

**DEVELOPING CHARACTER BASED INTERACTIVE
LEARNING MEDIA TO FACILITATE STUDENT’S SELF-
LEARNING OF CAPITA SELECTA MATHEMATICS (A
RESEARCH ON MATHEMATICAL CRITICAL AND
CREATIVE THINKING SKILLS OF MATHEMATICS
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EDUCATION FACULTY OF SILIWANGI UNIVERSITY IN
TASIKMALAYA)**

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Abstract

The objectives of this research are to design and develop character-based Interactive learning media to facilitate autonomous learning of college students in the course Capita Selecta to develop critical and creative thinking mathematical skills. Research methods and properties of the beginning of the study in the first phase of theoretical studies, mainly carried out in the literature study and consideration of the rational, empirical studies conducted when testing teaching materials and instruments interactive critical and creative thinking skills mathematically. The sample in this research is mathematics education students who take courses capita selecta math 3 group are 110 people. Data are collected to measure the ability to think critically and mathematically creative through a written test, while learning autonomy used to measure Questionnaire with Likert scale. The Results of the Research is that a character-based interactive learning media facilitate self-learning in the course Capita Selecta. The ability to think critically and mathematically creative of Students are adjusted at a high level qualifications. The Highest error of mathematic critical thinking made by students are at the focus indicator while the highest error of mathematic creative thinking are at the originality indicator.

Keywords: character-based interactive learning media, mathematical critical thinking, mathematical creative thinking, autonomous learning.

1. Introduction

In development countries, computers have been part of the learning process in the classroom. But in Indonesia, Although a growing fast of schools are equipped with computer labs, the use of computers for learning, including mathematics, has been still not optimal. Therefore, research on the effectiveness of the using

computers in teaching is necessary and the use of computers for educational purposes, especially mathematics education can be further improved. Curriculum 2013, are designed with the aim to prepare the Indonesian people have the ability to live as a person and a citizen who believed, productive, creative, innovative, and affective and able to contribute to the society, nation, state and world civilization. Satisfy these objectives students LPTK as mathematics teacher candidates should be prepare themselves to be part of the development of technology. The advantages of interactive multimedia applications of mathematics in explaining a concept can require students to explore and analyze, try out and explore the concept also the principles contained in the object problem.

The presence of the development science and technology provide opportunities for all to students to unimpeded access information relevant of their needed and demands; explore and find their own mathematical concepts contained in the computer program given. This will touch up an optimal utilization of the ability of students, so critical thinking and mathematically will be increased.

The one objective of the Faculty of Theacher and Education Siliwangi University in Tasikmalaya is to prepare of teachers in middle and high school in accordance with the neededthe both of quantity and quality. While one of the missions of Mathematics Education departement FKIP Sliwangi University is organizing a quality education to prepare skilled in mathematics education professionals. Based on this fact, students in Mathematics Education departement as mathematics teacher candidates need to prepare themselves to the maximum to be able to fill up the mission of Mathematics Education departement. To carry out this mission one of the subjects that a provision student teachers in middle and high school is a Capita Selecta Math. This subject discusses more depth some selected topics in mathematics and secondary school as well as the way they are presented in accordance with the secondary school mathematics curriculum and secondary regulations. Scope of the subject include: topicsmiddle school math and essential and common misconception (misconception), or a topic that is considered difficult for students and teachers and middle school of math.

To facilitate self-learning students, the use of instructional media is one of the alternatives in the development process of learning to be better. Muhammad (Samsudin, Ahmad, 2008), available at online interactive <http://pendidikansains.blogspot.com/2008/01/peran-multimedia--mmi-in.html>, stressed the importance of the media as a tool to stimulate the learning process. Through the use of instructional media, independently students better understand certain materials that seem abstract has easily visualized. In addition, students are expected as a mathematics teacher candidates are motivated and able to actively participate in classroom learning. Kusumah, Y (2008: 4) also that one of solution is deemed appropriate to realize the self-learning is the application of information technology as a medium of learning mathematics, which provide opportunities for students to learn independently via programmed instructional materials interactively.

