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Effect of Collaborative Based Inquiry Learning Model Using Macromedia Flash and Motivation on Science Learning Outcomes of 5th Grade Students of Elementary School Angkasa 2 Lanud Soewondo Medan

Wanty Astari[1], Retno Dwi Suyanti[2], Daulat Saragi[3]
[1]*Postgraduate Program in Universitas Negeri Medan, Indonesia*
[2,3]*Universitas Negeri Medan, Indonesia*
wantyastari18@gmail.com

Abstract

This study aims to determine the differences in learning outcomes with the use of guided inquiry learning models using collaborative-based macromedia flash and based on children's learning motivation attitudes, as well as the interaction between the two models with the level of children's learning motivation in influencing student learning outcomes improvement. The research was conducted at SD Angkasa 2 LANUD Medan in the even semester of the 2020/2021 school year. The sample in this study consisted of classes V-A and V-B which were taken by purposive sampling class. Class V-A is an experimental class that is taught using the guided inquiry learning model using collaborative-based macromedia flash, while for the control class, it is taught using the selected direct learning model, class V-B. This means that student learning outcomes with the guided inquiry learning model using collaborative-based macromedia flash is better than direct learning. Acquisition of calculated F value of 5,123 is greater than the F table of 4,001, with a significance value of 0.027 <0.05. This means that the learning outcomes of students with high learning motivation are better than students with low learning motivation, and the calculated F value of 0.189 is smaller than the F table, namely 4.001 with a significance value of 0.665> 0.05, then H0 is accepted and Ha is rejected, so in the study There is no interaction between learning motivation in the application of the guided inquiry learning model using collaborative-based macromedia flash or direct learning on student learning outcomes. This study shows that the learning model and learning motivation do not influence and reject the third hypothesis.

Keywords
learning outcomes; macromedia flash media; inquiry learning and motivation

I. Introduction

Science learning is related to how to systematically find out about nature, so that science is not only the mastery of a collection of knowledge in the form of facts, concepts, or principles but also a process of discovery that gives students the freedom to find something new. In science learning students do not only learn just concepts, but how to acquire these knowledge and concepts. In the learning process, the teacher is an important facilitator. The way the teacher delivers until the selection of the right learning model affects the results obtained by students.

One of the most important things students must have, especially in science lessons, is motivation. Someone who has high motivation, is thought to be enthusiastic about studying and exploring something well, so that it can enrich concept understanding and improve student learning outcomes. In science learning, especially those related to experiments, students have not been able to find their own science concepts that have been studied and only apply the concepts given by the teacher. Teachers as the spearhead in achieving learning objectives, need to choose effective and efficient learning methods.

Based on preliminary observations made at SD Angkasa 2 Lanud Soewondo Medan, it was found that student learning outcomes in science subjects in the last three semesters were still low. The total number of students in grade V SD Angkasa 2 Lanud Soewondo Medan, namely 40 students. The number of students who completed the daily tests of science subjects, especially in the material "Plant Breeding" amounted to 15 students or only 37% of the total while the number of students who did not complete was 25 students or only 63% of the total. It can be concluded that the number of students who did not complete was more than the number of students who did, especially in science subjects.

It is necessary to pay close attention to the acquisition of learning outcomes so that in the future improvements can be made so that the acquisition of learning outcomes can be improved. Given that science is an abstract science, theory and practice, in the implementation of learning students must have high learning motivation. Motivation will increase if students are involved in learning activities. This is in line with Sardiman (2011: 75) which states that "learning outcomes will be optimal if there is the right motivation." Motivation can function as a driving force for business and achievement of learning achievement for someone to do an effort because of motivation. The existence of good motivation in learning will show good results.

Other causes of low student learning outcomes are the use of monotonous learning models and the use of school facilities and infrastructure such as the use of multimedia which is still not optimal in teaching and learning activities. Science is rich in abstract concepts that make it difficult for students to imagine. If only abstract concepts could be made real so that they could be easily grasped by the five senses, then the problem would be very different. The lack of interaction between teachers and students causes students not to have too many opportunities to express what is on their mind. In the learning and teaching process there is a lack of good interaction between teachers and students.

