

Application of Flipped Classroom on Students' Learning Motivation on Human Excretion System Material

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Abstract: The low motivation of students is one of the problems in learning. Motivation is an impulse that causes an action to occur in order to achieve a goal. Evidence of the low level of understanding of students is seen from the average value of 32.26% which is still below the minimum completeness criteria. One of the efforts that can be done in solving motivational problems is to apply the flipped classroom model. This study aims to determine the effect of the application of the flipped classroom model on the motivation of students on the human excretory system material carried out in 2 high schools, namely SMA Negeri 1 Tapaktuan and SMA Negeri 1 Sawang. This research is quantitative through a Quasi-Experimental approach with a Non-randomized control group design, posttest-only design. The research sample was 195 students who were divided into two groups, namely 97 control groups and 98 experimental groups. The instrument used in this study was an ARCS motivation questionnaire. Motivation data were analyzed using the Anova test. The results of research on motivation show the value of Asymp Sig (0.00) < (0.05) which means that the application of the flipped classroom model has a significant effect on motivation. The conclusion in this study is that the application of the flipped classroom model has a significant effect on learning outcomes and student motivation.

Keywords: Flipped classroom; Learning outcomes; ARCS motivation

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Introduction

The development of information technology that is increasing rapidly in the current era of globalization cannot be avoided anymore its influence on the world of education. Global demands require the world of education to always and constantly adapt technological developments to efforts in improving the quality of education, especially adjusting its use for the world of education, especially in the learning process (Budiman, 2017).

Blindness in the global era is the inability to learn. The main characteristics of future Indonesian people are people who educate themselves throughout their lives and a learning society that is open but has a solid outlook on life. So, students must be provided with background

information that has a multiplier impact on their learning so that they can provide great motivation to read and learn information from various sources. There are several educational challenges in the era of globalization, the first is the quality of education. Second, the professionalism of the education staff. One of the important components in educational activities and the learning process is the educator or teacher (Lestari, 2018).

The serious problem that is still felt by education ranging from basic education to higher education is the problem of the quality of education and this can be solved through an educational technology approach (Jamun, 1996). The use of technology in education is useful for creating interesting and creative learning tools and media to improve the quality of education.

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One important output that is useful for evaluating the quality of education is learning outcomes. Learning outcomes are things that can be viewed from two sides, namely from students and teachers. If viewed from the side of students, learning outcomes are a better level of mental development when compared to before learning (Dimiyati, 2006). According to Hamalik (2007), if someone has learned there will be a change in behavior in that person, for example from not knowing to know. Student learning outcomes can be influenced by various factors, one of which is motivation. Motivation can come from within the student or from outside the student (Palittin et al., 2019).

Motivation is an impulse that causes an action to occur in order to achieve a goal. This motivation also makes a person more active in activities for certain purposes, even more so in an urgent situation (Palittin et al., 2019), in this study, what is meant by motivation is learning motivation, which is a person's encouragement or willingness to carry out activities. Learning so that learning achievement can be achieved optimally and will be seen as the level of learning motivation of students in the learning process in order to determine the suitability of the strategy or model applied.

The low level of ability of students in understanding subject matter is a problem that often occurs in the world of education and one of evidence of the low level of understanding of students can be seen from the daily and semester test scores of students whose average value is 32.26% which is still below the criteria. Minimum Completeness. This is in line with Natalina (2014) that the low scientific attitude of students toward learning biology occurs because during learning activities students only receive information conveyed by the teacher without being directly involved in the learning process so that students' independence in learning is lacking, students do not want to think, students do not want to try to find concepts and solve problems that have been given by the teacher.

Based on the results of observations in class XI IPA at SMA Negeri 1 Tapaktuan and SMA Negeri 1 Sawang, it was found that there were problems in learning outcomes and a lack of motivation in students. These problems can be seen from students paying less attention to the teacher in explaining the material being taught, and students being less enthusiastic in learning as evidenced by the absence of students asking questions about the material being taught. Then in the learning process, students have difficulty relating the material to their own experiences, and the poor learning outcomes of students are caused by a lack of confidence in students in answering. According to Nurhaeni (2011), there are three factors causing the low participation of students in the learning process, first students lack the ability to formulate their own ideas, second students lack the

courage to express opinions to others, and third students are not accustomed to competing with friends who other.

