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The learning strategy through the using of instruction technology interactive animation media (IAM) seen from independence learning mathematics secondary school students

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Abstract
The purpose of this study was to determine influence the model of interactive animations media (IAM), independent learning, and mathematical capability and interaction on student learning outcomes. This study is a quasi-experimental research subjects first semester of grade 12 students of the school year 2013/2014. Data collection techniques used in this study is a test method for measuring learning outcomes and mathematical capability review, questionnaires to measure the review independent learning and observation sheet as a result of supporting data affective and psychomotor aspects of learning students. The results showed: (1) there is a learning effect with IAM model significantly to the cognitive aspects of student learning outcomes, but there is no effect on learning outcomes aspects of students' affective and psychomotor aspects; (2) there are significant learning independence and self-reliance of high category learning significantly lower category of the affective aspects of students' learning outcomes, but there is no effect on the cognitive aspects of learning outcomes and psychomotor aspects of the student; (3) there is no effect of high and low mathematical capability of the student learning outcomes; (4) there is an interaction between the IAM model with independent learning significantly to the cognitive aspects of students 'learning outcomes, but there is no effect on learning outcomes aspects of students' affective and psychomotor aspects; (5) there is no interaction between the IAM model with mathematical capability of the student learning outcomes; (6) there is no interaction between the independent learning of the student learning outcomes; (7) there is no interaction between the IAM model with independent learning and mathematical capability of the student learning outcomes.

Keywords: Interactive animations media (IAM) model, Independence learning, mathematics capability.

1. Introduction
Mathematics has an important role in the development of science and technology today. Learning mathematics at various levels of education, including higher education should be based on the nature of the mathematical and modeling tools in solving problems in science (Stipek, DJ *et al*, 2001). Implementation of mathematical learning which refers to the mathematical nature should be a foundation for the development of Science and Technology (Science and Technology) in the future. However, based on some results of a research institute that studies assessing the level of competitiveness of human resources in the field is still relatively low mathematical Hatch, NW, & Dyer, JH (2004). That is because mathematics is often regarded as an obstacle for many students. Learning mathematics foundation for other subjects has not been understood in depth and only limited obligations in running the curriculum, so that loses its appeal and is considered difficult and unpleasant, and loose its relevance to the real world that is supposed to be the object of this science. In addition, mathematical learning is still inclined in memorized, the class is still focused on the teacher, and lectures become the primary choice in teaching mathematics. The above conditions have become paradigms and perceptions that mathematical learning is a difficult and complex subject, dull, so that only certain students are able to master it.
The paradigm of learning mathematics in secondary schools still a conventional pattern in the end it will be difficult to improve students' mathematical capability, because the conventional pattern, students are not accustomed to involve all of their capability in the process of solving problems related to the material they are learning. Integral to locate the material outside the area, trigonometry to measure angles, matrix equation for the completion

of the liner and so concretely related to problems in the neighborhood of students, but the learning is still dominated by the lecture method, only a mathematical description of products and a bit of a process. In addition, textual still learning and have not used any issues or problems that occur in the environment as a reference for students learning about linking issues with concepts learned in solving problems lead to poor posture and student understanding.

One of the problems in learning activities trigonometry topics are lacking the proper use of the model in the learning process which is already Surely seated students as the primary focus, while teachers act as facilitators and how to enrich the learning experience of students, and with their learning experience, students are expected to may take action in the troubleshooting process. This is in line with the constructivist paradigm, the paradigm of constructivism in learning according Kalbin and Dayang (2014) is: "there has been a paradigm shift in the previous study focuses on the role of teachers, the journey has increasingly shifted to the empowerment of students, where students are given the freedom to take the initiative and participate in learning activities ". Based on this theory, it can be explained that in the process of learning the most important is how students can be proactive and are directly involved in learning activities.

Such efforts can be realized by implementing appropriate learning model that is the model of interactive animations media (IAM). IAM learning model developed from the ADDIE model has the syntax: 1) initiation of the problem; 2) the establishment of the concept; 3) application; 4) strengthening the concept; 5) assessment, which is expected to be a learning process focuses on learning activities, assist and guide students in difficulty as well as play a role in assisting and enrich the learning experience of students to a problem-solving.