Previous research has an impact quite well that the media interactive teaching. Currently each classes in FKIP already available means to support learning based on information and communications technology (Information and Communication Technology / ICT). In the current circumstances, the lesson should be not longer be a tedious thing, as a few decades ago. Thanks to the development of information technology so rapidly, teaching materials can be presented with sounds and images are dynamic, not boring, as well as solid information. Therefore, the development of ICT-based learning is expected to improve the quality of the learning process in the classroom. UNESCO 2002 states that the use of ICT in teaching has three objectives: 1) to build a "knowledge-based society habits" such as problem solving skills (problem solving), communication skills, ability to find / manage information, transform the information into new knowledge and inform others, 2) to developed the ability to use ICT or "ICT literacy", and 3) to improved the effectiveness and efficiency of the learning process.

2. Theoretical Background

a. Interactive learning media

Media can literally be interpreted as an intermediary or introduction. Heinich, (Sanjaya, Wina, 2008: 204) argues, "The media is a channel of Communications. Derived from the Latin word for 'between', the term Refers' to anything that carries information between a source and a receiver. ' "Moreover, Briggs, L.J. (Sanjaya, Wina, 2008: 204) also states the media is "a tool to provide incentives' for learners that learning occurs. Media in the learning process tends to be interpreted as graphics tools, photographic, or electronically to capture, process, and reconstruct the visual or verbal information (Arsyad, Azhar, 2007: 3). With the presence of media in learning, students can learn the material independently and provides an opportunity to discover mathematical concepts and developed their creativity.

Media classified into five groups: (1) human-based media (teachers, instructors, tutors, role playing, group activities, field-trip); (2) print-based media (books, guides, exercise books (workbooks), work tool, and loose pages); (3) visual-based media (books, work tools, charts, graphs, maps, drawings, transparencies, slides); (4) based on audio-visual media (video, film, slide-tape program, television); and (5) computer-based media (computer aided teaching, interactive video, hypertext).

b. Critical and creative thinking skills

Thinking involves two major aspects of critical and creative. Both of think the use of reasoning to build a variety of ideas. According to Fisher (1995) think happens in everyone mental activity that serves to formulated or solved problems, make decisions, or gain understanding. Judging from the dimensions, Marzano et al. (1989: 4) found thinking includes five dimensions of metacognition, critical and creative thinking, thinking ability of the core, and the relationship between thinking with particular knowledge. In line with these opinions, Fisher (1995: 4) argues, that think

critically and creatively involve aspects of the mind, and both are used in reasoning and build ideas. Additionally thought to be involved in any mental activities that help to formulate or solve a problem, make a decision or to build understanding, and then through thinking can be interpreted something.

Ennis (1981: xvii) defines that critical thinking is a thought process with the aim of making sensible decisions about what is believed to be or do. More over Ennis (1981: 14) said that there are six basic elements of critical thinking Focus, Reasons, Inference, Situation, Clarity, and Overview. According to Baron and Sternberg (1987: 10) there are five keys in critical thinking that is practical, reflective, reasonable, beliefs, and actions. The five keys to be combined into a definition for critical thinking, critical thinking is a reflective mind that is focused on deciding what is believed to be or do. In addition, the notion of critical thinking is something reasonable, reflective thinking that is focused on what is believed to be the decision, done, or done (Marzano et al., 1989: 18).

Ervynk (1991: 47) argues that the mathematical creative is the ability to solve problems and to develop the structures of thought to the nature of deductive logic. The resulting concepts to integrate into the things that are important in mathematics. Silver (1997) suggests that creative has not privileged domain of a few individuals, but rather as an orientation or disposition toward mathematical activity that can be developed extensively in public schools. More over Silver argued mathematical activities such as problem solving and posing problems interwoven with creativity which includes fluency, flexibility, and novelty. Sriraman (2004) defines creativity as a process that results are not unusual, in the solution of the problem given and that regardless of the level of complexity. Sriraman also suggested that creativity can be applied in the classroom. So these issues are not only the motivation and perseverance but also has a very broad level of reflection.

