

Thinking Process in Student Vocational Math Problem Solving Based on Personality Type Extrovert-Introvert

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ABSTRACT

This study aims to describe vocational students thinking process with personality types extrovert and introvert personality type in solving mathematical problems using Polya measures. This research is a qualitative descriptive study. The population in this study were all students of class X in a vocational high school in South Tangerang City, Samples were six vocational students, the which consisted of three students and three personality types extrovert introvert personality type student. The election procedure is done using purposive sampling and snowball sampling. The instrument used was a questionnaire type of personality, problem solving ability test, and interview the subject of research. Based on the findings and discussions can be concluded that the students' ekstover personality types will use the thought process of assimilation when understanding a problem, make a plan in solving the problem, and check the answers that have existed over. While in implementing the plan on solving problems then use the thinking process of accommodation. Students introverted personality types will use the thought process of assimilation when understanding a problem, and the make plans in problem solving. Meanwhile, make and execute a plan in problem solving using assimilation thought process is not perfect. While in implementing the plan on solving problems then use the thinking process of accommodation. Students introverted personality types will use the thought process of assimilation when understanding a problem, and the make plans in problem solving. Meanwhile, the make and execute a plan in problem solving using assimilation thought process is not perfect. While in implementing the plan on solving problems then use the thinking process of accommodation. Students introverted personality types will use the thought process of assimilation when understanding a problem, and the make plans in problem solving. Meanwhile, make and execute a plan in problem solving using assimilation thought process is not perfect.

Keywords: Thinking process, problem solving ability, personality extrovert, introvert

INTRODUCTION

Mathematics is a basic knowledge of various disciplines. In an increasingly modern era is very important to learn mathematics. That's because having a role in advancing mathematical thinking on human power. At present, the development of mathematics underlying developments in the field of information and communication technology. Mastery of mathematics should have been prepared since in school so that students can create and control technology in the future. This was done to make students ready for the challenges of life are growing. Preparation was done by giving supplies to the students with the ability to think in problem solving.

The curriculum is currently creating a student has the ability in problem solving. Thus, an important aspect in the process of learning mathematics can be developed. Problems in mathematical filled with questions or math problems to be solved. Problems can be regarded as a question to be solved by someone, but someone is not yet know how to use to finish it [4]. Thus, students must merencanakan first procedure used in resolving a problem.

The thought process experienced by students when solving a problem is that he should be able to find an answer from permasalahan given. Principal component in thinking by Mayer there are three, namely: (1) the activity of a cognitive form of thinking, (2) the cognitive system that is the thought process that manipulates some knowledge, and (3) solving problems resulting of the thought process. The thought process that occurs consists of information received either from within or outside the student, later processed and stored, and dig up the information that has been remembered by the students. Ideas and experiences that are within one's mind is part of the initial schematic structure of knowledge that has been filtered and difasilitatori in mind.

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From it, Assimiliasi is a union process between the information and experience into a mental structure. Meanwhile, according to [6] assimilation can occur when children can enter a schema information into the existing pattern in mind before. Assimilation develop existing schema without making any changes [5]. By doing so, assimilation is a process to integrate the information into the existing cognitive stuktur into students' thinking.

Accommodation occurs when students are able to adjust the scheme in accordance with the pattern to new experiences and information they get. [5] states of accommodation is to change old scheme to establish a new scheme. Meanwhile, according to [7] accommodation is a cognitive structure adapted to the new situation. New experience can not be assimilated by the old scheme, because the old scheme does not fit with the new experience.

Knowledge of the strategies used in problem-solving process is a careful thought and reasoning are right for students [2]. During the process of solving problems, students are asked to write a proper explanation of what they have done and why they did it. That way, students can think carefully and appropriately accompanied by logical reasons related solutions to be applied when solving a problem in the future. It is similar to which states that the use of knowledge and skills previously owned a thought process undertaken by students in an attempt to resolve the problem or seeking the solution of a problem are obtained.

The thought process experienced by students when studying mathematics aims to evaluate the learning of mathematics in schools. On the other hand, Marpaung [3] argues that the thinking process undertaken by students in learning math and figure out how to interpret the student's mind is the task of mathematics education. The process of thinking in students is constructed in a way to interpret the source (of information) that has been gathered by observing the patterns of students while studying mathematics. By doing so, the teacher know the location and the type of error that students doing the learning process are known. Students can also make mistakes that often they do as the information learned to understand the material. Errors that often arise vary, so the thought process that there was not the same. It is as said by [1] the thinking of students will vary according to the type of personality he has.