Characteristically general mathematical material is applied in an attempt to realized issues are abstract, where the teacher in the learning process can provide hands-on experience to students by bringing them to the native environment through the medium of interactive animation, which is one of the alternative solutions that can be used by teachers in order to enrich the learning experience of students. Availability media technology-based learning has been also underutilized by the teacher in the learning, where the media interactive animation has excellent benefits to explain some of the materials that are abstract into concrete form, and vice versa but with certain requirements which became the limitations of the medium genuine as the ease of access and affordability.

According to Sutrisno (2011), Webb (2004) "Climate learning enriched by the availability of learning technology provides results include: (1) accelerate cognitive understanding; (2) expand the learning experience so that students can learn mathematics through direct experience by relating to everyday life; (3) improve self-management. IAM-based instructional media used in this study predicted able to provide a real picture and clear to students in accordance with the original environmental conditions.

Achievement of optimal learning results in addition influenced by external factors also influenced by internal factors of students, such as independent learning and mathematical capability of students. During this time students are varied internal factors has not become a serious review by the teacher. Less involvement of students in analyzing issues related to the environment and not optimal students in using their knowledge in solving problems caused students tend to be passive in learning activities, so that students do not have the mathematical ability to solve problems independently, therefore, independent learning and the ability Noteworthy in learning mathematics so characteristic as an independent student who has mathematical capability can be owned by students.

According to Sutrisno (2011), Bruner (1961) "learning is an active search for knowledge that is done by a person in solving the problem so as to produce knowledge that is really meaningful". Theory Bruner suggested to the students to learn through active participation in order to find his own curiosity, and the process to obtain these results is said to have students can learn independently. While the mathematical ability as a result of the implementation of the mathematical study conducted on students, Mariana and Praginda (2009) separates into two effects, the effects of direct and indirect effects. The immediate effect of students achieved as a result of the student learn to understand a natural phenomenon. Indirect effects achieved by students as a result of the student in the process of doing mathematics, mathematician mimic the natural phenomena revealed. Process undertaken by students in doing mathematics, will be interpreted as a mathematical ability. According Nuryani (2007) "mathematical ability is a skill activities are interconnected among each other", while Padilla (in Hamilton and Swortzel, 2007) divides into the basic skills of mathematical capability (Basic Skills) and integrated skills (Integrated Skills) . Based on the above, it should be carried out research in mathematical learning in the integral material using IAM models in terms of independent learning and mathematical capability of students. The purpose of this research is to determine: (1) the effect of IAM on the model of student learning outcomes; (2) the effect of higher learning independence and self-reliance categories studied the low category of the student learning outcomes; (3) the influence high mathematical capability and mathematical ability category lower category of the student learning outcomes; (4) the interaction between IAM models with independent learning on student learning outcomes; (5) interaction between IAM with mathematical capability of the student learning outcomes; (6). interaction between independent learning with mathematical capability to student learning outcomes; (7) the interaction between the model IAM with independent learning and mathematical capability of the student learning outcomes.

Methods

This research was conducted at SMA N 3 from November 2013 to December 2013. This study used a quasi-experimental methods. The experimental group was treated with the IAM. The design of this study using a factorial design with IAM independent variable, dependent variable is the student learning outcomes and moderator variables include independent learning and mathematical capability. Data collection was performed using tests to measure learning outcomes and mathematical capability, questionnaires to measure learning independence and observation sheet as supporting data affective aspects of learning outcomes and student psychomotor aspects. Data independent learning and mathematical capability is obtained before the samples are given treatment, while learning outcome data obtained after the

sample was given treatment.

Data were analyzed descriptively and statistically followed by Scheffe test. Statistical tests performed at a significance level of 5%. Before statistical analysis of test preconditions, namely homogeneity test and test of normality of the data obtained.

Results and Discussion

The research data was obtained through mathematical ability test, questionnaire independent learning, and achievement test and observation on affective and psychomotor aspects of students. Data Description independent learning (IL), mathematical capability (MC) is presented in Table 1 below.

Table 1: Description of Data Independence Learning and Mathematical Ability Students

	Independent Learning	Mathematic Capability
Mean	76.24	73.82
sd	7.28	12.43

Data Description student learning outcomes based learning media, independent learning and mathematical capability of students can be seen in Table 2, below.