Based on the results of interviews with teachers and students, it was revealed that there is nothing wrong with the application of learning models that attract attention to increase student motivation, so that learning so far has only been through textbooks that are explained verbally. It was also revealed that one of the materials that were poorly understood by students in class XI of SMAN 1 Tapaktuan and SMA Negeri 1 Sawang was excretory system material which is a complex material that contains processes or mechanisms that tend to be difficult for students to understand and remember. Materials that are difficult for students to learn will have a direct impact on student motivation. According to Putranadi (2021) said that in the learning process of biology learning media is very necessary, because the current learning process is still using conventional methods in teaching. This causes the process of teaching and learning activities to be less effective and the level of understanding of students in learning is not as expected.

One way that can be used by teachers in solving motivational problems is by applying the flipped classroom model because the flipped classroom model contains the media materials needed to attract the attention of students. According to Rusdi (2018), the flipped classroom is best used to improve students' cognitive learning outcomes. The flipped classroom is a web-based learning model. The web-based learning model consists of problems, resources, collaboration, related cases, scaffolding, and community. The quality of a learning web content can be seen from three conditions, namely; First, the content is accurate and appropriate to the level of learning among students. In addition, the content looks attractive, up-to-date, and timely. As well as content is subject to extensive study. Resources use appropriate theory. Second, the use of up-to-date technology and multimedia can help students to understand the information easily. Third, the design of the web-based learning model is really in accordance with the principles and theories used as the basis for the design. Overall, the model is suitable for increasing the competence of students (Deejring, 2014).

The use of flipped classrooms as an alternative to traditional learning environments has attracted the attention of researchers and educators alike. Technological advances in tools such as interactive videos, interactive activities in the classroom, and video conferencing systems paved the way for the widespread use of reverse classrooms (Cabi, 2018). In a reverse classroom, the teacher's role should be to guide students to think and discuss, and to provide professional feedback and advice. Good quality self-study can lead to

heated communication, discussion, and increased problem-solving skills. Therefore, in the flipped classroom process, students act as active learners and make good use of the assistance provided by experts to explain relevant concepts (Hwang et al., 2015). The most common reason for reverse classroom approaches is that they facilitate experiential learning and support active construction of knowledge (Awidi & Paynter, 2019).

The inverted classroom model is based on the idea that traditional teaching is reversed in the sense that what is normally done in the classroom is reversed or replaced with what students normally do outside the classroom. So instead of students listening to lectures in class and then going home to work on an assigned set of problems, they read course literature and assimilate lecture material via videos at home and engage in problem solving, analysis, and teacher-led discussion in class (Nouri, 2016).

The flipped classroom is also a learning model in which the giving of materials and assignments is reversed and is also an approach that moves information out of the classroom and assimilation of information into the classroom and learning that provides various learning resources for students to access before learning (Patandean, 2021). The concept of this flipped classroom model refers to what is usually done in the classroom which is now done at home or outside the classroom and what is done at home is now being done in the classroom (Bergmann, & Sams, 2012). The activities in the classroom are meant to focus students on the application of the content for them to gain a better understanding of the material being taught. These activities can be individual or collaborative and move the teacher from a source of knowledge to becoming a facilitator of student learning (Gillette et al., 2018). A 3-stage reverse classroom design framework consisting of pre-class, in-class, and post-class learning activities (Rotellar & Cain, 2016).

The flipped classroom model itself actually uses media as a learning tool. The advantages of the flipped classroom are that students can participate in learning according to the speed of their understanding because there is an opportunity to repeat the material if needed, students have the opportunity to access learning, and learning time in class is used effectively by teachers and students. Based on the results of previous studies, it was revealed that studying a material through video animation is more interesting than using a book, because it can provide visualization. Because empirically students tend to like media with full color and visualized in a realistic form (Daryanto, 2015).

The flipped classroom model plays an important role in determining the expected learning outcomes. Today, technology has been integrated into the lifestyle and workplace and has improved learning and

outcomes in the classroom (Jdaitawi, 2019). student-centered learning embodies a set of theories that include active learning, peer-assisted learning, and collaborative learning (Rolff et al., 2019) (Akçayır & Akçayır, 2018). According to Ayçiçek & Yelken (2018) the flipped classroom model has a positive effect on academic achievement compared to traditional teaching methods.

