Influence of the Flipped Classroom Learning Model and Student Learning Styles on Student Learning Outcomes

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Abstract

Based on the results of observations of teacher-centered learning activities, during teaching and learning activities in class students are not actively involved and the interaction between teachers and students in the learning process is still not implemented well. Therefore, a solution is needed to overcome this problem, namely finding an effective way to improve student learning outcomes in the learning process. The purpose of this research is to find out what the learning model is *Flipped Classroom* and learning styles influence student learning outcomes. This research presents the results of data obtained by students of SMP Plus Al-Kautsar Malang City in 2024 in the science learning process. This research also presents data in the form of learning outcomes for class VII students in the learning process using the learning model *Flipped Classroom* and Learning Style (Visual, Auditory, Kinesthetic). The method used in this research is *Quasi Experimental Design* with a quantitative approach and research design, namely control class and experimental class. The results obtained are known based on the values *Posttest and questionnaire* given to the control class and experimental class and then tested for normality, homogeneity and hypothesis testing using *Two Way Anova*. According to the research results and discussion of the Two Way Anova test calculations, the value (Ha1) sig. 0.000 < 0.05) ; (Ha2) sig. 0.644 > 0.05) ; (Ha3) sig. 0.420 > 0.05). Based on theoretical studies and calculations, it can be concluded that: (1); There is an influence between the flipped classroom learning model on student learning outcomes. (2); There is no influence between auditory, visual and kinesthetic learning styles on student learning outcomes. (3) There is no interaction between the flipped classroom learning model and learning styles on student learning outcomes.

Keywords: Flipped Classroom, Learning styles, Learning Outcomes

1. Introduction

Education plays a very important role in creating complete resources for both individuals and groups. In accordance with research by Choiroh (2018) which concluded that each individual achieves different results in developing understanding. This is proven by frequent assessments carried out by teachers, but the learning outcomes achieved vary (Ilham, 2013). Learning outcomes are the achievement of educational goals by students who participate in the teaching and learning process. The goals of education are ideal, but the learning outcomes are real. According to Taufiq (2020), science subjects are science that studies natural phenomena and everything that exists in nature, and its scope includes living things, energy and its changes, the earth, the universe and their characteristics. The important role of science in the progress of our nation means that science education must be introduced, taught and developed as early as possible to the younger generation, especially for junior high school students who are generally at the age they feel desire tends to be higher. In science learning, students are encouraged to learn through active involvement with student skills, concepts and principles.

Another factor that causes low science learning outcomes is that science is a lesson that is difficult to understand. Another problem experienced by students in the learning process is understanding and responding to the material provided by the teacher. Therefore the method chosen must be capable increase students' interest in learning and learning independence, so that the learning process is meaningful and students can achieve optimal cognitive abilities (Apriyanti, 2019).

In accordance with the results of observations carried out by researchers in class VII of SMP Plus Alkautsar Malang in 2023/2024, several pieces of information were found. Based on the results of observations, science learning activities are centered on the teacher, during teaching and learning activities in the classroom students are not actively involved and the interaction between teachers and students in the learning process is still not implemented well. Lack of usage learning media during learning process activities, so that students are less motivated in participating in the learning process. This also has an impact on student learning outcomes. It can be seen from the average grade VII science subject score at SMP Plus Alkautsar which is still far below the score of 70 which is the standard KKM score.

Apart from appropriate learning methods, learning style can also be used as one of the things that influences learning outcomes. Knowledge about student learning styles is very important for teachers, parents and students themselves to know because knowledge about learning styles can be used to help maximize the learning process so that learning outcomes can be achieved in accordance with the expected goals. According to Mulyono (2012) learning style is closely related to a person's personality, which is influenced by character, experience, education and developmental history.

