

Implementation of Blended-Flipped Classroom Model Assisted by Video to Improve Students' Creative Thinking Skills

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Abstract: This study aims to determine the improvement of students' creative thinking skills through a video-assisted blended-flipped classroom model on work and energy materials. This study uses a quantitative approach. The research was carried out at SMA-IT Abu Hurairah Mataram in the 2nd semester of the 2021/2022 academic year. The research subjects were 32 students of X MIA 2. The instrument used is a test of creative thinking skills on work and energy materials. The results showed that the N-Gain scores of students on the aspects of fluency, flexibility, originality, and elaboration were 0.91; 0.27; 0.13; and 0.40 respectively. The average N-Gain score is 0.41 in the medium category. Thus, it can be concluded that the video-assisted blended-flipped classroom model can improve students' creative thinking skills.

Keywords: Blended learning model; Flipped classroom; Video; Creative thinking skills

Introduction

The world of the 21st century is now in the era of the Industrial Revolution 4.0. The development of science and technology in the 21st century provides new challenges in the world of education to produce good quality human resources in facing the era of global competition. Broad access to the internet and the development of digitalization in the Industry 4.0 era provide an opportunity to re-examine current instructional pedagogy in the context of 'deeper learning' for 21st-century skill acquisition and Industry 4.0 readiness (Bishnoi, 2020). World Economic Forum (2015) released a report that an individual needs a combination of several competencies to be able to live properly in the 21st century, including creativity, critical thinking skills, communication skills, and collaboration skills.

Individuals who are able to adapt and think creatively are urgently needed to face the industrial revolution 4.0 and the challenges of the 21st century (Munandar, 2009). Based on the Future of Jobs survey conducted by the World Economic Forum (2020), the skills most needed in 2025 are creativity and innovation. Four of the top five skills that are increasingly important

and in demand in the future on the list relate to the ability to think creatively.

Creative thinking skills consist of four aspects, namely fluency, flexibility, originality, and elaboration (Guilford, 1967). Adequate creative thinking skills are expected to be achieved by students through classroom learning. Students who have adequate creative thinking skills are likely to be able to study problems systematically (Rachmawati et al., 2018), face millions of challenges in an organized way, formulate innovative questions, and design solutions that are considered relatively new (Ibrahim, 2011).

Indonesia is ranked 85th out of 129 countries in the GII (Global Innovation Index) in 2021. Indonesia's innovation index is the second lowest in ASEAN. The Global Innovation Index (GII) was compiled using 80 indicators by Cornell University, the World Intellectual Property Organization (WIPO), and INSEAD. This shows that the creativity and innovation of Indonesian are still low.

Based on observations made at one high school in Mataram, SMA-IT Abu Hurairah, students' creative thinking skills are still very low. The low creative thinking skills of these students are caused by several things. First, the teacher still emphasizes the learning process of understanding concepts rather than

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developing students' thinking skills and competencies. Second, both teachers and students still have a mindset that the learning process is teacher-centered, so they are not used to carrying out student-centered learning. Another factor is the limited time and ability of teachers in preparing learning tools and assessments that are oriented toward improving creative thinking skills. As a result, as the fourth factor, the teacher only gives problems whose solution is directly on the use of existing physics formulas (close-ended questions) and does not facilitate students to solve real-world problems creatively as an effort to improve students' creative thinking skills in solving problems.

A new idea to overcome the low creative thinking skills of students is to apply a learning model that is able to encourage and motivate students to actively participate in the learning process and integrate technology (Gunawan et al., 2017). One of the learning models that are in accordance with the current development of digital technology and can facilitate an intensive learning process in acquiring knowledge and creative thinking skills is the blended learning model. Blended learning is also an innovative learning model that can be implemented in the era of Industrial Revolution 4.0 (Hadiprayitno et al., 2021).