To overcome this problem, teachers must always innovate to make interesting learning methods and models so that they can help convey the knowledge they have. One of the right efforts is to use a guided inquiry learning model by presenting interesting and interactive learning media in their learning. learning as a medium between the teacher as the sender of information and the student as the recipient of the information must be communicative, especially for objects visually. One of the learning media referred to is the use of macromedia flash. The advantages of Macromedia Flash as an audiovisual technology, are able to produce new features that can be used in education so that problems that exist in students can be resolved properly. This software is useful as a tool in developing Guided Inquiry learning models, this is a program for designing animated graphics that is very popular and widely used by graphic designers. The advantage of flash lies in its ability to produce animated motion and sound. Early development of flash was widely used for animation on websites, but nowadays it is widely used for learning media because of its advantages.

In the journal Macromedia Flash learning media research by Adegoke (2011) concluded that student learning outcomes in physics can be improved with multimedia instruction. Students who were given computer-based multimedia instruction showed better things at remembering and transferring knowledge than those taught with better teaching. teacher centered.

Based on the background of the problem that has been stated above, the researcher is interested in conducting a research entitled 'The Effect of Collaborative Guided Inquiry Learning Model Using Macromedia Flash and Motivation on Science Learning Outcomes of Class V SD Angkasa 2 Students at Lanud Soewondo Medan.

Based on the background of the problems above, the problem formulations in this study are:

1. Are there differences in learning outcomes with the guided inquiry learning model using collaborative-based macromedia flash and direct instruction models?
2. Are there differences in learning outcomes between groups of students who have high learning motivation compared to groups of students who have low learning motivation?
3. Is there an interaction between direct instruction and guided inquiry and learning motivation in influencing student learning outcomes?

Based on the problems that have been formulated, the objectives of this study are:

1. To find out differences in learning outcomes with the use of guided inquiry learning models (guided inquiry) and direct learning models (direct instruction).
2. To find out differences in learning outcomes between groups of students who have high learning motivation compared to groups of students who have low learning motivation.
3. To determine the interaction between the direct instruction and guided inquiry learning models with the level of learning motivation in influencing student learning outcomes.

II. Review of Literatures

2.1 The Nature of Learning Motivation

According to Arsani (2020), learning is essentially a cognitive process that has the support of psychomotor functions. Low learning outcomes and students' critical thinking skills are also influenced by low student motivation. The importance of motivation in the learning process because it can arouse and increase the enthusiasm of students in learning.

Hamalik (2010: 161) divides the types of learning motivation into two types, namely: intrinsic motivation, namely motivation that is included in the learning situation and meets the needs and goals of students and extrinsic motivation, namely factors from outside the student learning situation such as numbers, reward levels and competition.

Soemanto (Djamarah, 2011: 158) said that there are several forms of motivation that can be used to direct students' learning, namely: (1) number members; (2) gifts; (3) competition; (4) ego-involvement; (5) giving tests; (6) knowing the results; (7) praise; (8) punishment; (9) desire to learn; (10) interest; (11) recognized objectives.

Motivation encourages someone to do an activity or job. Likewise, when studying, motivation is needed. Learning outcomes will be optimal if there is motivation. The more precise the motivation, the more successful the lesson will be. The same thing was also conveyed by Djamarah (2002: 123), there are three functions of motivation, namely: (1) motivation as an action driver. Motivation serves as a driving force to influence what attitudes students should take in order to learn, (2) motivation as a driving force for actions. The psychological urge to give birth to attitudes towards students is an unstoppable force,

which then manifests in the form of psychophysical movements, (3) motivation as action 1586 direction. (Khairani et al, 2020).

