Students' view of flipped classroom in physics' class

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The flipped classroom is one of the strategies and learning models that can improve student learning outcomes. Recent research has been done to see the strengths, weaknesses, and effects of the flipped classroom on learning, but not much research has been done to see students' responses to the application of the flipped classroom in physics class in senior high. The purpose of this study is to see how students respond to the application of flipped classrooms in physics learning at the high school level. The phenomenological research design is used to examine the factors that influence research. The result showed that teachers need to consider several things that impact the learning process.

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1. Introduction

The flipped classroom is one of the many lessons that focus on student learning [1]. The most striking difference is that this study focuses on the importance of using media before class begins [2]. There are several different understandings about learning flipped classrooms. According to [2], a flipped classroom is defined as learning done with videos or other learning materials that can support the learning process in the classroom, and enhance interactive and collaborative learning, so students can understand, apply, analyze, evaluate and make things.

Changing the composition of learning opens up opportunities for teachers to evaluate the process of student activities during learning. The stage of delivering knowledge at the beginning of learning can optimize the process of building other knowledge [3]. This condition forces students to take over the learning process and decisions before, during, and after class ends [4]. The impact is that the flipped classroom learning model increases the possibility of student-centered learning and leaves conventional learning methods [5].

The activities carried out while doing the flipped classroom learning model based on previous research are very diverse. There is research that focuses on pre-class learning activities by examining the effects of various learning videos [6]. There is also research that focuses on activities carried out during the learning class, as conducted by [7]. Based on research studies that have been done, the learning process will be carried out by giving learning videos before class, and students will work on the exercise questions while in class.

The difference between this qualitative research and similar research conducted previously is that this study aims to investigate the experiences of students who have experienced flipped classroom learning. Other studies are generally carried out using mixed methods and quantitative designs and are centered on testing the effectiveness of the application of flipped classrooms to the learning process [2,4,5,8]. Research conducted by reviewing the article obtained several results, namely, 1) there is an influence between the subjects taught with student learning outcomes [2], 2) the application of flipped classrooms in physics classes is very limited. Based on the cases, this research needs to be done to see students' responses to learning flipped classrooms in physics classes, compared to conventional or traditional learning that has been done so far.

2. Research method

Qualitative research is carried out using a phenomenological approach that aims to understand the essence of the phenomenon by exploring the experience during the process [9,10]. The phenomenological approach is chosen because it is capable to describe the meaning of the experience in terms of what and how the experiences were [9,10].

The research subjects were selected by purposeful sampling technique. Four from the twenty-nine students were chosen as samples. Four students come from high and low achieving students based on their final grade. Aside, this selection also involves researchers 'consideration of students' ability to express opinions.

2.1. Learning process

This research was conducted after applying flipped classroom learning to twenty-nine students from science class. Learning is done by using the help of google classroom. The first learning meeting is held to guide students in practicing what needs to be done so that the learning of flipped classrooms can take place well and smoothly.

Before class begins, the teacher will upload a video with a learning file that will be discussed in class. Students are asked to watch videos and read the material before learning

begins. The video used in the lesson is taken from the You Tube page with the following considerations: 1) the video contains a physical phenomenon that fits the learning topic, 2) the video is made from a trusted platform/account, 3) the video uses English or Indonesian. This video will be uploaded to the Google classroom page a week before learning begins, so students have enough time to prepare for physics learning. When in the classroom, the teacher will conclude about the material that has been given and continue learning by discussing practice questions.

This learning is carried out on the subject of work-energy and impulse-momentum. The subject of impulse and momentum has a duration of meeting time of 7×45 minutes, with a record time of 3×45 minutes done by students to do quizzes and do individual assignments. The subject of work and energy is carried out for 8×45 minutes, with 4×45 minutes of students doing practical activities and quizzes. Based on the division of learning time, students actively learn with the learning model of the flipped classroom for 4×45 minutes for each subject.

2.2. Data collection

The validation process of the interview's guide is done by two lecturer form physics education department. The individual structured interviews, then conducted in April 2020 with four science students who had learned physics using the flip classroom learning method and traditional method.