In a person's personality is divided into various types, [8] personality types are classified into two major groups, the type Extrovert and Introvert. While [9] found extrovert characters growing niche to be Gregorious, while the introverted growing niche to be private, the activity of the extrovert is seen as directed towards the external world and that of the introvert inward upon himself or herself. Thus it can be said that a person who has an extrovert personality type environment determines the patterns of thought, persaan and actions. It can occur in both the social environment and non-social. In other words, the mind which is owned by the extrovert always directed to the outside while the introvert subjective factors determine feelings, actions, and thoughts and less suited to the outside world is not good.

To get information about the thinking processes of students in terms of personality types, it will be investigated how the thinking of student in solving mathematical problems in terms of personality types extrovert-introvert on vocational students Letris Indonesia 2 Pamulang. The material is applied in this study, namely Systems of Linear Equations Two Variables (SPLDV), because there are students not master the material. The goal of the researchers performed this study is to describe the thought process of vocational students in solving mathematical problems in each personality type.

RESEARCH METHOD

Pime Frame this study in class X in one of the vocational schools in South Tangerang. This location was chosen on the following grounds: (1) this school has never been a study about the thinking process in vocational students in class X in the material system of linear equations in two variables (SPLDV) that in terms of personality types extrovert-introvert, (2) researchers found data and information needed in school, (3) the school can cooperate well. Samples were taken using purposive sampling techniques and methods snowball (snowball).

The data collected by the research subjects who meet the specified criteria. The data collected in this study uses problem-based interviews in which students work on comprehension tests later interview-based problem solving problem solving. After that, the data obtained is then analyzed and validated using triangulation of time. Data obtained with a valid subject of the same triangulation. By doing so,

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gained as much as 6 research subjects, namely three of the subject extrovert and introvert 3 of the subject.

RESULTS AND DISCUSSION

Data from the results of tests carried neither the first nor the second has been obtained, analyzed and triangulated in order to obtain valid data, valid data is then used to determine the thought processes that have been carried out students. The following valid data obtained from each respective group.

Valid data from students extrovert (E1, E2, E3) can be seen in Table 1 below,

Table 1. Data subjects E1, E2, and E3 are valid

Troubleshooting Steps				
Subject	Understanding The Problem	Make Plans Troubleshooting	Implementing The Plan Troubleshooting	Checking Back Answers
E1	Can easily and correctly determine what is known and what is being asked of the problem. May determine that it is known already can be used to answer what is asked. Back can reveal problems with sentences or words alone.	Can mention other knowledge that can be used to solve the problem. Can make troubleshooting plan.	May address the issue appropriately by modifying the substitution step	Believing the truth of the results of his work in a way-kan substituting the results obtained in the initial equation has been created.
E2	Can easily and correctly determine what is known and what is dtanyakan of problems May determine that it is known already can be used to answer the questions asked Can turn a problem into a mathematical model	Can mention other knowledge that can be used to solve the problem. Can make troubleshooting plan.	May address the issue properly in accordance with the plan and calculation algorithms used also true	Believing the truth and verifying the answers do the same when determining the answers.
E3	Can easily and correctly determine what is known and what is being asked of the problem. May determine that it is known already can be used to answer what is asked. Back can reveal problems with sentences or words alone.	Can mention other knowledge that can be used to solve the problem. Can make troubleshooting plan.	May address the issue appropriately by modifying the substitution step	Believing the truth of the results of his work in a way-kan substituting the results obtained in the initial equation has been created.

Valid data from students introvert (I1, I2, I3) can be seen in Table 2 below.