Gage and Berliner (Djamarah, 2011: 171) say that the types of motivation that can be done to increase the motivation of students are: (1) using verbal praise; (2) use tests and scores wisely; (3) arousing curiosity and a desire for exploration; (4) doing extraordinary things (5) stimulating the desire of students; (6) take advantage of students' perceptions; (7) establish unique and extraordinary concepts and principles so that students are more involved in learning; (8) use simulations and games; (9) minimize the attractiveness of conflicting motivational systems; (10) minimize unpleasant consequences for students from involvement in learning.

According to Santrock in Simanjuntak et al, (2020) Motivation is a process that provides enthusiasm, direction, and behavior persistence. Behavior that is motivated is behavior that is full of energy, purposeful and enduring. Motivation provides extraordinary enthusiasm and encouragement for someone to behave and can provide direction in learning. Without motivation, a person cannot do activities. Motivation has a very important function in an activity, it will affect the strength of the activity, but motivation is also influenced by goals. The higher and the meaning of a goal, the greater the motivation, the stronger the activity will be.

Based on the description above, it can be concluded that learning motivation is divided into two types, namely motivation that comes from within (intrinsic) and motivation to learn that comes from outside the self (extrinsic).

Uno (2008: 123) classifies motivational indicators as follows: (1) the desire and desire to succeed; (2) encouragement and need in learning; (3) the existence of hopes and aspirations for the future; (4) there is appreciation in learning; (5) there are activities that are interesting in learning; (6) there is a conducive learning environment, allowing a student to learn well.

Natural Sciences (IPA) deals with how to find out about nature systematically, so that Science is not only the mastery of a collection of knowledge in the form of facts, concepts or principles but is a process of discovery.

Kardi and Nur (in Trianto, 2014: 136) define that science studies the universe, objects that exist on the surface of the earth, in the bowels of the earth and in outer space, both those which can be observed by the senses and those that cannot be observed with the senses. Because science or natural science is the science of the world of matter, both living things and observed inanimate objects. Wahyudi (in Trianto, 2014: 136) says that science is a collection of knowledge arranged systematically, and its use is generally limited to natural phenomena. Its development is not only marked by a collection of facts, but by the existence of a scientific method and a scientific attitude.

Based on the opinions of the experts above, it can be concluded that science is the study of knowledge that is systematically structured, and in general its use is limited to natural phenomena and their contents that can be observed by the senses or that cannot be observed by the human senses. According to the Ministry of National Education (in Deden, 2013: 2) the objectives of learning science in elementary schools according to Anonymous (2016: 13) are: (1) Increasing the belief in the togetherness of God Almighty; (2) Develop an understanding of various kinds of natural phenomena, concepts and useful principles of science; (3) Developing curiosity, positive attitude and awareness of the interplay between science, environment, technology and society; (4) Conducting experiments to foster the ability to think, act, and communicate; (5) increasing awareness to participate in preserving the environment and natural resources; (6) Obtain knowledge, concepts and science skills as a basis for continuing education to SMP or MTs.

2.2. Collaborative Based Guided Inquiry Learning Model

Guided inquiry is a learning process where the teacher provides basic elements in one lesson and then asks students to make generalizations. According to Sanjaya (2008: 200) guided inquiry learning is a model of inquiry learning in which the teacher provides guidance or guidance that is quite broad. Part of the planning is made by the teacher, students do not formulate problems or problems. In guided inquiry learning, the teacher does not just let go of the activities carried out by students. The teacher must provide direction and guidance to students in carrying out activities so that students who think slowly or students who have low intelligence are still able to participate in activities that are being carried out and students have the ability to think highly and do not monopolize activities therefore the teacher must have the ability to manage good class.

Myers in Mustaji (2010: 34) views collaborative learning as a "transaction" oriented dialogue as between collaboration between learners. The idea of collaborative learning starts from a philosophical perspective on the concept of learning, to be able to learn one must have a partner and work together to solve a problem.