Learning styles are believed to play an important role in the process of teaching and learning activities. Students who are often forced to learn in ways that are less suitable and comfortable do not rule out the possibility that the learning process will be hampered, especially in terms of concentration in absorbing the information provided. This ultimately has an impact on learning outcomes that are not optimal as expected. Learning style is a combination of how a person absorbs, organizes and processes information. Learning styles not only include aspects of information processing, viewing, listening, writing and speaking, but also aspects of sequential, analytical and holistic information processing, namely left brain and right brain aspects. Another aspect is the reaction to something (abstract and concrete) in the learning environment

According to research by Gunawan (2004) *Flipped classroom* In general, it is the opposite of the traditional learning model, making learning more personal, interactive and flexible through the integration of technology, because many students now use technology such as smartphones and laptops but have not fully utilized it to support learning activities, including initiatives to search for various learning resources. The biggest characteristic of implementation *Flipped classroom* is to enable students to learn independently and flexibly outside the classroom, as well as providing learning methods and content that enable students to actively learn face-to-face in class. This model can be an alternative for solving science teachers' problems related to limited learning time in class by giving students responsibility for accessing class content outside of class.

An individual's learning style is a way of interacting with the existing learning environment. In research, Sutama and Binta Anggitasari stated that student learning styles are the key to developing performance in learning. Each student certainly has a different learning style, knowing these different student learning styles can help teachers in delivering learning materials to students so that student learning outcomes are more effective (Darmadi, 2017).

2. Method

In this study, researchers try to determine the influence of the learning model *Flipped Classroom* and student learning styles on student learning outcomes in science subjects at SMP Plus Alkautsar Malang. This type of research uses a quantitative approach in a quasi form Experimental and using research design *nonequivalent pretest – posttest control group design* (pretest – posttest two groups). Quasi Design Experimental used in this research is Pretest & Posttest *Non equivalent Control Group Design*, namely a design that provides a pretest before being subjected to treatment, as well as a posttest after being subjected to treatment in each group

The population in this research were class VII students at SMP Plus Alkautsar, Malang City, 2023/2024 academic year, totaling 35 students. The sample in this study was selected through consideration of science subject teachers who had relatively the same abilities and almost the same number of students. The samples in this study were class VII A, totaling 17 students for the experimental class and class VII B, totaling 18 students for the control class. The instruments used in this research were posttests and questionnaires.

3. Results and Discussion

3.1 Result

Data on learning outcomes in science subjects obtained from giving posttests and questionnaires to the two research sample classes will be subjected to prerequisite tests, namely normality tests and homogeneity tests on posttest data on student learning outcomes along with questionnaires.

a. Normality test

The normality test is carried out to determine whether the data comes from a normally distributed population or not

1. Posttest normality test

Table 1 Posttest Normality Test Results

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		Kolmogorov-sminirnov			Shapiro-wilk		
	Learning model	**Statistic**	**Df**	**Say.**	**Statistic**	**Df**	**Say.**
Learning outcomes	*Flipped Classroom*	.186	17	.120	.912	17	.107
	Conventional	.170	18	.179	.909	18	.084

From Table 1 it is known that the Shapiro-Wilk sig value in the experimental class from the posttest normality test is 0.107 and in the control class from the normality test it is 0.084. So it can be concluded that the average is normally distributed because it has Sig > 0.05, so from the test results above showing Sig values = 0.107 and 0.084 > 0.05, it can be concluded that the test data is declared to be normally distributed.

2. Questionnaire Normality Test

Table 2 Results of the Questionnaire Normality Test

		Kolmogorov-sminirnov			Shapiro-wilk		
	Learning Style	**Statistic**	**Df**	**Say,=.**	**Statistic**	**Df**	**Say.**
Learning outcomes	Visual	.197	18	.063	.900	18	.058
	auditorium	.179	13	.200	.925	13	.293
	Kinesthetic	.236	4	.	.911	4	.488

From Table 2 it is known that the Shapiro-Wilk Sig value in the experimental class from the normality test of the visual learning style questionnaire was 0.58, the auditory learning style questionnaire was 0.293, the kinesthetic learning style questionnaire was 0.488. So you can concluded that the average is normally distributed because Sig > 0.05, so from the results testing above shows the Sig value of visual learning style = 0.058, auditory learning style = 0.293, kinesthetic learning style = 0.488 > 0.05, so it can be concluded that the test data is stated to be normally distributed

b. Homogeneity Test

The Homogeneity Test is carried out to determine whether the objects (experimental class and control class) under study have homogeneous variants or not.

