The Implementation Of Flipped Classroom Models To Increase Self-Reliance And Motivation Of Student Learning

Irin Agustina Dwi Astuti, Yoga Budi Bhakti, Ria Asep Sumarni, Dwi Sulisworo, M. Toifur

Abstract: Student oriented physics learning is often affected by time allocation, but they should complete their learning. This situation makes teachers as educators think of appropriate teaching methods. One of the teaching methods to overcome this issue is the flipped classroom, where learning to explore and understand teaching is done outside of class, and interactive activities are carried out in the classroom. A new paradigm that demands education, learning must be able to establish students in learning (self-regulated learning). Learning motivation affects students’ self-reliance learning. Students have low self-reliance learning because the environment does not accustomed to self-study. Students are accustomed to learning to be guided by teachers in class. A learning approach that theoretically could potentially facilitate self-learning is a flipped classroom model. Information and communication technologies have an essential role in helping improve the teaching and learning process. This research aims to describe the extent to which flipped classroom models can make students learn independently and to improve the learning motivation of students. The sampling technique is a random sampling cluster. The instruments used are the motivation and self-reliance questionnaire sheets of students who have been validated and tested for reliability. The result showed that the flipped classroom could improve self-reliance and student learning motivation. Students become more enthusiastic and interested in learning science with the flipped classroom. This result expressed on student's work on time, and students can study themselves without being tutored by the teacher.

Index Terms: flipped classroom model, motivation, physics learning, self-reliance, e-learning.

1. INTRODUCTION

Self-reliance is a character that students must develop, especially self-reliance in learning or known as self-regulated learning, which allows proactive students to manage their learning activities [1]. Self-regulated learning in students is reflected in the control of him in addressing the problems that occur in the learning process [2]. In other words, students learn to control their learning activities. Students monitor and motivate themselves during the learning process. Besides, students are expected to be able to evaluate and monitor their learning outcomes as to what is expected in the learning process [3]. During the learning process, students are expected to be able and actively seeking relevant learning resources by utilizing information technology. This skill is following the effort of establishing students in learning. Adequate information technology facilities and infrastructure allow students to access a wide range of learning resources easily. However, the number of learning resources is not necessarily comparable to students' learning outcomes. Studies regarding how to teach physics always attract the attention of educators [4]. Recent research shows that traditional teaching methods and techniques in physics courses have adverse effects [5], [6]. In traditional approaches to teaching physics [7], in which teachers are active, and students are passive and are not responsible for their learning, students listen and take notes [8].

Furthermore, in physics learning taught with a traditional approach, students do not realize the relationship between the subject and real-life events [9]. If students learn a concept in current learning conditions by associating it with the real world, their learning is more effective and consistent [10]. In the active learning conditions, teachers guide and prepare class conditions in which practical learning approaches are used. Students in active learning participate in learning activities in cognitive, emotional, social and physical ways, and classify knowledge, examine by forming hypotheses and make connections with previous learning [11][12][13]. Students in such a way are likely to be failed individuals loaded with information based on memorization. The creative individual can quest and produce solutions by tackling problems [14]. This skill also affects the motivation and self-sufficiency of students negatively [15]. Based on the results of interviews in several schools in Jakarta, there are several cases of science studies suffering a shortage of time. It takes a long time to explain the material to students. Many students still consider the physics material to be abstract, especially the temperature and heat material. Students usually study at school only to listen to explanations from teachers who are one-way learning, so that the activity of students is also not seen. Students' learning interests are low showed from students' attitudes during learning physics in the classroom. They were not ready and do activities in the classroom awaits orders from their teachers first. Students independence is also not seen either in search of learning resources, practicing various questions and evidence outside the meeting, and monitoring their learning achievements. While self-effort seeks to learn resources, exercise problems and awareness in monitoring the progress of learning is an essential aspect of the success of independent learning [16]. There are many different ways to articulate the nature of independent learning. It is sometimes referred to as “self-regulated learning,” “self-directed learning,” or "learning how to learn" [17]. There are three characteristics self-regulating: understanding of their approach to learning and how best to efficiently maximize their learning; motivation to take responsibility for their learning; and ability to work with
others to enhance the depth and breadth of their learning [18]. Motivation is a student's willingness, need, desire, and compulsion to participate in and be successful in the learning process. Motivation is an intricate part of human psychology and behavior that influences how individuals choose to invest their time, how much energy they exert in any given task, how they think, and feel about the task, and how long they persist at the task [19][20][21]. Based on the phenomenon, researchers filed a Self-learning approach arranged with class flipping models. The flipped classroom is a learning approach where learning activities from a combination of learning outside the classroom through the use of learning media (e-Learning) as a foundational carrying base and learning activities in the classroom include Project-based learning and group discussions through [22][23][24][25]. Flipped learning is learning that combines meetings in a classroom with online learning. According to Herreid [26] in flipped learning things that are usual in the classroom, such as explaining the material, giving assignments, exercises, and house assignments on the move becomes an online study.