Alwasih, (2013: 28) argues that collaborative learning in learning is as follows: "Collaborative learning emphasizes the construction of meaning by students from social processes that are based on the learning context. The basis of the collaborative method is the interactional theory which views learning as a process of building social interactions. Collaborative learning can be an opportunity to lead to successful learning practices, collaborative learning involves active participation of students and minimizes differences between individuals. Collaborative learning has increased the momentum of formal and informal education from the two forces that meet, namely: (1) the realization of practice, that life outside the classroom requires collaborative activities in real life; (2) foster awareness of social interaction in an effort to realize meaningful learning.

Istarani (2015: 19) argues that an effective way of implementing collaborative learning is: "(1) the grouping using the reference level of ability must be done carefully; (2) the number of group members should be kept a little, in a group of 3 to 4 people and a maximum of up to 5 members (students); (3) collaboration must be applied consistently and systematically but should not be overused".

From the above definitions, it can be concluded that the collaboration of the arena of greeting and gathering knowledge to obtain scientific concepts through experiences that he has experienced, discovering scientific concepts through investigations and discussing collaborative activities with his peers in a study group. In this collaborative discussion activity, students are conditioned to form a U-shape seating chart formation, in order to facilitate the expected collaborative dialogue activities, to achieve the goal of the learning process someone (teacher) requires the energy power of colleagues who will exchange ideas, direct and cooperate in adding to the treasury of science.

2.3. Macromedia Flash Learning Media and Its Use in Science Learning

In science, there are two symptoms that can be visualized, namely (1) related to motion such as wave phenomena, the motion of electrons in atoms, and so on; (2) unrelated to motion such as lines of electric force, interference patterns, diffraction, and so on. Visualizations related to motion are called animation, while those that do not move are called visualizations. Given that science is relatively abstract concepts, animation of abstract

concepts will help facilitate the absorption of science by users. The use of instructional media is not easy. In using the media, several techniques must be considered so that the media used can be maximally utilized and does not deviate from the purpose of the media. In this case, the media used are computers and LCD projectors.

In teaching science, teachers often experience difficulties when meeting material that requires imagination and exemplifying the material referred to in life. Often the teacher conveys what is on his mind verbally (in words), so there are times when what the teacher means is different from what the students perceive. To solve this problem we can use macromedia flash learning media. This program is able to create the desired animated image so that what the teacher means can be shown on the computer easily for students to understand.

Macromedia Flash Professional 8 is an animation program that has been widely used by animators to produce professional animations. Among animation programs, Macromedia Flash program is the most flexible program in making animation, such as interactive animation, games, company profile, presentations, movies, cartoon animation, and other animated displays.

The animation produced by Macromedia Flash is an animation in the form of a movie file. The resulting movie can be in the form of graphics or text. The graphic referred to here is a vector-based graphic. So, when we access via internet media, the animation will be shown faster and look smoother. In addition, Macromedia Flash also has the ability to import sound, video, and image files from other applications. Its ability to produce motion animation and sound can be used as a website maker software, as well as many other advantages compared to other animation software. With its advantages and advantages, Macromedia Flash as an audiovisual technology is able to produce new features that can be used in education.

The advantages of the Macromedia Flash program compared to other similar programs include: Can make interactive buttons with a movie or other object; (1) Can make color transparency changes in movies. (2) Can make animation changes from one form to another; (3) Can create animated movements by following a predefined flow; (4) Can be converted and published into several types including .swf, .html ,. gif, .jpg, .png, .exe, .mov; (5) Can process and create animation from Bitmap objects; (6) Flash vector-based animation programs have the flexibility in making vector objects (Research and Development Division Team, 2007: 3)

III. Research Methods

The subjects in this study were all fifth grade students of SD Angkasa 2 Lanud Soewondo Medan which consisted of two classes, namely VA and VB, totaling 40 students. Considering that this research conducts treatment and the number of classes is only 2 (two classes) and the research sample is determined by purposive random sampling technique or selecting samples based on research considerations, namely from class Va for experimental classes which are taught using Guided Inquiry learning model using macromedia flash media and for Class Vb control class which is taught using a direct learning model using macromedia flash media. This type of research is a quasi experimental research (quasi experimental research). The quasi-experimental method is a design that has a control group, but cannot fully function to control external variables that affect the implementation of the experiment. The study conducted sample grouping based on classes that had been formed

before or existing classes. So this research uses a quasi-experimental method with existing classes without forming a new class. The instrument data obtained then used Simple Linear Regression analysis on SPSS 20.