1. Posttest Homogeneity Test

Table 3 Posttest Homogeneity Test

		Levene Statistic	Df1	Df2	Say
Learning outcomes	Based On Mean	.019	1	33	.891
	Based On Median	.013	1	33	.908
	Based On Median and with adjuste df	.013	1	31.978	.908
	Based On trimmed mean	.017	1	33	.897

From Table 3 Posttest Homogeneity Test in class experiment and the control is known to have a Sig value of 0.897 in the experimental class from the homogeneity test, so it can be concluded that the average has a homogeneous distribution because Sig > 0.05, so from the test results above it shows a Sig value of 0.897 > 0.05 so it can be concluded the test data is declared to have a homogeneous distribution.

2. Questionnaire Homogeneity Test

Table 4 Questionnaire Homogeneity Test

		Levene Statistic	Df1	Df2	Say
Learning outcomes	Based On Mean	1.431	2	32	.254
	Based On Median	1.290	2	32	.289
	Based On Median and with adjuste df	1.290	2	30.685	.290
	Based On trimmed mean	1.421	2	32	.256

From Table 4 Questionnaire homogeneity test in class experiment and the control is known to have a Sig value of 0.256 in the experimental class from the homogeneity test, so it can be concluded that the average has a homogeneous distribution because Sig > 0.05, so from the test results above it shows a Sig value of 0.256 > 0.05, so it can be concluded the test data is declared to have a homogeneous distribution.

c. Hypothesis testing

This hypothesis test uses the Two Way ANOVA Test which aims to determine whether or not there are group differences that are influenced by 2 factor variables. Data on student learning outcomes in class VII science subjects on Food Chain material have met the

prerequisite test assumptions so that hypothesis testing can be continued. Where the hypothesis of this research is:

Table 5 Research Hypothesis

H_{a1} : Is there an influence of the Learning Model *Flipped Classroom* on Student Learning Outcomes

H_{a2} : Is there an influence of student learning styles on student learning outcomes

H_{a3} : Is there an interaction between the influence of the learning model *Flipped Classroom* And Student Learning Styles on Student Learning Outcomes

To prove this hypothesis, Two Way Anova will be tested as follows,

Table 6 TWO WAY ANOVA test results

Source	Type III Sum of Square	Df	Meas Square	F	Say.
Corrected Model	2780.256	5	556.054	6.813	.000
Intercept	122395.576	1	122395.576	1499.645	.000
Learning model	1939.077	1	1939.077	.447	.000
Learning_Style	73.031	2	36.516	.894	.644
Learning_Model * Learning Style	145.906	2	72.953		.420
Error	2366.875	29	81.616		
Total	175250.000	35			
Corrected Total	5147.143	34			

From Table 6 it can be seen from the results of the Two Way Anova test the significance value of the learning model *Flipped Classroom* 0.000 < 0.05 means that the hypothesis that there is an influence of learning on student learning outcomes is "accepted". The significance value of learning styles is 0.644 > 0.05, meaning that the hypothesis that there is an influence of student learning styles on student learning outcomes is "rejected". The significance value of learning models and learning styles is 0.420 > 0.05, meaning the interaction hypothesis between the influence of learning models *Flipped Classroom* And student learning styles on student learning outcomes are "rejected".