Table 2. Data subjects I1, I2 and I3 are valid

Subject	Troubleshooting Steps			
	Understanding The Problem	Make Plans Troubleshooting	Implementing The Plan Troubleshooting	Checking Back Answers
I1	Can easily and correctly determine what is known and what is dtanyakan of problems. May determine that it is known already can be used to answer what is asked. Can revisits the problem by creating a mathematical model	Can mention the materials / other knowledge that can be used to solve the problem. Can immediately make plans troubleshooting	May address the issue properly in accordance with the plan and calculation algorithm used is also true.	Believing the truth and verifying the answers do the same when determining the answers.
I2	Can easily and correctly determine what is known and what is dtanyakan of problems. May determine that it is known already can be used to answer what is asked. Can revisits the problem by creating a mathematical model	Can mention the materials / other knowledge that can be used to solve the problem. Can immediately make plans troubleshooting	May address the issue properly in accordance with the plan and calculation algorithm used is also true.	Believing the truth and verifying the answers do the same when determining the answers.
I3	Can easily and correctly determine what is known and what is dtanyakan of problems. May determine that it is known already can be used to answer what is asked. Unable to reveal the back problem (one in creating a mathematical model)	Can mention the materials / other knowledge that can be used to solve the problem. Unable to make a plan for problem solving equations made wrong	Unable to answer problems correctly because the plans are made wrong.	Substituting-kan results obtained in the initial equation and can be confident that the results are not correct, but did not conduct an examination of job measures

The thought process of the student in problem-solving abilities will be determined from the data above. Starting from understanding a problem, make a plan in solving problems, carrying out a plan that has been made in solving the problem, then the last check the answers from each group (extrovert and introvert).

Extroverts group consisting of 3 students. At the time to understand the issues, all students can easily and correctly know the problems that are known and asked. Students also can determines that it is known already can be used to answer what is asked. In this section, students can write back using their own words. At this stage, students use the thinking process of assimilation, where the incoming information corresponding knowledge that is in the previous scheme. Furthermore, to make plans in troubleshooting, this section students can mention other knowledge that can be used to solve the problem. Students can plan with good problem solving. In this section, students still use the thinking process of assimilation. Students can easily determine the materials used when solving a given problem. The next phase, execute the plan in solving the problem of students using the thought process of accommodation. It can be seen, when the students get an answer is not directly substituted into the

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equation, but the equation that consists of the combined first and second equations. To get the values of other variables to be searched, the student must make modifications at the time of the substitution. It is the same as that expressed by [7] someone that blends with the stimulus in the accommodation is the result of a previous scheme modification process. In addition to the above, there are also students who get the results of these questions by trial and error until he managed to answer correctly. This issue occurs because of the possibility of the material being taught to students not yet well understood by students.

The last stage is the answer obtained from the thought process of assimilation is checked and rechecked. The answers they find are the result of the conviction itself by substituting the answer of the existing equation. After that, the students look back on the existing shortcomings by examining each step in finding answers lengkap.

Another group that is introverted, the group consisted of 3 students. At the time to understand the issues, all students can easily and correctly know the problems that are known and asked. Students also can determines that it is known already can be used to answer what is asked. In this section, students can write back using their own words. At this stage, students use the thinking process of assimilation, where the incoming information corresponding knowledge that is in the previous scheme. Furthermore, to make plans in troubleshooting, this section students can mention other knowledge that can be used to solve the problem. Students can plan with good problem solving. In this section, students still use the thinking process of assimilation. Students can easily determine the materials used when solving a given problem. The next phase, execute the plan in solving the problem of students using the thought process of assimilation is not perfect. Students can execute the plan in solving the problem well. However, during the process of calculating the students do kesalahan. So that the final result obtained was wrong.

The last stage is the answer obtained from the thought process of assimilation is not perfect. At this stage, steps in finding an answer is not checked and checked kembali by students. By doing so, the errors that have students do can't be known for future learning.

CONCLUSIONS

Based on research telah described above, it can be concluded that the students' personality type ekstrovert will use the thought process of assimilation when understanding a problem, make a plan in solving the problem, and check the answers that have existed over. While in implementing the plan on solving problems then use the thinking process of accommodation. Students introverted personality types will use the thought process of assimilation when understanding a problem, and make rencana in problem solving. Whereas, in making and implementing plans in problem solving asimiliasi menggunakan thought process is not perfect.

Based on the results that have been described, then there is a suggestion to be conveyed to: (1) a teacher of mathematics in order to teach students how to execute the plan in solving the problem of the plans that have been made before, and remind students to re-examine the problem solving and seeing a shortage of answers obtained, (2) other researchers to be one of the references in developing this article.

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