Mathematical creative thinking is the ability to find and resolve problems with components of mathematical proficiency/fluency, flexibility,

and originality and elaboration / of detail. Fluency is the ability to put forward similar ideas to solve a mathematical problem. Flexibility is the ability to produce a wide variety of ideas to solve problems outside the usual categories. While the new thing is the ability to provide responses that are unique and unusual.

3. Method

This research is the development of character-based on media interactive learning course on mathematical models capita selekta Research Development. According Ruseffendi, E.T (2005: 32) that research and development (developmental research) is research that aims to assist in making decisions about better things to be carried out from the others, from the standpoint of effectiveness, and others. in taking decision, the element of subjectivity certainly can not be removed ". Furthermore Ruseffendi, E.T (2005: 32) also said that "research development (developmental research) find patterns and sequences of growth or change, and primarily aims to developer of teaching materials that are beneficial to the school"

This research is a study of development (developmental research) medium term (over 2 years). Research methods and the nature of the study in the first phase initiated theoretical studies mainly carried out in the literature study and consideration of the rational, empirical studies do when guided interactive teaching materials and instruments ability to critical thinking and mathematicalcreatively.

The sample in this study are students who took the mathematics education mathematics capita selecta as much as 3 class numbered 110 people. The data would be collected to measure the ability to critical thinking and mathematicall creatively using written tests in narrative form as much as 6 questions for critical and 4 about to be creative, while learning kemamdirian used to measure Questionnaire with Likert scale.

4. Result and Discussion

The trial results about the ability to think critically and mathematicalcreatively, all matter is valid, as well as the test results questionnaire independence declared valid student learning as much as 40 statement. The results of observations during the learning process, student enthusiasm and the spirit of learning, means an interactive learning media can motivate students to learn. In addition, an interactive learning media can facilitate self-learning students both at school and at home. To enhance the learning motivation of students, lecturers should devise their own interactive learning media in accordance with the condition or characteristics of the students, so that students are able to learn independently. In addition, students must be trained High Other Thinking such as critical and creative thinking skills of students.

Research Year 2 begins with the preparation of pretest and posttest matter of critical thinking skills and creative mathematics. The number of critical thinking skills matter as much as 6 mathematical problems, and creative thinking abilities about mathematics as much as 4 matter. Critical thinking mathematically includes indicators Focus, Reason, Inference, Situation, Clarity and Overview, while creative thinking mathematically includes indicators Fluency, Flexibility, Originality, and Elaboration. Then about students tested in as many as 38 people. The test results obtained, all about are valid. Before the lecture using textbooks and interactive learning media, held pretest critical thinking and creative mathematical skills. The objective is the ability to see the beginning of creative and critical thinking math students. Once completed the entire lecture, held postes the ability to see the end of creative and critical thinking math students. Results obtained pretes and postes compared with an increase in critical thinking skills and creative mathematics student.

Interactive learning media mathematics can present concepts and high-level skills in mathematics, which is connected between one element and the other element is difficult to be taught and learned through books alone. The advantages of interactive multimedia applications of mathematics in explaining a concept can require students to explore and analyze, try and explore the concepts and

principles contained in the material that it faces, so it is relatively faster to build a structure of student understanding. This is caused because the integration of components such as voice, text, animation, pictures / graphics, and video functions to optimize the role of the senses in receiving information into the system memory. Regular learning has been done without the help of interactive media has not given the opportunity students to explore and develop their creativity. Therefore, the development of interactive learning media predicted to be able to facilitate students to independently develop high-level thinking skills.

5. Conclusion dan Remark

Results from this study is a character-based interactive learning media can facilitate self-learning students in the course Capita Selecta Math. The ability to think critically and creatively Students are at a high level qualifications. Students experienced the highest error indicator mathematically focus on critical thinking and originality indicator for creative thinking mathematically.

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