3.2 Discussion

The initial ability of students' science learning outcomes in the cognitive domain in the experimental and control classes is still low. The pretest and posttest questions used are instruments used to measure learning outcomes, especially in the cognitive domain. There are several things that cause low initial abilities in students' cognitive learning outcomes, including learning approaches that do not emphasize individual student involvement, so that students are less active in participating in science learning activities in depth to achieve maximum learning outcomes. Then, learning that still applies conventional methods cannot accommodate individual differences, especially with a large number of students in one class,

limited student attention and theoretical content that requires in-depth understanding. This method does not consider whether the learning materials provided are appropriate or not to the students' abilities, needs and interests. Thus, students find it difficult to remain interested in what they are learning, because this method assumes that students' learning methods are the same and not personal, so the learning process tends to be one-way (*teacher center*). Of course, this means that students are not actively involved, and are not trained to try to participate in the learning process optimally, but only become passive listeners during science learning. This will make students' understanding of science less in-depth. This results in student achievement of learning outcomes still being low.

The final ability of students' learning outcomes in both classes increased after being given different treatment. The experimental class is given learning capabilities using models *Flipped Classroom* while the control class learning uses conventional learning. The final ability of student learning outcomes can be seen from the results of the posttest which uses the same questions as the pretest. The posttest results show that the final learning abilities of experimental class students have increased significantly from their previous abilities. Even though the final ability of both classes increased, the final ability of the experimental class was greater than the control class. The higher final ability results of experimental class students compared to the control class were caused by several things, including: 1 the students' ability to construct their knowledge in understanding science in depth during learning and 2 the enthusiasm and interest of experimental class students during the learning process.

Model Implementation *Flipped Classroom* (Independent Asynchronous Activities) students are involved in constructing their own knowledge before participating in learning *face to face* with teaching materials that can be accessed via learning videos on Google Classroom provided by the teacher. This is in line with previous research, that students build their own knowledge based on the initial knowledge they obtained through learning videos provided by the teacher. (Apriyanah, 2018). In direct synchronous activities in class, students are actively involved in delivering and listening to material presentations and discussions, students are not only listeners when science learning takes place and students do not feel bored, this causes students to be enthusiastic in carrying out collaborative and motivated learning activities during the process learning takes place. This factor is in line with previous research that students become more confident in class activities, ready to accept learning activities with better motivation than ordinary learning models. (Enfield, 2013). And learning outcomes can be improved through collaborative learning and student learning motivation (Santoso, 2013)

The learning outcomes of experimental and control class students have mutually increased. The increase in the experimental class and control class was in the medium category. Meanwhile, the increase in control class learning outcomes was in the low category. The low increase in learning outcomes in the control class was caused by students' lack of training in developing their learning outcomes during the learning process. Students only receive information or knowledge conveyed by the teacher, so students are not optimal in developing their learning outcomes. This is in accordance with previous research which states that in the conventional learning model the subject matter is mostly delivered by the teacher, students are less involved in learning so it can cause students to feel bored when receiving the material delivered by the teacher. (Choiroh, 2018).

Increased learning outcomes for experimental class students higher compared to the control class due to the use of the model *Flipped Classroom*, during the learning process that positions students as subjects and objects of learning and can accommodate individual differences. Experimental class learning with models *Flipped Classroom* involving students in two processes of learning activities, namely independent asynchronous activities and direct synchronous activities (*face to face*). Independent asynchronous is carried out by asking students to construct their own knowledge by learning independently through teaching materials that can be accessed at any time via videos sent via *google classroom* and each student is asked to make an individual summary regarding the material related to the video provided. Students can also search for information freely from other sources which they think is related to the video they are watching, so that when they are in class students are more ready to receive learning because they already have the material they will study as a prerequisite for taking part in the lesson. *(face to face)* in the classroom. Synchronous directly strengthens students' knowledge and students will apply the knowledge they have gained during the independent asynchronous learning process. Meanwhile, in the control class learning that used conventional learning, students were not actively involved, only listening to the teacher's explanation and only a few students were involved during the question and answer session at the end of the lesson. Students are not used to constructing their knowledge optimally in following the learning process.

