to get solutions (Trianggono, 2017: 2).

The function of thinking is to solve problems. Usually individuals move according to their own habits, but when individuals face situations that cannot be handled in the usual way, problems will arise. Then the way to solve these problems is motivation to solve problems and problem solving strategies, namely to solve the problems faced by these problems, individuals need different times. When we encounter a problem, we will do our best so that the problem will disappear quickly, and can be resolved in any way without thinking first, so that the results of solving the problem cannot satisfy us, even cause new problems. (Anita Maulidya, 2018). Thinking is the use of concepts and symbols, not objects and events. Problem solving is the process of solving problems or events, selecting jobs and getting closer to the authenticity of certain goals to be achieved. Besides the meaning of thinking, it also explains the thought process, because by understanding the thought process we can not only solve problems, but even discover new things. Problem solving is a high-level psychological process and requires a more complex thought process (Bell, 1978).

This article will show how to analyze thinking and problem solving in children or individuals who are the object of research, and discuss how in the context of solving this problem, it is seen that the steps taken from one individual to another are different.

2. Method

The method used by researchers is a qualitative method, where this article discusses the analysis of thinking and problem solving, this type of research method is the analysis of literature studies (literature research) this article will describe the analysis of scientific journals that are relevant to the discussion that has been selected, as for The stages in this research method are (1) selecting articles, (2) collecting initial data, (3) challenges from topics, (4) collecting supporting data, (5) making conclusions and recommendations online. According to research by Saryono (2011), qualitative research is research that is used to investigate, find, describe, and explain the characteristics of social influences, which cannot be explained, measured, or described by other methods (for example quantitative methods).

3. Result and Discussion

A. The Nature of Thinking and Problem Solving

Usually thinking activities start from asking questions and answering questions or dealing with problems that need to be solved Humans think to face and understand various situations or facts so that we can decide, imagine, solve, organize and plan. Guarantee the existence of a thinking process, namely seeing the results of thinking, namely in the form of changes in behavior, whether the changed object is right or wrong (Alex Sobur, 2003: 201). According to Mohamad Surya (2015: 117) Cognitive behavior is at a high or highest level. It is said that thinking is a form that is introduced by manipulating many concepts, especially in the context of abstract concepts. Therefore, the ability to think is only possible if you already have strong reasoning abilities to support certain concepts. Two things that are the basis of thinking skills are the level of reasoning abilities and mastery of concepts with certain abstract abilities.

In addition, Charles and O'Daffer (1997) suggested that the objectives of teaching problem solving in learning were: (1) fostering students' thinking skills, (2) fostering the ability to choose and use problem-solving

strategies, and (3) fostering attitudes and beliefs. on problem-solving skills, (4) fostering students' ability to use relevant knowledge, (5) fostering students' ability to monitor and evaluate their own thinking and work when solving problems, (6) cultivating in an atmosphere of cooperative learning students' ability to solve problems; (7) the ability of students to find the correct answer is being worked on.

Polya (Hudoyo, 2003: 87) explains that the goal of problem solving is to try to remove difficulties from difficult goals. Problem solving can be seen as a process that requires students to find combinations of previously learned rules and use them to solve new problems. Based on the description above, it can be concluded that solving a problem is an attempt by people to use the knowledge, skills and understanding they have solved. A person's problem causes the person to at least try to solve the problem he is experiencing. Therefore, he must use various methods, such as thinking, trying, and asking questions to solve problems.

B. General Forms of Problem-Solving Tasks

When looking for a solution to a problem, there are rules that will cause a person to solve the problem. These rules will provide instructions for troubleshooting, there are many rules for solving problems. Mainly there are two things, namely the problem rules must be resolved through several logical steps and rules or rules as a whole (in Walgito, 2010).

In the context of solving this problem, it is observed that the steps taken from one person to another are different. Some people take action immediately after understanding the order and trying to reach the goal in the right way, and some people don't take action, but consider the possibility of solving the problem before taking certain action. According to Greeno (in Ellis, 1978), according to the cognitive processes involved in problem solving, problems can be divided into 3 types:

1. Inducing Structured Problem, this type of problem requires people to find patterns that connect problem elements from one element to another. .

2. Transformation Problem, in this type, objects and symbols must be manipulated or changed according to certain rules to get a solution.

3. Arrangement Problem, to get a solution, the elements of the task must be arranged or rearranged. All the elements of the task are listed, and then have to be rearranged in some way to achieve a solution.

