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ERROR ANALYSIS OF GUARDIANS STUDENT IN UNDERSTANDING THE PROBLEM OF DIVERGENCE

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Abstract

The aim of this research to know the error of the guardiant student in understanding the problem of divergence. This research used the qualitative descriptive. The procedure of data collection was used by the Think Out Louds. Technically the analysis of data that was used (1) studied all the datas that were gathered, (2) made classification of the type of the identity of the student, (3) Study results the work of student in understanding the problem of mathematics, (4) carried out the verification from data. Whereas for the checking of the legality of the data used the level credibility by using the triangulation technique. In this research could be concluded that the student's error in resolving the problem in understanding the problem was the habit, intepretasi the language, and symbolic.

Keyword: understanding the problem, error, divergence.

INTRODUCTION

Learned to be a process of the change behavior cognitive, psychometric and affective that happened not because an accident and this behavior was permanent. Someone it was said studied mathematics if himself this person happened an activity that could result in the change in the behavior that was linked with mathematics. This change happened from did not know to know this concept, and could use him in continued material or in the daily life (Herman Hudoyo, 1990: 4).

In the study of mathematics, the solution of the problem also became the matter that was important to be invested for student. One of the aims studied mathematics was student was expected to be able to cultivate the capacity to think critical, logical, systematic, conscientious, effective, and efficient in solving the problem (BNSP, 2006: 146). Was or not reached the aim study of mathematics one of them could be seen from the success of student in understanding mathematics and making use of this understanding to resolve problems of mathematics and other knowledge. With the solution to the problem, mathematics did not lose from the meaning. Because a concept or the principle will be significant if could be applied in the solution to the problem, similar was revealed by Djamilah Bondan Widjajanti (2009) That stated that the solution to the problem was the process that was used to resolve the problem. The problem happened was caused by the existence of the situation gap during resolved the problem with the aim that will be achieved to solved the problem.

Saw the importance of the solution to this problem then already naturally if the solution

of the problem was given to student in order to be able to resolve the problem of mathematics so as the aim study of mathematics could be reached. So as student might not avoid the difficulty in studying mathematics especially in solving the problem. Generally the difficulty solved the problem of mathematics that was experienced by student different depended on participant's capacity educated in breaking him. To increase participant's capacity educated in order to be able to resolve the problem, student must try to motivate himself so that more liked mathematics.

Error's that were carried out by student in resolving the problem could become the guidance to know how far student controlled material. Therefore, the existence of these error must be identified and looked for by factors that affected him if must be looked for the solution to this error resolution. Therefore, information about the error in resolving the problem could be used to increase the quality of the studying activity taught and in a manner indirectly could increase the studying achievement of student.

In line with one of the typical characteristics in mathematics that is deductive reasoning then the connection between the concept or the statement in mathematics was consistent. It was studying that mathematics was a process that continuous to receive the concept, the idea, and new knowledge that were based on experiences beforehand. Therefore, for each kind of participant's material educated was expected really to control the concept that was given because this concept will be used to study following material. As a result the Analysis of the error in a manner gave details was needed so that error's of participant's educated and his cause factors could be known to help overcame this problem.

The problem in mathematics usually shaped of the matter, but not all the matters in mathematics became the problem for student. This was caused by matters of mathematics occasionally could be completed by student without experiencing the problem. Polya (1973, 154 157) said that the matter kind was divided into two that is problem to find and problem to proved. As realized this matter then the matter that will be given eventually various proved and searched as well as was regarded as the problem that must be solved by student.

One of the steps to resolve the problem was with understood about the problem. Polya (1973: 5 19), said that in the Understand stage of the problem student must be believed it. To believed a problem could be carried out with read repeatedly, asked to himself about what knew, what was not known, and asked about the aim of the problem of this mathematics. The Understand stage the problem gave the foundation for student to be able to take a step in the following stage that is make a plan, Carry out our the plan and then look the back at the completed solution. If student could not identify what was known and what was asked about from a problem then had the possibility of student this was not able to solve the problem that was dealt with by him.

Student that could not write or reveal what was known and what was asked about from a problem, then in a manner the concept of student error experienced. That was caused by student could not to identified the problem. According to the Subaidah (2006: 172) stated that the error concept was the error understanding towards the concepts that were related to material. Almost same was revealed by Muhammad Zaenal Abidin (2012) stated that the error concept was carried out by student was caused by the inability of student in understanding the problem, decisive theorems or the formula that was used to solve the problem. Was based on the student

that could not determine the problem could be grouped in the error concept. The impact of this error concept was the inability of student to solve the problem.

Human was born in the different situation. The different caused by the process to think that happened in respectively could be different by individual. Although humankind was born by twins, but they have difference. David Keirsey (1998: 1 – 16) different someone became four temperaments that is guardians, artisans, idealist and rationalist. There are temperament was based on preference that was owned by humankind that is extraverted introverted, sensory intuitive, thinking feeling, and judging perceiving. David Keirsey (1998: 78 – 82) added that Temperament guardians had the trend concrete and cooperate in his daily life.

Based on this matter in this research will be seen by the error of student's guardians in understanding the divergent problem was for the problem of proved and the problem of find. So that the capacity of student's guardians in understanding the problem of mathematics could be known better, then in the problem solving of mathematics the guardians student was aimed to identify what was known and what was asked about from the problem.