To test the hypothesis, use the two way anova test which answers the hypothesis as follows;

1. Results of the first hypothesis analysis (H_{a1})

Based on the results of two-way variance analysis calculations for unequal cells, H is obtained$_{1A}$ accepted, this means there is a difference between learning *Flipped Classroom* and conventional learning. With the significance value of the learning model *Flipped Classroom* 0.000 < 0.05 means that the hypothesis that there is an influence of learning on student learning outcomes is "accepted"

2. The results of the second hypothesis analysis (H_{a2})

Based on the results of two-way variance analysis calculations for unequal cells, the result is (H_{a2}) is rejected, it can be concluded that learning styles have no effect on learning outcomes with a learning style significance value of 0.644 > 0.05, meaning that the hypothesis that there is an influence of student learning styles on student learning outcomes is "rejected"

3. The results of the third hypothesis analysis (H_{a3})

Based on the results of the ANOVA of two unequal cell paths, the result is (H_{a3}) is rejected, this means there is no interaction between the behavior of the learning model *Flipped Classroom* with student learning styles on student learning outcomes. This is due to differences in influence between learning models *Flipped Classroom* and student learning styles on student learning outcomes. With a significance value of learning models and learning styles of 0.420 > 0.05, this means that the interaction hypothesis between the influence of the learning model is hypothesized *Flipped Classroom* And student learning styles on student learning outcomes are "rejected". Therefore, based on the results of the research conducted, it appears that there is

no interaction between learning model factors and student learning style factors on student learning outcomes.

4. Conclusion

Based on the data analysis and hypothesis testing that has been carried out, it can be concluded that students who receive the Flipped Classroom learning model are better than students who receive conventional learning. There is no influence of student learning styles on student learning outcomes. There is no interaction between the Flipped Classroom learning model and student learning styles on student learning outcomes

References

Choiroh, A. N. L. dkk. ,. (2018). "Pengaruh Model Pembelajaran Flipped Classroom Menggunakan Metode Mind Mapping Terhadap Prestasi Dan Kemandirian Belajar Fisika. *Jurnal Pendidika Fisika*, *Vol.7*, 4.

Jacob Enfield. (2013). "Looking at the impact of the Flipped Classroom Model of Instruction on Undergraduate Multimedia Student at CSUN." *". TechTrends. Vol 57. No. 6, 2013, h. 14-18. , Vol 57*.

Pipit Apriyanah, dkk. (2018). "Efektifitas Model Flipped Classroom pada Pembelajaran Fisika Ditinjau dari Self Efficacy dan Penguasaan Konsep Siswa. *Jurnal Inovasi Pendidikan Fisika Dan Riset Ilmiah, , Vo. 2 No.2, , Vo. 2 No.2,* 7.

Singgih Santoso. (2013). "Pengaruh Model Pembelajaran Kolaboratif dan Motivasi Belajar Terhadap Peningkatan Hasil Belajar Fisika Siswa Kelas X." *Jurnal Berkala Fisika Indonesia*, *Vol.5*, 15–19.

Fahrezi, I., & Taufiq, M. (2020). Meta-analisis pengaruh model pembelajaran project based learning terhadap hasil belajar siswa pada mata pelajaran IPA sekolah dasar. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(3), 408-415

Gunawan. (2004). *Sembiring, R., & Situmorang, J. (2015). Pengaruh model pembelajaran dan gaya belajar terhadap hasil belajar matematika.*

Ilham, Muh. Y. & K. (2013). *Pengaruh Model Pembelajaran Aktif Tipe Giving Question and Getting Answers Terhadap Hasil Belajar Siswa Kelas X SMA Negeri 1 Bajeng*, *14*, h.21.

Darmadi, H. 2017. Pengembangan Model dan Metode Pembelajaran dalam Dinamika Belajar Siswa. Yogyakarta: Penerbit Deepublish (Grup Penerbit CV BUDI UTAMA).

Apriyanti, Y. (2019). *Pengembangan Perangkat Pembelajaran Flipped Classroom Pada Materi Getaran Harmoni*.