Table 2: Average Student Results Based Learning IAM, Learning independence and mathematics capability

	IAM Learning	Independence learning	Mathematics capability
Cognitif	75.21	71.72	63.32
Affective	62.15	82.37	70.02
psicomotor	70.25	76.45	72.82

Table 2 above shows that the average score of the cognitive aspects of learning outcomes, higher in the group of students with learning IAM. Furthermore, the average score of cognitive and affective learning outcomes of students who have a high learning independence better than students who have low learning independence, while the results of learning psychomotor learning independence lower category better than independent learning higher category. Table 2 shows that the average score Affective learning outcomes and psychomotor aspects of students who have a higher category of mathematical capability is better than the students who have the capability mathematical lower category, while the cognitive aspects of learning outcomes mathematical capability lower category better than the mathematical capability of high category.

The data obtained are then processed using ANOVA statistical analysis.

Summary of the results of statistical tests are presented in Table 3, Table 4 and Table 5 below.

Table 3: Summary of ANOVA Cognitive Learning Outcomes

No	Variable test	p-value	Result of test
1	Media Learning	0.013	Denied
2	Independence Learning	0.435	Accepted
3	capacity of Mathematical	0.845	Accepted
4	Media dan Kemandirian Belajar	0.023	Denied
5	Media and Independence Learning	0.876	Accepted
6	Independence Learning and Mathematical Capability	0.237	Accepted
7	Media, Independence Learning and Mathematical Capability	0.221	Accepted

Table 4. Summary of ANOVA Affective Learning Outcomes

No	Variable test	p-value	Result of test
1	Media Learning	0,321	Accepted
2	Independence Learning	0,012	Denied
3	capacity of Mathematical	0,435	Accepted
4	Media dan Kemandirian Belajar	0,654	Accepted
5	Media and Independence Learning	0,143	Accepted
6	Independence Learning and Mathematical Capability	0,123	Accepted
7	Media, Independence Learning and Mathematical Capability	0,768	Accepted

Table 5. Summary of ANOVA results Psychomotor Learning

No	Variable test	p-value	Result of test
1	Media Learning	0.457	Accepted
2	Independence Learning	0.324	Accepted
3	capacity of Mathematical	0.345	Accepted
4	Media dan Kemandirian Belajar	0.768	Accepted
5	Media and Independence Learning	0.431	Accepted
6	Independence Learning and Mathematical Capability	0768	Accepted
7	Media, Independence Learning and Mathematical Capability	0.872	Accepted

After the ANOVA statistical test, it will be followed by a further test after ANOVA. In this study further post-ANOVA test will be conducted on the first and fourth hypothesis hypotheses on the cognitive aspects of learning outcomes and the second hypothesis on affective aspects of students. In the hypothesis of unity, to know the influence of instructional media for cognitive aspects of student learning outcomes can be seen in Table 2. The average results of student learning based media. Result scores cognitive aspects of learning outcomes using the media IAM score of 75.21

In the fourth hypothesis, for the interaction model of the IAM with independent learning high and low categories of the cognitive aspects of students' learning outcomes, testing followed by Scheffe test with the plot of the interaction are presented in Table 6 below.

Table 6: Interaction Media Learning with Independent Learning.

		Mathematic capability
Learning Media	Height	72
	Low	43

According to Table 5 above, it appears that the interaction between the IAM with independent learning higher category better to students' cognitive aspects.

In the second hypothesis, to determine the effect of high category learning independence and low categories of the affective aspects of students' learning outcomes, testing continued with test independent sample t-test. Test results are presented in Table 7. The histogram in below.

Table 7: Results of independent sample t test affective aspects of learning outcomes based Independence Student.

	Independent Learning
Height	76.57
low	65.25

Based on Table 7 above, it is known that the average value for students who have learning independence higher category on learning outcomes affective aspect is 76.57 and for students who have learning independence lower category of the affective aspects of learning outcomes is 65.25. It shows that there is influence of higher learning independence category on learning outcomes when compared with the affective aspects of learning independence low category of the affective aspects of students' learning outcomes.