C. Stages of Problem Solving

Polya (1973) defines problem solving as an effort to find a way out of difficulties, so as to achieve a goal that cannot be achieved immediately. Polya believes there are four steps to solve this problem, namely:

1. To understand the problem at this stage, the individual must really understand the problem, such as knowing the unknown, knowing whether the conditions existingare sufficient to determine the unknown, whether too many or conflicts, and use symbols as appropriate to describe the problem.

2. Develop a problem-solving plan to find connections between existing information and unknown information. When making plans, individuals can help others by paying attention to several methods that can help you solve the problem, and finally come up with a solution plan.

3. The implementation plan at this stage, the plan has been executed, please check each step so that the individual knows that each step is correct and can prove that each step is correct.

4. Check the solution again. At this stage, the following questions can be asked: can the stated results and reasons be checked, whether the results obtained are different, can the solution be checked at a glance, and whether the solution obtained can use the same solution or method for this problem.

Problem solving can be achieved by learning (Marcut, 2005):

1. The focus of problem solving is students' attention, namely attention and thoughts to remember more facts.

2. Problem solving makes students believe that they have the ability to solve math problems and that maths is meaningful.

3. Through interesting learning to solve problems, students will remember les.

D. Theories of Thinking and Problem Solving

According to Ellis (1978) there are three theoretical approaches used in the study of the process of thinking and problem solving among them:

1. Theory of Stimulus-Response

The basic concept of this theory is that thinking is a related process. Thinking is seen as hidden or implicit "trial and error" behavior. Assuming that in any problem situation, students will bring some habits to achieve the situation. These habits have different functions depending on the task or problem. These habitual tendencies not only differ in intensity with circumstances, but are also arranged in a hierarchy called the family of habits. In other words, students enter a certain situation with a certain level of intensity of habit changes. The theory emphasizes that in the case of problem solving, existing habits will emerge according to intensity, satisfying the tendency for effective responses and successful problem solving.

2. Gestalt theory

Thinking in terms of Gestalt is considered a problem of organizational perception, namely as the process of seeing environmental stimuli in a different way than before. Thinking is considered to be the core conceptual process of perception. Like SR theory, Gestalt theory concludes that problem-solving activity is the ability to reorganize their understanding of the world or apply insights to a problem. According to this theory, the problem solving process is the process of connecting various elements into one. According to the perspective of cue psychology, understanding the relationship between related elements can improve effective problem solving skills (Surya, 2015).

3. Information processing approach

This method uses a computer program format to formulate flowcharts or special sequences, but humans are much more complex than computers. In this way, the program can simulate mental processes, which is used as a very abstract model and must be able to process thinking and solve problems.

E. Piaget's Theory of Cognitive

Development The famous Swiss psychologist Jean Piaget (1896-1980) said that children can actively construct their own cognitive world. Piaget believed that children can adapt to new ideas according to their own ideas, because more information will increase their understanding of the world. Piaget believed that cognitive development occurs in four stages. Each stage is age related and consists of a different way of thinking. Piaget believed that more information does not advance children's thinking, and the quality of progress varies.

Piaget (Sitti Aisya Mu'min, 2013: 91) suggests the stages of cognitive development are as follows:

1. The sensorimotor stage, this stage takes place from birth to about two years of age. At this stage, the baby develops senses of the world by coordinating his sensory experiences of movement (muscles). In this early stage, babies only show reflex patterns that adapt to the world. In infants one to four months of age, babies rely on primary circular responses, namely actions or movements they perform in response to the same previous form of action. Babies at four to twelve months of age experience secondary circular reactions, which include attempts to interact with their environment.

2. The pre-operational stage, this stage lasts from 2 to 7 years of age. This stage is a more symbolic thinking stage, but does not involve operational thinking. This stage is more selfish and intuitive. Preoperative thinking includes two sub-stages, namely the symbolic function stage and the intuitive thinking stage. The sub-phase of symbolic function occurs

between the ages of two and four. The sub-stages of symbolic function appear between two and four ages. At this sub-stage, the child begins to show objects that do not exist psychologically. This expands theworld psychological of the child to a new level. The early development of language and the emergence of an attitude of playfulness are examples of the continuing development of symbolic functional thinking. Toddlers start scribbling pictures of people, houses, cars, clouds, and other objects in this world. In their imagination, the sun was blue, the sky was green, and cars were floating on the clouds.

3. Concrete operational stage, from seven to eleven years of age. The specific surgery idea includes the use of surgery. Logical reasoning replaces intuitive reasoning, but only under certain circumstances. There is a classification ability, but it cannot solve abstract problems.