2 METHOD

The method used in this research is quasi-experiment with pre-test post-test of non-equivalent control group design research. The author provides a pre-test and post-test to measure the motivation and independence of learning students before and after applying the treatment. The study uses one class without a comparative class, so see the motivation and independence changes learned before and after that flipped classroom was set up. Sampling techniques Used is a random cluster sampling.

<table>
<thead>
<tr>
<th>TABLE 1. RESEARCH DESIGN</th>
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<tbody>
<tr>
<td>Group Physics Class</td>
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This study was carried out over six weeks in the 2019-2020 academic year. "Temperature and Heat" unit was taught to students. Since students always confuse the concepts in the "Temperature and Heat" unit, they are unable to associate them with the real world. However, the subjects in the "Temperature and Heat" units are strictly related to daily life and were specially chosen for this reason. Before commencing, the students were informed about the flipped classroom approach. At the beginning of the period, the researchers prepared activities, video lectures, and simulations suitable for each subject in the "Temperature" units. The video was produced using Macromedia Flash. The video was consistently between 10-15 minutes in length to ensure reasonable viewing time for students, as suggested by Bergmann and Sams [27]. The teacher delivers video to the students via Edmodo and Youtube Channel each week. Students were given up to three days to watch the video. Data collection techniques were using the questionnaire. The questionnaire is a series of a written question/statement used to collect the desired research information. Instruments used in this research sheet is a closed statement questionnaire in the form of a checklist with a Likert scale. The variables tied to this research are the motivation and the self-reliance of learning students, while the free variables are the flipped classroom. Research instruments tested first before use in the measuring variable focus by looking at validity and reliability. Validity the instrument shows that the outcome of measurements depicts aspect measured, reliability of the instrument concerning the degree of accuracy of measuring results. The validity testing of the instruments used is a moment product and reliability testing using the Alfa Cronbach. Validity testing criteria is if $r_{xy} > f_{table}$ then the problem item is declared valid, conversely if $r_{xy} < f_{table}$ then the question item is declared invalid. The reliable instrument must qualify the coefficient of Alpha Cronbach ≥ 0.6.

3 RESULT DAN DISCUSSION

This study examined the effects of the flipped classroom approach to the motivation and self-reliance in a physics learning on academic achievement, and to determine the opinions of students towards flipped classroom approaches. Before the implementation, the pre-physics concept test scores indicate that the knowledge levels of students were the same. Teacher conducted the flipped classroom learning for six meetings in schools in the Jakarta area. In the beginning, students were taught to get an account by registering to e-learning. E-Learning used was the Edmodo application. The teacher used Edmodo to manage a learning material and a physics animation video that can be used to study students when at home. Student familiarized the use of e-learning interfaces. At this meeting, students were introduced to the menus presented on the e-learning page. Table 2 explains the flipped classroom stages and activities.