Based on the summary of the results of statistical tests Anova in Table 3, Table 4, Table 5, Table 6 and Table 7 above, obtained hypotheses to be described as follows:

A. First hypothesis

Statistical tests showed that there are significant learning model IAM to the learning outcomes of students in the cognitive aspects of the integral material. Software model of learning technologies by Aikenhead (2013), Yoruk (2009) is a learning model based on the active participation of students in the mastery of mathematics through the processes experienced based learning experience, where the experience is useful to establish the knowledge in learning technology can be used in problem solving.

Based on the theory advanced by Aikenhead and according to the research conducted, the invitation stage raised issues or problems that can be extracted from the students, which raises the issue of the goal is for students to focus on learning and linking the events that have been known by students with the material to be covered, so that seems to be the continuity of knowledge received by students. Armed with the knowledge that has been received by the student in the learning process is expected to perform troubleshooting based on the issues raised. IAM model application on research conducted in the learning process aims to enrich the learning experience of students. Where is the media that is used to display the original environmental conditions raised as an issue of the problems through observation animated images.

The influence of the cognitive aspects of learning outcomes using instructional media is multimedia, so research doing Serin, O. (2011). The results showed that cognitive learning achievement of students using computer simulation is better than those who did not use. Research conducted by Potyrala (2002) on technology in education, the results of these studies indicate that facilitates information technology to enable the educational goals of students in the cognitive process. Cognitive understanding of the students obtained in accordance with the opinion delivered by Sutrisno, (2011), Alessi and Trollip (2001) in which the learning media can be a special attraction to motivate students to learn. In addition, students can learn to be more confident in accordance with its own way, as well as more students have the opportunity to explore because it is motivated by the presence of media in learning so that students' learning activities will increase. Associated with the integration of the use of IAM in learning, can be used as a tool to engage students in thinking that is indicated by the use of media that can provide a good learning experience to the students with capability the media to present a learning environment that is native to the classroom so as to enrich the teaching and learning stimulate students' cognitive abilities. Aside from the perceived media use can support the dynamic delivery of information related to the material presented, so that makes it easy for teachers to motivate students to learn because at the same time the media used force as a source of learning when students explore ideas and solving problems in learning. This is in accordance with the theory of learning Bruner, free discovery learning.

Bruner argues that the learning process will go well and creatively if teachers find a concept, theory, rules or issues through the examples found in the life (Uno, 2010). Absence of influence that occur in affective and psychomotor aspects aspect, due to the lack of sensitivity of the students in discovering the problems causing the effectiveness of instructional media in providing learning experiences to the students to be not optimal. This affects the lack of active participation of students in the learning process, so that students do not have the ability to respond well to related problems of the material learned. Another thing that contributed to the lack of physical activity undertaken by students of the interactive process using instructional media due to limited facilities and infrastructure. Solutions that can respond to the discussion given above, learning should be conducted in a computer lab so that students can carry out overall interactive activities against media that is used, it is felt able to provide maximum learning experience for all students. Thus, students will actively participate in the learning and provide the ability for students to perform troubleshooting.

B. Second Hypothesis

Statistical tests showed that there are significant independent learning and independent learning high category lower category of the affective aspects of students' learning outcomes in the integral material independence of learning by Yamin (2011) is a study conducted by the students freely determine their learning objectives, learning direction, planning a learning process , learning strategies, use of learning resources chosen, making academic decisions, and carry out activities for the achievement of learning goals. Based on the above opinion, may imply that self-learning is active and participatory way to develop each individual's self that is not tied to teacher attendance, meeting face to face in the classroom, and the presence of friends learn. Self-learning is learning to develop themselves, skills own way. Self-learning can not be deemed to learn themselves, the most important thing in the process is to increase capability self-learning and skills of students in the learning process without the help of others, so that in the end the students are not dependent on the teacher, counselor, friend, or other person in the study. In the self-learning students will strive itself in advance to understand the content to read or watch through the medium of learning. If having trouble then ask or discuss with friends, educators, or anyone else. Independent students will be able to find a source of learning needs. On the other hand self-learning requires motivation, tenacity, seriousness, discipline, responsibility, willingness, and curiosity to grow and advance in knowledge. Many growing information that is not socialized in the learning process caused by limited resources, knowledge, and experience that can be searched by the students to be discussed in class.