IV. Discussion

After the data is collected and statistically analyzed, then hypothesis testing is carried out. This hypothesis test uses the ANOVA test with the help of SPP 22.0 for windows. The learning outcome test data obtained were then calculated the average value of each group which was then compiled as a table for two-way ANOVA, briefly presented in Table 1.

Table 1. Design of 2 x 2 Factorial Anava

Motivation learn (B)	Learning model (A)		Average
	Macromedia Flash based Inquiry (A1)	Direct Learning (A2)	
High Motivation (B1)	44.28	35.67	42.61
Low Motivation (B2)	41.14	31.04	33.18
Average	43.59	20	

To see the difference in learning motivation and student learning outcomes on the given learning, the Two Way Anova test with the Univariate General Linear Model (GLM) uses SPSS 22.0 as well as to see how the influence of student learning motivation on student learning outcomes. Do students who have a high level of learning motivation have high learning outcomes or are vice versa lower, and whether there is an interaction between the learning model and the level of learning motivation in influencing student learning outcomes.

The description of the output statistics from ANAVA data on learning motivation and student learning outcomes can be seen in Table 2 below.

Table 2. Factor Data between Subjects

	Value Label	N
Learning Model 1	Macromedia Flash based Inquiry	20
Learning Model 2	Direct	20
Motivation to learn 1	High	23
Motivation to learn 2	Low	17

Based on table 2, it is obtained that the total number of students who have high and low learning motivation. Overall, 23 students who have high learning motivation and 17 students who have low learning motivation.

The analysis was then continued with hypothesis testing. Testing was carried out with the help of SPSS 22.0. The test results were carried out by testing the ANOVA two-way hypothesis with the General Linear Model (GLM) Univariate SPSS 22.0 which can be seen in Table 3 below:

Table 3. Two-Way Anava Test Results

Result	Sum of Squares	Degrees of Freedom	Average Squared	F	Significance
Corrected Model	2343.808	3	781.269	25.753	.000
Intercept	59648.964	1	59648.964	1966.242	.000
Learning_Model	903.007	1	903.007	29.766	.000
Motivation to Learn	155.420	1	155.420	5.123	.027
Learning_Model * Motivation to Learn	5.730	1	5.730	.189	.665
Total	95368.000	40			

Based on 3 the results of the two-way ANOVA test above will be used to answer the hypotheses proposed in this study. The following is a description of the results of the hypothesis test.

4.1 First Hypothesis

H_0: μA1 = μA2: There is no significant effect of the collaborative-based guided inquiry learning model using macromedia flash on student learning outcomes

H_a: μA1 ≠ μA2: There is a significant effect of collaborative-based guided inquiry learning model using macromedia flash on student learning outcomes

The results of the analysis of variance in table 4.1 obtained a significance value of the learning model of 0.000. Because the significance value of 0.000 <0.05, so the results of testing the hypothesis rejecting H0 or accepting Ha at the 5% significance level, it means that there is an effect of student learning outcomes who are taught with collaborative-based guided inquiry learning models using macromedia flash and direct learning. In other words, from the results of this hypothesis test, it can be concluded that students who were taught with collaborative-based guided inquiry learning using macromedia flash obtained an average value of learning outcomes better than students who were taught by direct learning.