RESEARCH METHOD

In accordance with the problem that will be researched so this research including in the descriptive research qualitative. This research mean to reveal in depth the error of student's in the process of thinking about solving the problem of mathematics. The subject of the research was the student of Mathematics program in Sarjanawiyata Tamansiswa Universities that took the subject of the analysis vector of the academic year 2012-2013 their type guardians that was taken in a purposive sampling.

The guardians' student was given the work sheet for student containing the divergent problem that must be solved by the student who consisted of four problems. The work sheet of the student was one of methods to transferring what was thought about by the student when they solved the problem of mathematics.

In this case the method that was used to gather the data was Think Out Louds (the TOL). The data that was received, was analyzed used the analysis technique of the data that was developed by Lexy J Moleong (2000). As for the analysis stages of the data that was used in this research was (a) studied all the data's that were gathered from various sources, (b) studied results of the work of the student in completing the matter of the solution to the problem of mathematics, and (c) carried out the verification from the data and the source of the data that has been classified and wrote product of the data. Whereas to appoint trust worthiness used *credibility*. In this research used technical credibility that was the observer's perseverance and triangulation. The observer's perseverance was carried out by the researcher personally by means of carrying out observation in a thorough manner, conscientious and continually for the research. Whereas triangulation according to Lexy J. Moleong (2000: 178) it was technical the legality inspection of the data that made use of the data that was other apart from the data that was received for the need of the checking or as the standard towards the data. As for the triangulation technique in this research was technical source triangulation that is confirming the

data that was received from a source with the other source by means of comparing the data produced by the test was written.

RESULT AND DISCUSSION

The works sheet for student the containing four problems. The four problems were (1) if $\emptyset = 2xy^2z^3$ and $\vec{A} = 2yzi - x^2yj + xyz^2k$ determined $\overline{\nabla}(\emptyset\vec{A})$, (2) to know the height of a hill (meters) was $p(x, y) = 10(2xy - 2x2 - 4y2 - 18x + 28y + 12)$ with x was the distance to east the J (kilometer) and y was the distance to north the J (kilometer), determined the location of the peak of the hill was and the height of the hill, (3) proved that $\overline{\nabla}(\overline{\nabla} \times \overline{A}) = 0$ and (4) If A and B was the function that differentiable, proved that $\overline{\nabla}(A + B) = \overline{\nabla}A + \overline{\nabla}B$. Henceforth this problem was grouped in the problem of the type searched and the type proved.

In the problem of proved (F1 and F2) was received that error were carried out by the student guardians was (1) could not name matters that were asked about from the problem, and (2) the student guardians did not name anything from the problem F1. The guardians student's error in understanding the problem of the type proved this became unique was caused by the student did not write what was known or what was asked about from the problem. Referred in the Subaidah opinion (2006) and Muhammad Zaenal Abidin (2012) then the student's error guardians this could be grouped in the concept error. This was caused by the wrong student in the understanding of the concepts that were related to material or the problem; the student could not understand and send again the available concepts in the problem of the type proved.

The impact of the error concept was the student could not solve the problem for the following stage (planned the problem, carried out the plan and checked came back). But the student's error by writing or sending what was known and asked about did not make the student stopping in the stage understood the problem. At least the student guardians still could carry out the stage planned to resolve the problem, to carry out the plan or to check again the answer that was compiled. So as the impact of the error concept did not happen to the student guardians.

Was based on results of the interview was received that error happened to the guardians student was caused by the student was not used to send matters that were known and matters that were asked about to the sheet of the answer. The guardians student really wrote or sent the stage carried out the plan (resolved the problem) and checked again the answer that was compiled, so as the student could resolve the problem of the type proved although the stages solved the problem from Polya was not carried out intact. Was based on this then this kind error could be categorized in the error because of the habit.

Almost was the same the error that was carried out by the guardians student in understanding the problem of the type proved, the guardians student also experienced the error that was same in the type of the problem searched that is (1) the student could not send matters that were asked about, and (2) the student could not send matters that were known and asked about. The kind error thus still could not be grouped in the concept error, this was caused by the impact of the concept error did not happen in the further stages in solving the problem. So as this kind error was grouped in the error because of the habit.

Moreover, the guardiants student also experienced the interpretation error of the language and the symbolic error on the stage understood the problem of the type searched. The interpretation error of the language was the error that was caused less accurated in read and wrote the problem so as to be wrong in translating the meaning from the problem. The interpretation error of the language was carried out by the student guardiant with wrote $\vec{A} = 2yzi + x^2yj + xyz^2k$ whereas for the distance of the student ought to say kilometer (km) not with meters (m). This kind error was carried out by the student was caused the student not more conscientious in reading the problem. In understanding the problem, participants educated could do by means of read repeatedly to avoid the error in meaning of the problem. Whereas the symbolic error was carried out by the guardiants student related with more unusual symbols was used. The operator nabla that was symbolised with the delta ($\overline{\nabla}$), By the student was replaced with the symbol that was more unusual like D. Apart from the use of this more unusual symbol, the student guardiant also carried out the error in the writing of the symbol of the vector, like the symbol of the A vector that ought to be symbolised with $\vec{A}$ or $\vec{a}$ Only was deafened by A or a then. The symbolic error the guardians student was carried out by the student was caused they used to symbols of mathematics that facilitated in the writing. So as the symbol $\overline{\nabla}$ or $\vec{A}$ to be ignored in solving the problem in the stage understood the divergent problem.

CONCLUSION

Was based on this analysis could be concluded that the student's error in understanding the problem of divergency was the habit error, the interpretation error of the language, and the symbolic error.

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