The process of self-learning gives students the chance to digest the teaching materials with a little help from the teacher. They follow the learning activities with teaching materials that have been designed so that any problems or learning difficulties have been anticipated earlier. Learning plan drawn up by the

teacher based on the student's learning experience by using media that can deliver native environment as an object of study lead to a tendency for students to act positively and caused high interest to participate in the learning process. Positive action in the learning process is shown with reading material based on the handbook, noting the confirmation by the teacher, expression and response to the opinion delivered by peers, read the tutorial contained in the IAM, active discussion and sharing of ideas. Another thing that also affect the learning achievement of optimal affective aspects.

Based on the quantitative data obtained from the results of hypothesis testing and further post-ANOVA test revealed that students who have learning independence higher category has more influence on the affective aspects of learning outcomes than students who have learning independence low category. This can be seen from the average value obtained in which students who have learning independence higher category scored 86.71, while students who have learning independence lower categories scored 84.66.

Acquisition value at the top, can be caused by the use of instructional media and motivation given by the teacher in the classroom generate a positive response to the active participation of the students, so that students have a desire to draw attention to the learning process that ultimately students can formulate learning goals with good. This is consistent with constructivism learning theory according to Suparno (1997) where learning is an active activity, where students construct their own knowledge. Affirmed that students seek their own sense of what they learned. Conveys the idea that the old to the new situation. Make reasoning on what he learned by looking for meaning, comparing it to what is already known and finish between what is known to what is required in the new experience. Students who have good independent learning, will be able to construct their own knowledge, and with knowledge of its students can make the formulation of the problem, hypothesis, testing the hypothesis, solve problems, find answers, describing, designing, and express ideas.

Based on the above, the results obtained in line with research conducted Pearce (2001), entitled "The Use of Self-Directed Learning to Promote Active Citizenship in STS Classes", the results of these studies show the result of which is that students who have learning independence will have a positive attitude outstanding students to steer yourself in completing the task. Absence of influence that occur in cognitive and psychomotor aspects, is caused by students not prepared him well to be able to learn on its own initiative, the students do not have the internal motivation that grows from within itself, but still hoping for external motivation given by teacher. This is certainly not a significant influence on the cognitive aspects of learning achievement of students.

Another thing that influences is the student does not have the self-initiative in seeking references associated with the material as a source of learning, and not be able to recognize and identify the materials and tools they need to learn, is evident from the few students who are active in the learning of mathematics which require active participation of students to be able to answer the questions contained in the interactive learning modules. The solution can be given response above discussion is very necessary independence of student learning to be developed, so that students can construct their own knowledge, and with knowledge of its students can make the formulation of the problem, hypothesis, testing the hypothesis, solve problems, find answers, describing, designing, and express ideas.

C. Third hypothesis

Statistical tests showed that there was no effect of high mathematical ability and mathematical ability category lower category to the learning outcomes of students in an integral material. Praginda (2009) is a skill or skills as a result of indirect effects or stages are performed by students in learning mathematics. Skills are intended, according to Padilla (in Hamilton and Swortzel, 2007) is a mathematical capability, which are divided into basic skills (Basic Skills) and integrated skills integrated (Integrated Skills). In understanding the mathematical students can also understand the relationship between mathematics and technology education.

Based on the theory and Praginda Mariana (2009), less optimal learning outcomes achieved by students because learning outcomes are achieved not result from indirect effects achieved by the students as a result of the process undertaken by the students in learning, mimicking experts in expressing natural phenomena. Learning outcomes achieved by students indicated as a result of the direct effect achieved by the students of the learning process to understand the original environmental conditions through the medium of learning, the process of understanding what is meant here is the student already has a complete picture of the condition of the surrounding environment, which is the area of residence of students , and interactive activities of students through the media is only done by the students to recall a memory that never understood before, because the students are not used to make observations using the media, but the students are used to obtain conventional learning with lecture method. Absence of influence is caused by the students do not understand the mathematical capability, so the instructions contained in the model of student learning is not understood as the use of mathematical capability, it makes the learning environment that provides the original context and the use of mathematical capability during this phase of problem solving used by students to analyze problem solving, synthesize new knowledge to plan and establish a solution to the perceived problem solving is viewed not optimal.