The data collected by sending the interview's guide to the students and the students answered the questions using a voice recorder. The reason behind this method is because the research was held during the COVID-19 pandemic. Consequently, each interview only lasted approximately twenty minutes, and they sent back the answer using an application named "line". Several adjustments are made to minimalize other factors that can interrupt the data. The adjustments are 1) before they record the answer, the researcher makes a question and answer session to make the same perspective of how this interview would be 2) they are not allowed to cut anything during the recording process so that the thinking process can be seen.

The interviews were used to identify the student's perception of traditional learning and flipped classroom. Interview questions are divided into several sub-categories, namely types of individual learning, learning in schools, conventional teaching, and flipped classrooms.

The results of the interview are then transcribed, generalized, and carried out the data reduction. Then analyzed the data into themes that represent the findings. The results of this theme allow the depiction of data so that the connection between data can be seen.

3. Result

The process of qualitative data analysis is focused on the process of coding research data to understand important and related data between one student and another student. The interview transcript produced several themes that describe the results of the study. These themes are the identification of student learning styles, conventional teaching, frequent learning, flipped classroom, and evaluation of learning videos. Based on the themes mentioned, the results of the research will be presented in tabular form as follows.

In the section on changes in learning styles, based on research subjects, three out of four students experience changes in learning styles. S1 states that learning in a flipped classroom can change learning styles. The reason he delivered was that with the video, S1 could better understand the material being taught, compared to only seeing visual images. Another student who stated his learning style changed was S2. Students

TABLE I. Interview data on students' perception of conventional learning .

Theme	Excerpt (Translated)
Advantage	
Students have more time for asking	(S1) "The problem is that the teacher teaches directly, and we can ask questions, so the material delivered is clearer, and if something is confusing, just ask the teacher."
	(S4) "Students can immediately ask the teacher if they don't understand."
Students understand the material well	(S2) "... what I like is that I can understand better because only the teacher explains."
	(S3) "The advantage is that the teacher can explain more clearly."
Disadvantage	
Students do not prepare the materials	(S1) "So it's the teacher who teaches, so when they teach it, we don't need to prepare [silence], and everything is taught by the teacher in front."
Boring	(S2) "Sometimes, even though it's fun to be bored because it keeps seeing power points and not doing other activities."
	(S3) "The weakness is usually more boring."

TABLE II. Interview data on students' perception of the flipped classroom.

Theme	Excerpt (Translated)
Advantage	
Attracting students' interest in learning	(S2) "In my opinion, this learning method can also make physics learning interesting because using video is a new thing."
More comfortable because there are no distractions from other friends	(S4) "Physics class is fun, more interesting because, with various sources or media, classroom learning can be more interesting." (S2) "The advantage is that it is more flexible and also more focused because we do it ourselves, and we avoid other distractions."
Can set video speed	(S1) "I think it's more comfortable because you can pause it in the play video that is shown right when you study."
Time efficiency	(S3) "The advantage is that it is more time-efficient, and before entering class, we already understand it first."
Disadvantage	
Limited time for asking	(S2) "It's limited to asking the teacher and working with that teacher."
Less free time outside school	(S1) "The thing is that we learn through video so that what is used is a free time, which should not be used to learn new material." (S3) "The disadvantage is that it takes up our free time."

state there is a change in learning style because the learning process experienced in the classroom is different. Changes in learning styles experienced by S4 are changes in views of the topic to be studied. Students state the video can give an illustration with an example application and an explanation of the concept given.

4. Discussion

Several main things will be discussed in this research fatherly to answer the research objectives. It contains several topics, namely, 1) Student responses to the learning videos given before learning, 2) Student responses to the comparison of conventional learning and flipped classroom learning, 3) Student responses to understanding resulting from the flipped classroom learning model, 4) Student responses to the challenges that exist when teachers apply the flipped classroom learning model.

