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# LEARNING USING GAME: ALTERNATIVE STRATEGY TO DEVELOP CRITICAL THINKING (STUDY CASUS ON EPSILON GAME IN REAL ANALYSIS LEARNING)

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Abstrac

Critical thinking skill is important for student in education program. K epsilon game can be used qin .Players in a game use all energy and ability to become the winner in the game without neglect the role play. Learning using game can develop critical thinking skill, problem solving skill, and sportive.

Keyword : Critical Thinking, K epsilon game, sequence limit

## INTRODUCTION

The development of science and technology needs one to master information and knowledge. The mastery of technology needs critical, systematical, logical, and creative thinking. So it is needed a program of education that enables to develop the ability to think critically, systematically, ability of critical, systematical, logical and creative thinking is mathematics. As it is said by Wittgenstain [ Suriasmantri, 2003 ] that mathematic is a method to think logically.

Improving the quality of mathematics education in all types and levels of education should always be sought when considering the importance matema and its role in dealing with the advancement of science and technology and global competition. Efforts to improve the quality of mathematics education has been done by the government. one only to improve the 1994 curriculum by developing curriculum 2004 and Kurikulum Tingkat satuan Pendidikan (KTSP).

Math skills that must be possessed by students in primary and secondary education must be owned also by students of mathematics. Committee on the Undergraduate Program in Mathematics (CUPM) provided 6 Recommendations 2004 for the basis for the majors, programs and all courses in mathematics. One recommendation explains that each course in mathematics should be an activity that will help students in the development of analytical, critical reasoning, problem solving and communication skills.

From the description of the capabilities that must be possessed by students of mathematics as well as recommendations should CUPM 2004 educational institutions in charge educating prospective teachers of mathematics to prepare students to have the ability to think critically mathematically. LPTK prospective teachers in charge of giving birth mathematics is responsible for preparing students to reinforce critical thinking skills. Critical

thinking skills are not in born but the ability of someone who must be nourished. Lecturer plays a role in the business development of critical thinking skills.

In the learning process, it seems not many professors who create the conditions and situations that allow students to do critical thinking process. The strategy is most often done to enable the student faculty are involving students in discussions with the whole class, that of lecturer to students and from students to lecturers. Under the conditions of the learning activities, students are not accustomed to thinking critically. In one long-term goal is to develop a mathematical learning Critical thinking

The results of the national assessment test math olympiad level students demonstrate that critical thinking skills can be said masihrendah mathematically. Addressing the problems associated with the low critical thinking skills and student mathematical importance it is necessary critical thinking and innovation in order to improve the learning process. To improve the ability of critical thinking mathematically, educational institutions that educate prospective teachers of mathematics need to make improvements in the learning process. As said Fruner and Robinson (2004) that in order to improve the critical thinking skills of learning mathematical concepts should be focused on understanding the various approaches rather than procedural skills

The game is a fun activity if the type of game in accordance with the stage of development of the players. Players are always trying to be the winner while attending a game. This condition allows the player to perform critical thinking activities in pleasant conditions. In addition, in a game requires strategy to play it so it can be determined who the winner. It can encourage players to hone ability to think critically

Real analysis is an eye kulaiah compulsory for student teachers. This course is a course that abstract object. This subject matter concerns the definition, lemma, and the theorem and its proof. Students are generally less interested in this course, but because the material is have a high difficulty level, learning activities are generally centered on the teacher that makes the students passive in lectures. In this paper will try to apply the learning to apply the method in the course of playing on a real analysis of the material, especially in the limit of the line in the game epsilon games to develop students' critical thinking abilities.Capacity building is one of them can be done through learning can develop students' critical thinking abilities.

## DISCUSSION

Several studies have identified several skills education associated with the critical thinking skills to find analogies and Other relationships between information, determine the relevance and validity of information can be used to solve the problem, and identify and evaluate solutions or alternative ways of settlement (Pott, 1994)

According to Ennis (1996) critical thinking is a thought process that aims to make rational decisions directed to decide whether to believe or do something. From the definition of Ennis may be disclosed several important things. Critical thinking is focused into

something full understanding of consciousness and lead to a goal. The purpose of critical thinking is to consider and evaluate the information that ultimately allows us to make decisions

Chanche (Huitt, 1998), a cognitive psychologist defines critical thinking as the ability to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw conclusions, evaluate arguments and solve problems. According Sukmadinata (2004) Critical thinking is a skill reason regular, systematic skills in assessing, solving problem, interesting decisions, providing confidence, analyzing assumptions, and search scientific.