4.2 Second Hypothesis

H_0: μB1 = μB2: There is no difference in learning outcomes of students who have high learning motivation with students who have low learning motivation

H_a: μB1 ≠ μB2: There are differences in the learning outcomes of students who have high learning motivation with students who have low learning motivation.

The results of the analysis of variance in table 4.1 obtained a significance value of 0.027 motivation to learn. Because the significance value is 0.027 <0.05, so the results of testing the hypothesis rejecting H0 or accepting Ha at the 5% significance level means that there is an effect of student learning outcomes who have high learning motivation with groups of students who have low learning motivation. From this hypothesis it can be concluded that the learning outcomes of groups of students who have high motivation to learn are better than groups of students who have low levels of motivation to learn.

4.3 Third Hypothesis

H_0: A> <B = 0: There is no interaction between learning models and learning motivation on student learning outcomes.

H_a: A> <B ≠ 0: There is an interaction between learning models and learning motivation on student learning outcomes.

The results of the analysis of variance in table 4.1 show that the significance value of the model * learning motivation is 0.665. Because the significance value is 0.665> 0.05, so the results of hypothesis testing reject Ha or accept H0 at the 5% significance level, meaning that there is no interaction between the learning model used and student learning motivation in influencing student learning outcomes.

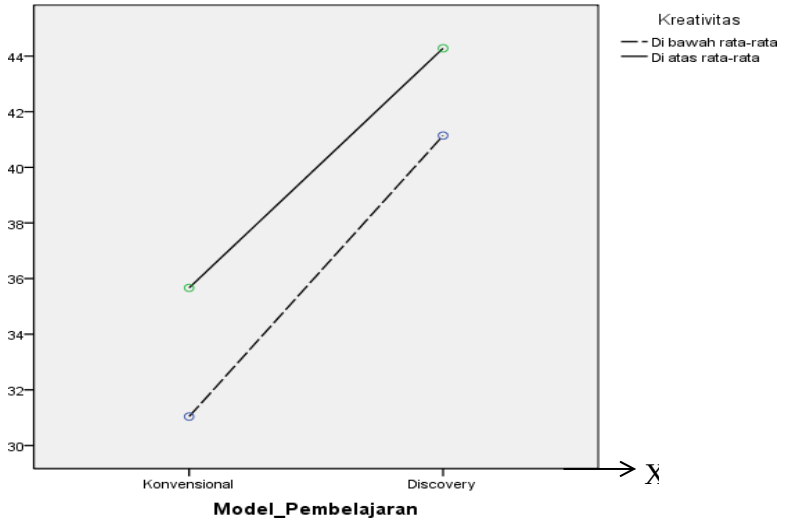

Figure 1. *There is no Interaction between Learning Models and Learning Motivation on Higher-Order Thinking Skills*

Based on Figure 1 shows a graph of the interaction between learning models and learning motivation on student learning outcomes. It can be seen that the two lines are parallel, meaning that learning motivation does not play a role in the application of the two learning models, therefore it can be concluded that there is no influence between the interaction of learning models and learning motivation on student learning outcomes.

V. Conclusions

Based on the results of research analysis and discussion, several conclusions can be obtained as follows: 1) Based on the results of the two-way ANOVA test with the calculated F value of 29.76, greater than the F table of 4.001, with a significance value of 0.000 <0.05. This means that student learning outcomes with the guided inquiry learning model using collaborative-based flash media macros are better than direct learning, 2) Based on the results of the two-way ANOVA test with the acquisition of a calculated F value of 5,133, greater than the F table of 4,001 , with a significance value of 0.027 <0.05. This means that the learning outcomes of students with high learning motivation are better than students with low learning motivation, 3) The results of the two-way ANOVA test with the acquisition of a calculated F value of 0.189 are smaller than the F table, namely 4.001 with a significance value of 0.665> 0.05 then H0 accepted and Ha rejected, so in this study there was no

interaction between learning motivation in the application of guided inquiry learning models using collaborative-based flash media macro or direct learning on learning outcomes.

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