<table>
<thead>
<tr>
<th>TABLE 2. THE FLIPPED CLASSROOM STAGE</th>
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<td>Stage</td>
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Source: Astuti [28]

Besides, teachers always check back the number of students who attend the course. Teachers also provide solutions in case of problems with the use of personal accounts when logging in the page. At the second and third lesson, students familiarized themselves with many activities. Some of the activities were downloading learning materials, downloading animated videos, filling out self-regulated forms as learning achievements, filling out student motivation form, and downloading worksheets. At the fourth and fifth meetings, students work on worksheets with discussions with their peers. The teacher is only as a facilitator and runs a discussion about the questions and worksheets that students. At the last meeting, the student worked on the evaluation to learn how to
understand the temperature and heat material.

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>Value of each statement</th>
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<tbody>
<tr>
<td>1.</td>
<td>Create a work plane</td>
<td>3.2</td>
</tr>
<tr>
<td>2.</td>
<td>Preparing equipment that supports learning before school</td>
<td>3.1</td>
</tr>
<tr>
<td>3.</td>
<td>Utilizing books</td>
<td>3.3</td>
</tr>
<tr>
<td>4.</td>
<td>Make use of nearby places or environments</td>
<td>3.2</td>
</tr>
<tr>
<td>5.</td>
<td>Not enough by hearing and absorbing but also by doing</td>
<td>3.3</td>
</tr>
<tr>
<td>6.</td>
<td>Utilize anyone with certain skills</td>
<td>3.2</td>
</tr>
<tr>
<td>7.</td>
<td>Exchange opinions with students</td>
<td>3.4</td>
</tr>
<tr>
<td>8.</td>
<td>Dare to reveal the problems</td>
<td>3.2</td>
</tr>
<tr>
<td>9.</td>
<td>face</td>
<td>3.3</td>
</tr>
<tr>
<td>10.</td>
<td>Utilizing the experience to resolve the problem</td>
<td>3.2</td>
</tr>
<tr>
<td>11.</td>
<td>Happy with learning focused on</td>
<td>3.4</td>
</tr>
<tr>
<td>12.</td>
<td>problem-solving</td>
<td>3.6</td>
</tr>
<tr>
<td>13.</td>
<td>Average</td>
<td>3.3</td>
</tr>
</tbody>
</table>

The other result, flipped classroom approaches that encourage students to gain cognitive skills such as knowledge acquisition before lessons, as well as focusing on higher-level cognitive skills such as application, analysis, synthesis, and evaluation with the support of their friends and teachers during lessons, agree with the Bloom Taxonomy. In the literature, as observed in this study, it was found that the flipped classroom approach increases the academic ability of students [31][32][33]. According to the motivation theory, the expectations of success related to three factors: how students give attribution to the successes and failures of the previous activities, how students interpret their competence, and how students maintain their self-esteem [34][35]. The situation is related to how the students show their performance when individuals interact with the learning materials and environment during the learning process. The confidence level of the student whether he/ she can accomplish well of their task or not, will determine the student's success [36][37]. According to Sulisworo & Suryani [38], motivation has an effect or influence on student learning achievement. There is a tendency that the better the student's motivation, it can be estimated that she/ he will have an excellent learning achievement. In this case, higher IT learning does directly affect higher learning achievement. The students do e-learning to study or search the relevant learning material, especially science. Implementation of the learning strategy that engages the student to use the computer and to search the material from the internet can be used [39][40]. The flipped classroom is one of the learning models that utilize IT in class. Self-Reliance flipped classroom approach is proposed to help students schedule their out-of-class time to read and comprehend the learning content before class effectively. They are capable of interacting with their peers and teachers in class for in-depth discussions [16]. The findings indicate that integrating the self-regulated strategy and flipped learning can improve students' self-efficacy, strategies of planning, and managing time. Hence, they can learn effectively and have better learning motivation.

4 CONCLUSION

The implementation of a flipped classroom on physics learning can improve students self-reliance and learning motivation. This effect can be found in each learning self-reliance indicator that has a relatively good average value. The student's learning motivation increased by 27%. Students are enthusiastic and actively follow physics learning with the
flipped classroom.

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