Attainment of learning outcomes are less than optimal in the above, are not in accordance with the learning theory developed by Gagne (2013), Margaret E. Bell Gredler (1991) "The skills, appreciation and reasoning in people with all their diversity wide, so it is with hope, ideals, student attitudes and values of people, generally known development largely depends on what is called a learning ". From this definition it can be seen that learning is not a single process, learn formed by obtaining various behaviors due to environmental stimuli into several stages of processing information in a person's cognitive processes.

Related to the research carried out, then the idea Gagne to be the foundation of learning that requires students to be able to use his skills as steps in solving problems related to the environment getting less than optimal results. Solutions that can respond to the discussion given above, students need to be introduced to mathematical capability, so that students have the skills needed by them in studying mathematics and students can understand about the relationship between mathematics and

technology, so that students can create something useful ideas to anticipate issues mathematical.

D. Fourth hypothesis

Statistical tests showed that there was an interaction between IAM Mathematical models in terms of higher learning independence and self-reliance category lower category learning on learning outcomes of students on the cognitive aspects of the integral material. Learning with models of learning technology software according to Pearce (2001) is a learning model that can guide students to be able to learn it
independently through direct experience gained in the process of learning, where students get experience is the result of the transformation process and the simulation of media used by teachers to assist students in mastering the material and increase the activity of learning, increase student learning activities are of course have an impact on the achievement of cognitive aspects of learning outcomes which cognitive learning achievement are either not regardless of the student's ability to regulate her motivation, both internal and external motivation so that students have a good ability to pursue and undergo the learning process as well as long-term tasks assigned by the teacher based on relevant information that they get to improve learning outcomes.

Learning experience that students get the result of the transformation process and the simulation of the media, it refers to the opinion of Galarneau (2005), Sutrisno, 2011) which explains that "The application of technology in schools and educational institutions have been implemented with the achievement of student learning outcomes are quite encouraging". Galernau explanation above, can be interpreted as a one-way pattern centered learning for teachers (Teacher Center) has recognized the rigid and formal strategies, as a result of creativity, activity and willingness to learn independently students did not grow as expected even tend to be passive.

Based on quantitative data further post-ANOVA test results obtained, based on the graphs presented that there is an interaction between the IAM with independent learning high category, the above conclusion can be explained that students who have learning independence will get a higher category learning outcomes better cognitive aspects. The resulting conclusions above, according to the theory of learning Vigotsky by Sheffer (in Wilantara, 2005) which states that a person other than the cognitive development
determined by the individual himself actively, also influenced by an active social environment as well. In learning activities should children receive ample opportunity to develop their potential through learning and growing with the help of teachers to facilitate in solving the problems faced. This view asserts that learning occurs when students are working on tasks that have not been studied, but the tasks that are in the "zone of proximal development" them. Zone of proximal development is the distance between the actual developmental level shown in independent problem solving skills and the level of potential development capability shown in the below problem solving capability guidance of an adult or more capable peers.

Based on some of the above explanation, the results obtained in line with research conducted by Lamb (2003), entitled "Learning Independently As a Pedagogical and methodological, Implications of New Learning Environments", the results of these studies show the result of which is that the use of media technology in learning actively encouraged students to learn independently, interactive and creative. Absence of interactions that occur in affective and psychomotor aspects, due to the lack of sensitivity of students in receiving stimuli presented through the medium of learning, causing students do not participate actively in the learning process. Students indicated not quick to take action as well as its own initiative in solving the questions in the student worksheet. Students no seriusly in the learning process from start to undergo observation phase to the completion phase of the problem, eventually making the student is unable to synthesize new knowledge is built to plan and define the solution of problem solving.

Solutions that can respond to the discussion given above, applied learning patterns lead students to broaden their horizons or solve the problems faced. Model IAM as a model of learning that lead students to discover for themselves about something that should be done, determine and choose the possibilities of the results of his actions and will solve its own problems faced without expecting others.

