



SELF ASSESSMENT TO KNOW UNDERSTANDING MATHEMATIC CONCEPT

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Abstract

This research is a qualitative study aimed to determine the students' understanding of the concept of matter limit. The subjects were students of class XI IPA 1 SMA Negeri 1 Watampone. The concept includes the definition of the limit. Data obtained using a research instrument in the form of self-assessment and then proceed with the interview subjects were selected based on the results of self-assessment has been done before. Analysis using qualitative analysis of students' understanding of the concept of the limit concept. The results of this study indicate that students' understanding of concepts some of which are not / do not understand especially regarding definitions limit. In addition students are also wrong about the resolution limit. Students who understand the concept of limit dinyakatakan them restate concepts, including examples and classify the sample to non-completion of function and limit the right results.

Kata Kunci: qualitative research, concepts in the limit.

A. Introduction

The success of a lesson is the main goal of a teacher as an educator in school. Therefore, various efforts are made to achieve that goal. In learning the main components are teachers and students in addition to other components as supporters. When viewed from the components of teachers, then a teacher must be able to guide students so that they can develop knowledge in accordance with the subjects he studied. In this case the teacher must fully master the material taught by using the right method and fun that helps students in mastering the lesson. Especially for math teachers, there is a special ability to be had. According to Udin (2011), in general, the task of mathematics teachers are: First, how the subject matter is given to the students in accordance with the standards of the curriculum. Second, how the learning process takes place by involving the role of students in full and active, in the sense that the learning process that takes place can be fun. Looking at the current phenomenon shows that most of the students' work, both daily and homework, shows that students have not been able to build their own concepts, the words students use in answering questions or solving problems using and modeling just like the words of the teacher, The author also observes students learning when there are repetitions or assigned tasks by the teacher. Students have not used a certain way that makes it easy to understand and

remember the lesson again. The impact students have difficulty when the question developed and young forgot if the material is asked a few days later. In a class that often occurs especially at junior and senior high school level, in learning mathematics, students tend to pursue value and care less about the learning process. Most of the students are still passive so it is difficult to know whether they already understand or not yet. They have not been lead in asking questions, have not realized that in science lessons observing it is very important, and not yet understand about the meaning of learning for him. In fact they tend to accept the appropriate given by the teacher. Under these conditions, the implementation of self assessments in learning is not yet fully feasible. This is related to the thinking patterns and attitudes of the students themselves.

But it is not impossible to apply self assessment, it can be a start for students in their learning. A person can be formed from his habit. Likewise with students, if the positive things about him applied from an early age then he will respond with a positive thing as well. This is what remains to be built in education in Indonesia is to give positive things both in thought and in itself to continue to learn and struggle.

So far the teachers only analyze the completeness of student learning outcomes, there has been no official report on self-assessment of students on learning mathematics in SMA Negeri 1 Watampone Bone District. Therefore the authors intend to conduct self assessment assessment of understanding of mathematics in SMA Negeri 1 Watampone.

B. Literature Review

Learning Mathematic

Learning mathematics is a mental activity to understand the meaning of relationships and symbols. So the notion of learning in the context of mathematics is a deliberate active process done to acquire new knowledge by manipulating the symbols in the structure of mathematics so that causes change in behavior.

Jerome Bruner (in Hudoyo, 1990) suggests that: "learning mathematics is to learn about the concepts and structures of mathematics contained in the material studied and to seek the relationship of such concepts and mathematical structures. Mathematics is arranged in a hierarchy with each other closely related. Advanced concepts are unlikely to be understood before understanding well the preconceived concept. This means that learning mathematics should be gradual and regularly systematic and should be based on past learning experiences. Students will easily learn new mathematical concepts, when based on what has been known.

Hudoyo (1990) argued that: "*Studying the concept of B based on the concept of a person needs to understand more about the concept of A, without understanding the concept of A is impossible to understand the concept of B, it means that math must be directed and orderly and based on past learning experience*". Therefore, learning mathematics is not just learning to master mathematics, but students must also master the prerequisite material for the material being and will be studied.

Concept in Mathematic

Mathematics is a subject full of concepts, so teaching mathematics is essentially the teaching of concepts and relationships or concepts as conscious relationships. The concept in mathematics is one object beside the other three objects, namely: facts, operations, and principles. Mathematics is currently experiencing both in terms of material development and implementation. This is not independent of the development of concepts as basic ideas that give the meaning of mathematics itself.