4. Formal operational stage, 11 to 15 years. At this stage, the individual begins to think about certain experiences and think about them in a more abstract, idealistic and logical manner. The abstract qualities of formal operative thinking are evident in verbal problem solving. On the other hand, formal operational thinkers can solve this problem. Even if the problem is only verbal. Apart from abstract abilities, formal combat thinkers also have the ability to idealize and imagine the possibility of solving problems and systems and draw conclusions.

F. Some Practical Suggestions Practice

According to Reyes et al. (1989), to teach problem-solving skills more effectively, teachers need to understand several factors, including: time, planning, learning resources-media, technology and classroom management. The planned time must be effective and consistent with the students' abilities and thought processes. It is best if the teacher can estimate the time it will take students to solve one or more problems.

Suggestions focused on the characteristics of the problem; characteristics of students who are able and unable to solve problems and

problem solving learning strategies. The following are some of the research results summarized in Reys et al. (1989).

1. Specific problem-solving strategies should be taught until students are able to solve problems correctly.

2. There is no best strategy to solve all problems (problems). At each problem solving stage, certain strategies are used more frequently than others.

3. The teacher must teach students various strategies for solving various problems. Students should be trained to use strategies for different types of problems, or to use different strategies for problems.

4. Students need to face problems with solutions they have not mastered (unusual), and are encouraged to try various alternative solutions.

5. Student achievement or problem-solving ability related to the stage of student development. Therefore, the difficulty in asking questions must meet the needs of students.

4. Conclusion

Manathought to confront and understand the various situations or realities so that we That can be decided, conceivably, be resolved, organized and planned. Guarantee.their thought processes to think that seeing the results to changes in behavior and object changes that do not rely on the right either.

The way to overcome these problems is with the motivation and strategies used to solve these problems,namely to solve the problems faced by these problems, and individuals need a different time. The purpose of teaching problem solving in learning is to fosterability/students' thinking, develop abilities;select and use problem-solving strategies, and foster problem-solving attitudes and self-confidence.

Each student has a unique way of thinking, one of the factors that affect students' problem solving abilities is the way students think which is the way someone usually uses in observing and mental activities, namely organizing and processing information. In the cognitive domain. So far, teachers still tend to use

the explanatory learning model. Most of the learning activities in this model are still led by teachers who actively teach, then provide examples and practice questions. While students only listen, take notes and work on questions raised by the teacher. This condition will not develop the personality, abilities and activities of students as expected. Because it requires a learning model for students to work in groups to exchange ideas in the problem solving process, students will understand, appreciate and learn from it.

Efforts to improve the learning process by choosing an appropriate and innovative learning model in school learning are also very important.

References

Alex Sobur. (2003). *PsychologyIGeneral.* Bandung: Faithful Library.

Anita Maulidya. (2018). *Thinking and ProblemsoSolving*. Raudhatul Akmal Islamic College.

Bell, FH (1978). *Teaching and Learning (in Secondary School).* New York: WMC Brown Company Publishing Town.

Bimo Walgito. (2010). *Introduction torGeneral Psychology*. Yogyakarta: Andi Offset.

Charles, R & O'Daffer, P. (1997). *How to Evaluate Progress in Problem Solving.* NCTM. Reston, VA.

Henry C Ellis. (1978). *Fundamentals 0f Human Learning. Memory and Cognition Michael Domjan.* 2010. The Principles of Learning and Behavior, 6th Edition. California: Wadsworth.

Hudoyo, Herman. (1988). *Teaching and Learning Mathematics*. Jakarta: Ministry of Education and Culture.

Krulik, Sthepen and Rudnick, Jesse A. (1995). *The New Sourcebook for Teaching Reasoning and Problem Solving in ElementarypSchool*. Temple University: Boston.

Marcut, I. (2005). *Critical Thinking-Applied toThe Methodology of Teaching Mathematics.* University of Macedonia.

Mochammad Maulana Trianggono. (2017). Causality Analysis Understanding the Concept ofkWith Students' Creative Thinking Ability. IKIP PGRI Jember.

Journal of Physics and Education Scientific (JPFK) Vol 3 No 1 March 2017, pp. 1-12.

Mohamad Surya. (2015). *Cognitive Strategieslin the Learning Process.* Bandung: Alfabeta.

Polya, G. (1973). *How,to Solve It (New of Mathematical Method).* Second Edition. New Jersey: Prence University Press.

Reys, Robert E., et. al. (1998). H*elping Children Learn Mathematic (5th ed).* Needham Hwight: Allyn & Bacon.

Sitti Aisyah Mu'min. (2013). Jean Piaget's Theory of Cognitive Development. STAIN Sultan Qaimuddin Kendari. Vol. 6 No. 1.

Suharnan..(2005). *Psychology.Cognitive. Revised Edition*. Surabaya: PublisherlSrikandi.