E. Fifth hypothesis

Statistical tests showed that there was no interaction between IAM models in terms of high mathematical ability and mathematical ability category lower category to the learning outcomes of students in an integral material. Important principles of learning theory Vigotsky, the need for interaction among students in the learning process and discuss issues to be solved together learning that play a role in the formation of students' cognitive and social structures. Not optimal student learning outcomes because there are some problems experienced by students in the learning process, including the students do not understand the mathematical problems encountered, so the instructions contained in the model of student learning is not understood as the use of mathematical capability, it makes learning to use the media learning provides a real-world context does not provide optimal learning results. Another thing that allegedly participated less optimal effect on learning outcomes achieved by students is the lack of active participation of students in the learning process, because the students are still expected to get help from the teacher in the learning process, so that teachers encounter barriers to engage students in developing the capability to think in order to achieve the objectives learning.

Limitations of the means used by students during the learning of mathematics takes place is also one of the factors that influence the inactivity participating students during the learning process, and ultimately learning outcomes are achieved not result from a direct effect achieved by the students as a result of the process undertaken by students in doing mathematics, which is a process undertaken meaning of mathematical capability. The value of learning outcomes achieved by students indicated as a result of indirect effects achieved by students in the learning process to understand the original environmental conditions through the medium of learning. Solutions that can respond to the discussion given above, the internal motivation of students must have to be grown for students to participate actively in the learning process. Provide job skills for students. Provide and cultivate the courage to seek the essence of the truth of an object

learning and learning environment in interactive activities through the media. Adding skills in using the media to seek knowledge and solve problems.

F. Sixth hypothesis

Statistical tests showed that there was no interaction between learning independence high and low category with high category mathematical capability and mathematical capability the low category to the learning outcomes of students in an integral material. Lipton and Hubble (2005) stated that "when students are allowed to make a choice to learn, they build a stronger sense of commitment to learning, a sense of ownership over their work, and the level of higher responsibility". Related to the research conducted, the researchers expect to learn independence held by the student is in a learning process that takes place, students are expected to be tried alone first to understand the lesson content to read or watch through the medium of learning. If you get into trouble then ask questions or discuss it with friends, or teachers. Students are also expected to be able to independently search for relevant learning resources in accordance with the material being studied.

During the learning process, some students were not showing the characteristics of an independent learner is desired, it can be seen from the lack of readiness of students to learn at their own initiative, thus causing students are not motivated to learn, and students are not able to define learning goals own. Students are seen waiting for the results of peers in learning log, without trying to assist argued and seek solutions of solving problems that arise in learning.

According to Harlen (the Exploratorium, 2006) is the process skills of skills that can be described in various ways, all of which have problems trying to draw conclusions through things or steps are interrelated. When we describe an example of "observing", then do a "hypothesis". Almost all activities beginning with "observation", it is part of the identified problem or ask a question and a very important one is to collect evidence. Based on these definitions can be concluded that the stages in mathematical capability should be based on the method. Related to the research conducted, it is expected that the steps that must be taken by students during the learning process in accordance with the mathematical capability stems from doing basic mathematical capability, and then continue capability integrated mathematics. It is expected that the knowledge that a student will be organized in a neat to be able to serve as the initial knowledge in providing solutions in any problem solving. During the learning process, there are some students do not do well the learning process, this is due to lack of students' understanding of mathematical capability, so that students do not have the skills in exploring environments that serve as learning objects, it also causes the students encountered difficulties in the analysis troubleshooting.

Based on the above, there are some students do not have the skills and are not actively construct their own knowledge so that meaningful learning occurs. It is not relevant to the meaningful learning theory developed by Ausubel (in Dahar, 1989) that meaningful learning is a process of linking new information on relevant concepts contained in a person's cognitive structure. Ausubel idea of the expected implications on research is not merely learning to memorize concepts or facts; it is an activity linking concepts to produce a full understanding, so the concept is learned will be well understood and not easily forgotten, so that students are able to obtain optimal learning results.

The solution can be given respond above, students need a strong commitment and motivation for learning, so that students have the responsibility to complete the tasks assigned to him so that students can perform troubleshooting. Mastery of mathematics through contextual learning is largely determined by capability and creativity of students in mastering mathematical capability. Students who are good mathematical capability, the academic performance is also good. Therefore, mathematical capability is necessary for enhanced and given understanding to students.