What is the concept concept?. According to Tambunan that "the concept of mathematics is an abstract idea used to classify events and objects, and determine whether events and objects are an example or not of ideas."

According to Sutton and Hugson that "the concept is divided according to its function into three kinds: the concept of classification, correlational concepts, and theoretical concepts". The concept of classification is a concept that allows people to classify objects or events and combine whether an object is an example or not an example, such as the concept of a triangle, the concept of a square and so on. The correlational concept is a concept that allows people to connect between two objects or more events. While theoretical concepts are concepts that allow people to explain the facts such as the concept of the original number, the number of cacah and so on.

Regarding the assertion that mathematics learns about organized structure, the concepts in mathematics are arranged hierarchically, from the simplest to the most complex concepts, then a teacher is required to teach them hierarchically, that is, before teaching the advanced concept must first teach previous concepts. Concepts that have been well understood by students can be used to gain new concepts by modifying the previous concepts. Therefore, mastery of concepts in

mathematics is one of the factors for the growth of creative attitude in students, which is needed in problem solving skills and problem-solving skills.

Understanding mathematical concepts should also pay attention to previous concepts. Mathematics is arranged in a hierarchy of one another closely related. Further concepts are unlikely to be understood before understanding well the preceding concept of the requirement. This means learning mathematics must be gradual and sequential in a systematic and should be gradual and sequential in a systematic way and should be based on past learning experiences. In order for students to be able to understand and understand the concept, should be taught in sequence. This is in line with the statement of Normandiri (2007) which states that in learning mathematical concepts, if concept A and concept B underlie the concept of C, then the concept of C is not possible dipejari before concept A and concept B studied first. Similarly, the concept of D, can only be learned when the concept of C has been mastered, and so on.

Concepts that have been well understood by students can be used to gain a new concept. Therefore, understanding the concept in mathematics is one of the factors for the growth of students' creative attitude, which is needed in problem solving skills and problem solving skills. Misconceptions received by students will be fatal to learn the next concepts.

The purpose of studying concepts is for students to understand (Yulius, 2005). Can show the characteristics, elements, differentiate, compare, generalize, and so on. The steps teach the concept, which is: presenting concepts, providing assistance (in the form of core content, key features, examples and not examples), giving practice (in the form of tasks to find other examples), giving feedback, and testing.

Stages of Mathematical Understanding

From several existing cognitive learning theories, the theory expressed by Skemp is considered the most effective learning theory in terms of self-assessment, especially in directing students to the level of understanding of mathematics learning. Skemp's theory is able to give a full picture of the level of students' understanding because it has a stratified stage of learning that is the level of instrumental and relational (Purnawa, 2011). Where in instrumental theory students can only understand the formula without having the ability to connect other concepts and on relational theory students can understand the formula and be able to connect some interrelated concepts. Based on the above explanation, during the classroom learning process; the mathematics teachers are expected to facilitate their students in such a way that the students have a relational understanding. There are two principles of school mathematics namely the principle of teaching and learning principles. The principle of teaching states that effective mathematics teaching requires an understanding of students' knowledge and requires learning, and afterwards, challenges and helps them learn well. While the principle of learning states that students must learn mathematics with understanding, actively build new knowledge based on experience and knowledge that already has.

Self Assesment

Self assessment emerged in 1980 with the publication of the Council of Europe text on the topic of Oskarsson. Since then, many programs around the world have tried to use self-assessment methods in learning. The use of self-assessment for learning purposes seems to be widely proven. Self-assessment can be defined as information about learners provided by self-study, about their abilities, the progress they think they make and what they think they can or can not do but with what they have learned in the course. An accurate self-assessment result is that it leads learners to more comfortable approaches to certain materials and more confidence when performing tasks associated with it. In essence, the self-assessment of greater ability to perform the task, the more likely it is that the learner will develop a sense of mastery over the task.

When defining self-assessment, Harris & McCann (1994) describe the concept as "useful information about students' expectations and needs, their problems and concerns, they feel about their own learning process, their reactions to materials and methods used, what they think about the course in general." Oscarson explains that the self-assessment field of language proficiency is concerned with knowing how, under what circumstances and with what students and securities users of a second language (SL) or a foreign language (FL) fit their own language abilities Ability here refers to both achievement and ability Self-assessment, according to Oscarson, comes from the awareness that effective learning is best achieved if students are actively involved in all stages of the learning process Self-assessment promotes learning autonomy and positively influences motivation and learning outcomes especially when assessments d envy being part of the teaching

days and when learners are doing it to monitor progress and improvement, not for class or placement.