Based on a preliminary study from Kurniawati (2019), it was stated that the application of the flipped classroom model showed a positive experience for students. In line with this, the provision of videos containing learning materials also helps students learn the material independently at home while being able to adjust their own learning speed. Therefore, researchers want to conduct research on the flipped classroom model to answer questions about the effect of the flipped classroom model on learning outcomes and students' learning motivation.

Method

This research was conducted at the Tapaktuan City Public High School. Tapaktuan City SMA consists of 2 public schools, namely SMA Negeri 1 Tapaktuan and SMA Negeri 1 Sawang. The approach used is quantitative with a quasi-experimental type of research with the type of Non-randomized control group posttest only design. This study uses two different methods with different classes, each class using the type of Non-randomized control group, posttest only Design (Ary, Donald, Cheser Jacob, 2010). The collection of motivational data in learning is carried out after the end of the lesson a motivation questionnaire is given.

In this design, the experimental class A and the experimental class B were not chosen randomly (not random). The difference between the two classes is the use of a peer group in the experimental class A while the control class B does not use a peer group with A lot of A and A little of A designs. The population in this study were all students of class XI science at SMAN 1 Tapaktuan and SMAN 1 Sawang, totaling 225 students with a sample of 195 students. Seen in Table 1.

Table 1. Research Sample

School	Class Status		Number of Students
	Control	Experiment	
SMA Negeri 1 Tapaktuan	XI-MIPA. 1	XI-MIPA. 2	131
	XI-MIPA. 3	XI-MIPA. 4	
SMA Negeri 1 Sawang	XI-MIA. 3	XI-MIA. 1	64

The determination of sample is determined by using a purposive sampling technique, namely the technique of determining the sample with consideration. Purposive sampling is used if the target sample being

studied has certain characteristics so that it is impossible to take other samples that do not meet the predetermined characteristics (Sugiyono, 2010). The basis for consideration of classes that have an average value that comes from teachers who are not significantly different or almost the same (homogeneous), then randomly selected to be used as the experimental class and the control class.

The instrument on learning motivation used is a questionnaire sheet for students in order to get the results of the learning process that has taken place at the end of the lesson using a linker scale which amounts to 36 questions using four indicators namely attention, relevance, confidence, satisfactions developed by (Huang & Hew, 2016) from John Keller (1983). The motivation data were analyzed by inferential method which firstly the data was changed from ordinal data to interval data through interval successive method.

Result and Discussion

The data from the research on learning motivation after validation of the questionnaire items showed that of the 36 questionnaire items provided, only 30 questionnaire items were declared valid and would then be analyzed. To see the difference in the average results of learning motivation in the control and experimental classes, it can be seen in Figure 1.

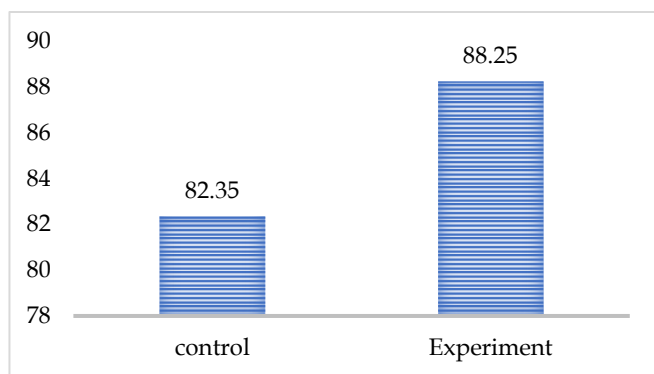


Figure 1. Average Posttest Motivation Questionnaire ARCS for Control Class and Experiment Class Students

Based on Figure 1, it shows that there is a difference in mean between the control class and the experimental class, with the posttest control class value of 88.25 and the experimental class's posttest score of 82.35. From this value, it can be proven that the posttest value of the experimental class is higher than the control class. This can be interpreted that the application of the full syntax flipped classroom model shows better results than the application of the non-full syntax flipped classroom.

The average increase in each indicator of ARCS learning motivation of students in the control and experimental classes can be seen in Figure 2.