In SBC mentioned that mathematical capability was appointed as the subject matter in its delivery integration on another subject matter. This means that mathematical capability is as important as math concepts. Learning mathematics emphasizes providing direct learning experience by developing mathematical capability of students who are already there.

G. Seventh hypothesis

Statistical tests showed that there was no interaction between the IAM model with independent learning and independent learning high category of low and high mathematical capability and mathematical capability the low category to the learning outcomes of students in an integral material. Software model of learning technologies according Poedjiadi (1994) is a form of learning that not only emphasizes the concepts but also emphasizes the mastery of mathematics and technology in a learning log. Principles and concepts needed by students to gain experience of learning requires active participation of students according to Bruner called learning independence. Poedjiadi emphasis on mathematical mastery and perceived technology requires skill and proficiency to be possessed by the students to be able to perform troubleshooting. Based on the above, the absence of interactions that occur thought to be caused by the student does not show seriousness in learning so that the learning experience gained is not accepted as a useful knowledge to perform troubleshooting.

Based on the observations made, the student is not prepared him well to be able to learn on its own initiative, the students do not have the internal motivation that grows from within itself, but still hoping for external motivation given by the teacher, is evident from the very few students active in the learning of mathematics which require active participation of students to be able to answer the questions contained in the tutorial learning mathematics can anticipate problems. Another thing that allegedly take effect is less well trained students in understanding the mathematical capability and lack of trained students to engage in physical activity, such as conducting experiments resulted in less than optimal knowledge gained by students during the learning process, leading to mastery of concepts held by students in order to establish knowledge it has to do problem solving becomes optimal.

Based on the conclusions obtained, it is not compatible with the theory of learning Ausubel (in Dahar 1989) in which the formation of the concept of the invention is a form of learning that involves psychological processes discriminatory analysis, abstraction, differentiation, formation of hypotheses, testing and generalization. In a study, a solution that can be given, the students in the learning process are faced with a number of

learning experiences, and through the process of actively involving stimulus and response can students find the concept of what he learned, so that results can be achieved optimal learning.

Conclusions and Recommendations

The conclusion of this study are as follows: (1) there is a learning effect with IAM models significantly to cognitive aspects of student learning outcomes, but there is no effect on the outcome

learning aspects of affective and psychomotor aspects of the student; (2) there are significant learning independence and self-reliance of high category learning significantly lower category of the affective aspects of students' learning outcomes, but there is no effect on the cognitive aspects of learning outcomes and student psychomotor aspects, and based on the average results obtained, independent learning high category better than learning independence low category to the learning outcomes of cognitive and affective aspects of students, while learning independence lower category better than higher category learning independence against the psychomotor aspects of student learning outcomes; (3) there is no effect of high mathematical ability and mathematical ability category lower category of the student learning outcomes, and based on the average results obtained higher category mathematical capability is better than the low category of mathematical capability to affective aspects of students' learning outcomes, whereas mathematical capability category lower is better than higher category mathematical capability on learning outcomes of students' cognitive and psychomotor aspects; (4) there is an interaction between learning model with independent learning IAM significantly to the cognitive aspects of students 'learning outcomes, but there is no interaction on learning outcomes aspects of students' affective and psychomotor aspects; (5) there is no interaction between the IAM learning model with mathematical capability of the student learning outcomes; (6) there is no interaction between independent learning and mathematical capability of the student learning outcomes; (7) there is no interaction between the IAM learning model with independent learning and mathematical capability of the student learning outcomes.

Suggestions are presented in this paper are: (1) the use of IAM learning model has been shown to improve student learning outcomes cognitive aspects, therefore it is recommended to be used in the learning process integral material; (2) the application of the IAM learning model is a complex learning process that requires the help of an observer, it is advisable for teachers to involve other teachers form a collection of mathematical teacher; (3) prior to the learning process, teachers should make observations prior to the environment that will be used as an object lesson for the learning process in line with expectations; (4) issues to be raised during the learning process should be taken of the real problems of the daily life of students, because students are expected to use the knowledge and skills they have to do a math problem solving; (5) The results of this study can be used as a reference for similar studies with different basic competencies; (6) This research can be extended by adding another independent variable is not only limited to high school only.

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