Self-assessment is useful because it has been considered that rather than providing comprehensive diagnostic tests to have a glimpse of possible field problems for students, it is much faster to ask students directly what the problems they have (Harris & McCann, 1994). At the same time, it has been found that self-assessment provides students with useful tools for making decisions about certain materials that may be useful to those outside the classroom, as well as to become more aware of their learning styles. In addition, Dodd points out that self-assessment is the best way to promote understanding and learning; support the belief that students who feel ownership for a class or a task and believe that they can make a difference, become more involved in their learning process.

In the "Inside Black Box" and *Beyond the Black Box: Assessment FOR Learning* ", teachers have experience by providing opportunities for students to participate in the assessment process. Since a lot of training and research documents have helped teachers to develop ways of using assessments to improve learning success students, for example, follow the way of working inside the Black Box by illustrating a very important part of the learning process in secondary school. The essence of the assessment of learning is how to inform and involve students in the assessment process.

Self-assessment is a process of formative assessment as long as students reflect and evaluate the quality of their work and learn from it, assessing the extent to which they reflect explicitly stated goals or criteria, identifying their strengths and weaknesses of work, and revising them properly. With a few exceptions, this definition of self-assessment does not include self-grading. In contrast, students' self-assessment is the process by which students gather information about their own performance and see how it fits into their goals and / or criteria for their work. Research is reported to be in compliance with a paper with a self-assessment definition. Simply put, we see self-assessment as self-giving feedback from ourselves.

Although there is no standard definition of self-assessment in the literature, there are several common self-assessment characteristics for various definitions. First, self-assessment is criteria-referenced. Frederiksen and Collins (1989), Wiggins (1998), and Stiggins (2001) argue that student job criteria must be so transparent that students can learn to evaluate their own work in the same way that the Gurumes did. The majority of studies available self-assessment reports use pre-determined assessment criteria by teachers or instructors but some, such as Dochy & McDowell (1997) dan Stallings & Tascione (1996) argue that criteria must be co-defined by instructors and students. A second general characteristic of self-assessment is the emphasis on promoting learning by providing feedback that guides students' efforts and strategies. The third characteristic is that it goes: self-assessment involves regularly monitoring and organizing one's thinking process and performing tasks as they occur.

Of the things that have been described previously indicate that the self assessment shows information about the state of learners of their ability to a thing. Students are given the freedom to reveal what they are aware of in the language they understand. It does not rule out the possibility of students expressing their understanding not directly, but explicitly from their explanations.

C. Methodology

This type of research is a qualitative research that aims to determine the understanding of student concepts. Researchers as the main instrument in collecting data both in the form of results of observation, interviews, and documentation. The subjects of the study are the subjects to be studied by the researcher. If we talk about research subjects, actually talking about the unit of analysis, that is the subject that became the center of attention or target researchers (Arikunto, 2010). The subjects studied were students of class XI IPA 1 SMA Negeri 1 Watampone District. In the early stages the initial step in recording data is to design data collection format, both related to interviews and documentation. The things that need to be included in the descriptive note are: (1) the description of the subject, (2) the reconstruction of the dialogue, (3) the physical background description, (4) the record of special events, (5) the painting of the activity, and (6)) observer behavior.

In recording the data is done as soon as possible, before the mind of the researchers mixed with other things, but cultivated full of tranquility (Suyanto & Sutina. 2005). In this case the researcher must provide sufficient special time, so that all the results of interviews or observations can flow smoothly. Miles & Huberman (Sugiyono, 2010) argued that the activity in qualitative data analysis is done interactively and lasts continuously until complete, so the data is saturated. Assessment

of self to students followed by interviews based on the results of self-assessment of students who have been analyzed before by doing the grouping. Analyze the data used by doing the data grouping, describe it, then make a conclusion. Data on student interview results are used to support the outcome of self assessment to reinforce information about how students understand the concept. The results of data analysis in the form of exposure about the situation under study presented in the form of narrative descriptions. Draw the research conclusions from the data already collected and verify the conclusion.