Critical thinking of Chenche and Sukmadinata have in common is the process mental to analyze, evaluate, and problem solving. through the process of think critically one can obtain the correct information, evaluate it and process that information in order to obtain a conclusion are reliable

Swart and Perkin (Hassoubah, 2004) states that critical thinking means searching for and collect reliable information for use as evidence to support an assessment. Thus critical thinking mostly consists of evaluating arguments or information and make decisions that can help develop confidence and take action and prove.

Critical thinking is critical thinking mathematically in the field of mathematics. Thus mathematical thinking is critical thinking process that involves knowledge of mathematics, mathematical reasoning and mathematical proof. critical thinking in mathematics is critical thinking skills in solving math problems. Based on the definitions of critical thinking suggested by expert, critical thinking mathematically indicators can be classified into five components thought critical, namely the analysis, evaluation, verification, troubleshooting, and find analogies (Suchi Rohaminah, 2006)

This paper will discuss how to make the learning of mathematics in real analysis courses on the subject of the limit line of the game using the game epsilon. Components of critical thinking can be developed that is on problem-solving and evaluation component.

II.1 Sequence

2.1.Definition A sequence of real numbers (or a sequence in R) is a function defined on the set $N = \{1,2, \dots\}$ of natural numbers whose range is contained in the set R of real numbers.

In other words, a sequence in R assigns to each natural number $N = \{1,2, \dots\}$ uniquely determined real number. If X : N —> R is a sequence, we will usually denote the value of X at n by the symbol rather than using the function notation X(n). The values are also called the terms or the elements of the sequence. We will denote this sequence by the notations $X, (X_n), (n \in N)$.

II.2 The Limit of a Sequence

2.2 Definition A Sequence$X = (x_n)$ in R is said to converge to $x \in R$ or x is said to be a limit of $(x_n)$, if for every $\varepsilon > 0$ there exists a natural number $K(\varepsilon)$ such that for all $n \geq K(\varepsilon)$, the terms $x_n$ satisfy $|x_n - x| < \varepsilon$.

II.3 Limit Rows With Epsilon Learning Games To Develop Critical Thinking Ability

Epsilon is a game playing on the limit of a sequence. Learning by applying epsilon game this can be done by divide students into small groups. In one round game, which plays the two groups. The first group as a player and the second group as the jury. The player will be the winner if the player able to answer the questions the jury. Jury about the card that contains the row and limit value. Players are asked to answer the question. if the row has a limit, the jury challenge players with a choice of a particular epsilon and epsilon memintapemain look for the corresponding k. If the line has no limit jury then challenge the player to show that the sequence is not converges to a jury selected value. Example cards matter

| |
|---|
| lim $\left(\frac{1}{n}\right)$ adalah<br><br>a.0 b. 3 c. 4 d.tidak ada |

Learning to use this method allows students to ie the components of critical thinking problem solving and evaluation. At the time of becoming players, students strive to answer questions from the jury and trying to prove that is by finding an appropriate k epsilon. to search for limit value, the students already have a stock knowledge before attending this course. It This allows students to find the limit in various ways. this activity is a step in problem solving is one of the components ability to think critically.

At the time of judging, the students tried to create questions and seek penyelesaiaanya. This activity allows students to create questions with a high degree of difficulty, but can be resolved. This activity is a step in problem solving is one of the components of critical thinking ability.

At the time of a player, the student should be able to evaluate on clarification of the jury to answer the next challenge. This activity is a step evaluation is one component of critical thinking ability. At the time of judging, students should be able to evaluate players and make the answer the next question with an answer that fit the player. This activity is an evaluation step, which is one component of the ability to think critically

Learning by applying epsilon game allows students not only to sit to hear a lecture from the teacher. Activity in learning this method allows students to develop their critical thinking ability is on problem solving and evaluation component. In addition, by using the method of learning the game can also attract students because the activity of a fun game.

## III.CONCLUSION AND SUGGESTION

Learning method using epsilon game can be used as an alternative to learning that can develop the ability to think critically in problem solving and evaluation component. In addition, This method can make learning real analysis becomes more interesting.

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