The learning process undertaken by students before class, in general, is to understand learning videos to build initial knowledge of the material to be taught. However, in practice, some students take notes, and some students don't. Students who did not record or summarize learning stated that watching videos made them lose their rest time, and generally, the videos were boring (S1 statement). These findings are in line with research by [8], which revealed the results that teachers find it difficult to supervise students directly when students are outside the school environment, including in the preparation of students in learning the material to be studied [11,12]. So the activities undertaken by students before learning begins are the students' responsibility for the learning process experienced [13].

The learning method that is often used by teachers in the learning process is the PowerPoint media-assisted lecture method. When in the classroom, the teacher invites students to listen to learning material, do practice questions, and do practical work. This learning has an impact on students' dependence on teachers to understand the material being taught. This is in line with the statement made by the S1, which revealed that with conventional learning, students do not need to prepare anything while in the classroom. Inversely related to learning is done with the flipped classroom because this learning forces students to learn what will be given before class starts [8]. Following research conducted by [5,14], compared to traditional learning, flipped classrooms change students to be more active in learning and assist students in reducing their cognitive load. They are evidenced by the statement delivered by S4 that students claim to get more picture about what will be learned from the video provided. Following what was delivered by [15], that learning should be done actively by students, so students can save the material that has been learned.

The flipped classroom learning model is closely related to increasing students' understanding of learning material and awareness of what is done by students [4]. But this research is inversely proportional to what is conveyed. According to statements made by S3, students are better able to understand the material taught by conventional learning methods. The

reason is that students have more time to ask questions than when using the flipped classroom learning model. Research conducted by [6] shows that some students can participate in learning well, but there are also students not yet familiar with this learning model. It is in line with research conducted by [13] that this learning model requires a certain period so that students can get used to the stages of learning undertaken.

The interview results show that there is an influence between the learning video on the learning process that students do. One of the students stated that the learning video could give an idea about the topic of the application example and an explanation of the concept presented. In contrast, S3 stated that learning is difficult because the explanation given by the video is difficult to understand. Based on research that has been done [6], after using three types of videos, there should not be a significant influence on the learning videos, so that a more in-depth search is needed regarding the effect of learning videos on students. However, in the learning video studied by [16], learning videos should be made with small topics in just 10-15 minutes in duration; the goal is that students' attention is more focused on the material presented. Differences in the absorption of information from the same video will also be overcome by giving a short quiz, as done [17]. The aim is that the knowledge building that has been built previously by students can be strengthened while learning takes place.

5. Conclusion and suggestion

Several limitations are used in research. First, the learning process carried out in class uses learning methods that are not fixed on the goal to improve any ability or skill. Thus, this study was conducted purely to see the effect of the flipped classroom, which aims to change the course of learning. Both of these studies are preliminary studies to see the weaknesses and strengths of flipped classroom compared to conventional learning and are limited to the topic of impulse and momentum as well as effort and energy. Further research is needed to see how they affect motivation, learning outcomes, and other factors that support the physics learning process. Third, the learning process is carried out by adjusting learning done at school so that the application time can be influenced by events or other activities that are within the scope of the school.

Another thing to note also is 1) the results of this study only discuss in terms of student responses to learning flipped classroom. The implementation of the flipped classroom that is done requires some improvement for better implementation. However, through this article, an understanding is obtained that flipped classroom attracts students to learn physics, although it requires further testing of the effect of motivation on the application of this learning.

Based on the results described above, there are several topics from the evaluation process that will be highlighted for further investigation. These topics are 1) the flipped classroom learning model carried out with the help of Google Classroom can be done well if the teacher can improve reciprocal relationships and active communication in the forum; 2) the flipped classroom learning model forces students to learn independently and be responsible for what is learned, and this will be able to support the improvement of students' metacognition in appearance [18]; 3) The flipped classroom learning needs to be familiarized so that students can adapt to different stages of the conventional learning model [13]; 4) The material given before class begins is recommended in the form of a short video with a duration of 5-10 minutes and discusses certain topics, not the whole [16]; and 5) The video evaluation process can be done by giving a quiz containing questions about the video provided [17].

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