D. Finding and Discussion

1. Findings

Exposure of the Self-Assessment subject to the concept of limits on definition of limits (right and left limits)

Limit merupakan nilai yang mendekati suatu variabel pada suatu bilangan.
 Limit kiri adalah pendekatan nilai dari sebelah kiri, $\lim_{x \rightarrow a^-} f(x)$
 Limit kanan adalah pendekatan nilai dari sebelah kanan, $\lim_{x \rightarrow a^+} f(x)$
 Misalnya, diberikan suatu limit fungsi
 $f(x) = \begin{cases} 5x, & \text{jika } x \leq 5 \\ 5x + 7, & \text{jika } x > 5 \end{cases}$

From the results of self-assertion conducted subject states how the limit is an approach to a value or number. Regarding the right and left limits of the subject the subject is curious to know through the graph as they explain.

Concerning the concept of the limit graph they understand that where if a graph / line meet one another point then it has the limit value otherwise if the graph / line does not meet at one point, then it has no limit value. Interview data about the understanding of the concept of limits on the definition of limits (right and left limits)

LM1-001	P	<i>Apa yang Anda ketahui tentang limit?</i>
LM1-001	J	<i>Limit merupakan suatu konsep dalam kalkulus</i>
LM1-002	P	<i>Apalagi?</i>
LM1-002	J	<i>Limit adalah salah satu bantuk dari palajan kalkulus untuk mencari suatu nilai</i>
LM1-003	P	<i>Nilai apa yang dimaksud?</i>
LM1-003	J	<i>Nilai limit. Seperti limit x menuju 0. x menuju 0 itu bukan berarti x sama dengan 0 tapi x mendekati 0 tapi bukan angka sebenarnya</i>
LM1-004	P	<i>Misalkan saya menuliskan limit x mendekati 5 apa maksudnya itu?</i>
LM1-004	J	<i>Limit x mendekati 5 itu maksudnya x menuju 5 tapi angka ketika dicari menggunakan rumus itu bukan hasilnya 5.</i>

The excerpt of the above interview shows that the subject understands the concept of a limit in which the value of the variable x listed in the question is not a value of x but only close to that value (LM1-003, LM1-004)

LM1-005	P	<i>Apa yang diketahui dengan limit kanan dan limit kiri?</i>
LM1-005	J	<i>(menggambar grafik) Kalau misalkan gambar bersambung antara sumbu ini (mununjuk yang tanda panah merah) dengan sumbu ini (mununjuk yang tanda panah biru) memiliki limit.</i>
LM1-006	P	<i>Yang mana kita maksud nilai limit disitu?</i>
LM1-006	J	<i>Tidak tau karena tidak diajarkan tapi menurut yang kuketahui kalau tersambung ini berarti ada nilainya tapi kalau terputus berarti tidak ada nilai limitnya.</i>
LM1-007	P	<i>Terputus yang bagaimana maksudnya?</i>
LM1-007	J	<i>(menggambar grafik) Tidak bersambung</i>

From the above interview passage the subject understands the concept of left and right limits which the subject describes it from with a graph. If the graph is connected at one point then the

graph has a limit value (LM1-005) and vice versa if the graph does not converge at one point then the graph does not have a limit value (LM1-007).

But for the matter of determining which is included from the value of the limit in the graph the subject has not been able. The reason for not being taught (LM1-006)

LM2-001	P	Apa yang Anda ketahui tentang Limit	
LM2-001	J	Limit merupakan sesuatu yang mendekati nilai	
LM2-002	P	Nilai yang bagaimana?	
LM2-002	J	Misalnya x mendekati nilai 2	(menulis)

From the excerpt of the above interviews it appears that the subject understands the limit which is a short x against a value which means that the value listed is an approximate value (LM2-002).

LM2-003	P	Sudah dipelajari tentang limit kanan dan limit kiri?	
LM2-003	J	Belumpi dipelajari	
LM2-004	P	Apa yang diketahui dari situ?	
LM2-004	J	Kalau limit kiri pendekatan nilai dari kiri, kalau limit kanan pendekatan nilai dari kanan	

From the excerpt of the above interview shows that the subject understands the right and left limits of the subject lies in the approximation of the limit value, if the left limit is the left value approximation but if the right limit approaches the value from the right (LM2-004). The interview continued as follows.