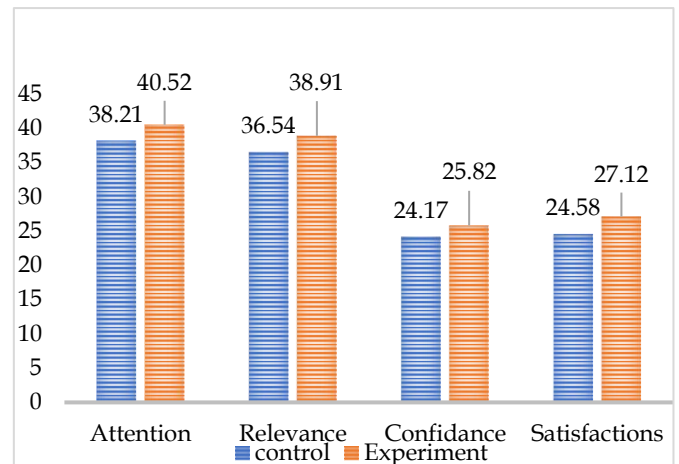


Figure 2. Average Indicators of Student Learning Motivation in Control and Experiment Classes

Based on Figure 2, it shows that there is a difference in the average score in the experimental class and the control class in both SMAN 1 Tapaktuan and SMAN 1 Sawang schools. The highest achievement indicator is the Attention indicator showing a value of 38.21 for the control class then increasing to 40.52 in the experimental class, this indicator stage increases the attention of students with the application of the flipped classroom model. Students feel that with a different learning model than usual, their attraction to the material will increase which will be in line with the increase in learning outcomes of the students themselves.

The lowest achievement lies in confidence. The average score of the control class is 24.17 and the experimental class is 25.82, but there is a difference between the control and experimental classes, although not too significant. The confidence indicator is because students tend to be pessimistic and think learning is a very big challenge. After being given treatment, the results were analyzed using ANOVA. The results of the ANOVA test can be seen in Table 2.

Table 2. ANOVA test results on learning motivation

Variable	Class	N	Average	standard deviation	Anova
Motivation	Control	97	82.35	4.75	Sig. 0.000
	Experiment	98	88.25	4.37	

Based on Table 2 shows that the learning motivation between the control and experimental classes shows a significance that is obtained by sig. 0.000 < 0.05 which means the hypothesis is accepted. From these results, it can be concluded that the application of the

flipped classroom model has an influence on the motivation of students. The use of the flipped classroom as previously stated provides great benefits for students. Students who do not attend class meetings can still study the material independently so they are not left behind with their friends.

Besides, the learning process is more planned and systematic because the material is studied first by students at home before the learning process in the classroom. So that the use of learning time is more effective than conventional learning (Subagia, 2017). The basic difference between the control and experimental classes lies in their grouping.

Grouping is organizing students to complete a given task. Students in one group interact with each other in solving a problem (Rudiyanto & Waluya, 2010). In the learning process carried out, the teacher acts as a facilitator, motivator, and also evaluator. Good cooperation between teachers and students in the classroom can make learning livelier and more meaningful. Besides that, it can also make teachers more enthusiastic in teaching and motivate other teachers to apply innovative learning models in the online learning period. This study describes the application of learning models that are interesting, innovative, and easily understood by students in accordance with learning theories and learning models, which are used to motivate and increase student enthusiasm in learning so that learning outcomes can increase (Chrismawati & Septiana, 2021).

Related research was also carried out by Rusnawati, (2020) that with the application of the flipped classroom learning model in database administration subjects, learning motivation showed that database administration in the experimental class was higher than the control class, this was because students understood the subject matter more easily by using the model. flipped classroom learning. In addition, students feel more interested in following the lesson so that students are more enthusiastic and feel happy when the lesson takes place. This can foster learning motivation for students which will have a positive impact on their learning outcomes.

According to Sinmas et al., (2019) that in solving the problems faced, students will be more enthusiastic because they already have knowledge of the material related to these problems through learning videos that they have learned at home. When students are enthusiastic in learning, students will be motivated to carry out learning activities seriously, so that they will try to be more active and intense in learning to better understand what is being learned, so that good and optimal learning achievement can be achieved.

Conclusion

The conclusion of this study is that the application of the flipped classroom has a significant effect on the motivation of students in the excretory system material, because this model integrates technology that contains learning materials to increase students' learning motivation.

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