LM2-005	P	Bisa dibuat grafiknya?	
LM2-005	J	Tidak tau	
LM2-006	P	Misalkan ada soal Limit x mendekati 4	
LM2-006	J	Langsung disubstitusi Kalau limit x menuju 4 untuk $x - 3$ berarti = 1 Kalau yang satunya	
LM2-007	P	Bagaimana hasilnya tentang nilai limitnya?	
LM2-007	J	x nya mendekati 4 dan nilai limitnya 1	

The excerpt of the above interview shows what the subject understands about the right and left limit of the subject of an algebraic function after performing an algebraic operation on a limit function (LM2-006, LM2-007). The interview then continued

LM2-008	P	Dalam bentuk tabel bisa dibuat untuk melihat limit kanan dan limit kiri?	
LM2-008	J	Dari fungsi bisa dilihat kalau $x > 4$ berarti mendekati dari kanan, kalau $x \leq 4$ mendekati dari kiri	
LM2-009	P	Bisa dijelaskan lebih lanjut	
LM2-009	J	(Membuat garis bilangan) Yang $x \leq 4$ (menunjuk panah merah) sebelah sini dan $x > 4$ sebelah sini (menunjuk panah biru)	
LM2-010	P	Jadi bagaimana masalah limit kanan dan limit kirinya?	
LM2-010	J	Limit kanan dan kiri yang ini (menunjuk garis bilangan)	

From the excerpt of the above interview shows that the subject understands the determination of the left and right limits by looking at the condition x of the known problem (LM2-008, LM2-009).

The result of data reduction based on the above data exposure, concluded about the concept of subject understanding that:

1. The subject of the concept of a limit in which the value of the variable x listed in the question is not a value of x but only close to that value (LM1-003, LM1-004)
2. The subject of the concept of the left limit and the right limit by describing it from with a graph. If the graph is connected at one point then the graph has a limit value (LM1-005)

and vice versa if the graph does not converge at one point then the graph does not have a limit value (LM1-007).

3. The subject of the concept of a limit which is an approximate x to a value which means that the value shown is an approximation value (LM2-002).
4. The subject of understanding about the right and left limits of the subject lies in the approximation of the limit value, if the left limit is the left value approximation but if the right limit of the right value approach (LM2-004)

The subject of the concept of the right limit and the left limit of the subject of an algebraic function after performing algebraic operations on a limit function (LM2-006, LM2-007).

2. Discussion

The subject states how the limit is an approximation of a value or a number. Regarding the right and left limits of the subject the subject is curious to know through the graph as they explain.

Concerning the concept of the limit graph they understand that where if a graph / line meet one another point then it has the limit value otherwise if the graph / line does not meet at one point, then it has no limit value.

Interview

1. The subject matter of the concept of the limit where the value of the variable x listed in the question is not the value of x but only close to that value
2. The subject of the concept of the left limit and the right limit by describing it from with a graph. If the graph is connected at one point then the graph has a limit value similarly with the opposite if the graph does not converge at one point then the graph does not have a limit value.
3. The subject of understanding about the limit which is the approach of x to a value which means that the value listed is an approximate value.
4. The subject of understanding about the right limit and the left limit of the subject lies in the approximation of the limit value, if the left limit is the value approximation of the left but if the right limit approaches the value from the right.
5. The subject of pahamami from the right limit and the left limit of the subject of an algebraic function where when the value of the right limit is equal to the left limit the algebraic function has a limit value.

The above reduction shows how the subject's concept of the limit is understood. The subject is able to reiterate the concept of limit as an approximate value or a limit in a function graph. Seeing this and based on the indicators of the concept of MONE then the subject can be said to understand the concept of limit.

Based on the understanding put forward by Polya (1985) the subject includes an inductive understanding, which can try something in simple cases and know that the case applies in similar cases. This can be seen from how the subject describes a limit value as an interconnected graph at one point indicating that the function graph has a limit value. Subjects also understand rationally that can prove the truth something that is seen from the subject's ability to determine if a function has a limit value by first doing the calculation of the right limit and the left limit.

Furthermore, based on what is explained by Skemp (1987) then the subject above can be expressed as a relational understanding that can relate a thing with other things correctly and realize the process done. This is evident from the subject's ability to explain both in the form of algebra function settlements and in the form of function graphs concerning the right and left limit.

E. Conclusion

In the definition of the definition of limit, the subject includes the notion of inductive and rational according to that proposed by Polya. Subjects also understand relationally as disclosed by Skemp. By him it is to teachers who teach mathematics subjects to presumably teach the whole lesson limit. The learner of the limit material should explain in more detail the meaning of the concepts in the limit so that the students better understand it both mathematically and theoretically.

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