Blended learning is a learning model that combines online and offline learning (Bender & Vredevoogd, 2006). This model is an innovative concept that combines the advantages of traditional classrooms with ICT-based offline and online learning (Lalima & Dangwal, 2017). Blended learning is relevant for use in higher education in Indonesia to strengthen students' self-confidence, develop collaboration skills and discuss with other students to solve problems (Zainuddin, 2018). The blended learning model allows students to interact with each other in the form of discussions and information obtained from various sources on an ongoing basis so that higher-order thinking skills can be developed (Doyan et al., 2022).

In the implementation of blended learning, teachers need to prepare the methods, media, and teaching materials that support the learning process (Dari, 2022). The main purpose of blended learning is to provide opportunities for students to learn independently by providing various learning resources and to encourage students to make the best use of face-to-face learning in developing knowledge through discussion, project, and problem-solving activities.

The type of blended learning that will be the focus of this research is the rotation model. There are several types of rotation models, including station- rotation, lab rotation, flipped classroom, and individual rotation (Horn & Staker, 2012). The type chosen in this study is the flipped classroom. Bergmann & Sams (2012) explained that flipped classroom model is a learning approach that exchanges activities in the classroom, namely the delivery of material by the teacher into

activities carried out outside the classroom. The material is given to students at home using electronic media and then applied in practical activities in the classroom (Arnold & Garza, 2014). Triantafyllou (2015) and Jeong (2017) state that there are three procedural instructional steps in a flipped classroom, namely: (1) Pre-class sessions where teachers deliver content or learning materials to students outside the classroom in a meaningful way; (2) In-class sessions as a stage of further learning that occurs in the classroom; and (3) Post-class sessions as reflective, evaluative and collaborative learning that occur after in-class sessions.

Based on previous research, the blended-flipped classroom model can help students to obtain more optimal learning outcomes (Pattiserlihun et al., 2020; Hasanah et al., 2021), improve students' creative thinking skills and creative innovation (Rahajeng et al., 2018; Wannapiroon & Petsangsari, 2020), increase students' self-efficacy and conceptual mastery (Yanah et al., 2018), increase students' learning achievement and independence (Choiroh et al., 2018), and increase students' critical thinking skills (Zulhamdi et al., 2022).

One of the media that can support flipped classrooms is video. According to Aca & Sulisworo (2020), the advantages of videos on the learning process are: (1) giving messages that can be received more evenly by students, (2) very good for explaining a process, (3) overcoming the limitations of space and time, (4) more realistic, can be repeated and stopped as needed, and (5) gives a deep impression that can affect student attitudes.

Based on these descriptions, researchers are interested in implementing a video-assisted blended-flipped classroom model to improve students' creative thinking skills. The purpose of this study is to find out the improvement of students' creative thinking skills through the learning process on work and energy materials using a video-assisted blended-flipped classroom model.

Method

This study uses a quantitative approach. The research was carried out at SMA-IT Abu Hurairah Mataram in the second half of the 2021/2022 academic year. The research subjects were 32 students of X MIA 2. The data was collected through a test by providing a test instrument for creative thinking skills on the work and energy material with as many as 4 essay questions. The test technique in this study was used to collect data on students' initial creative thinking skills before participating in the learning process with the blended-flipped classroom model (pretest) and after participating in the learning process (posttest).

The standard gain analysis is used to determine the increase in students' creative thinking skills before and after participating in the learning process. The equation that meets the standard gain is:

$$Std < g > = \frac{S_{post} - S_{pre}}{S_{max} - S_{pre}} \quad (1)$$

The standard gain score obtained is then classified into the category of students' creative thinking skills based on Table 1 in Sundayana (2014) below.

Table 1. N-Gain Index Interpretation.

N-Gain Score (g)	Category
$0.70 \leq g < 1.00$	High
$0.30 \leq g < 0.70$	Medium
$0.00 \leq g < 0.30$	Low

Result and Discussion

The increase in students' creative thinking skills can be seen through the results of the pretest and posttest obtained before and after the learning activities carried out at X MIA 2. Students' pretest and posttest scores can be seen in Figure 1. The students' average pretest and posttest scores are 22.07 and 53.91, respectively.

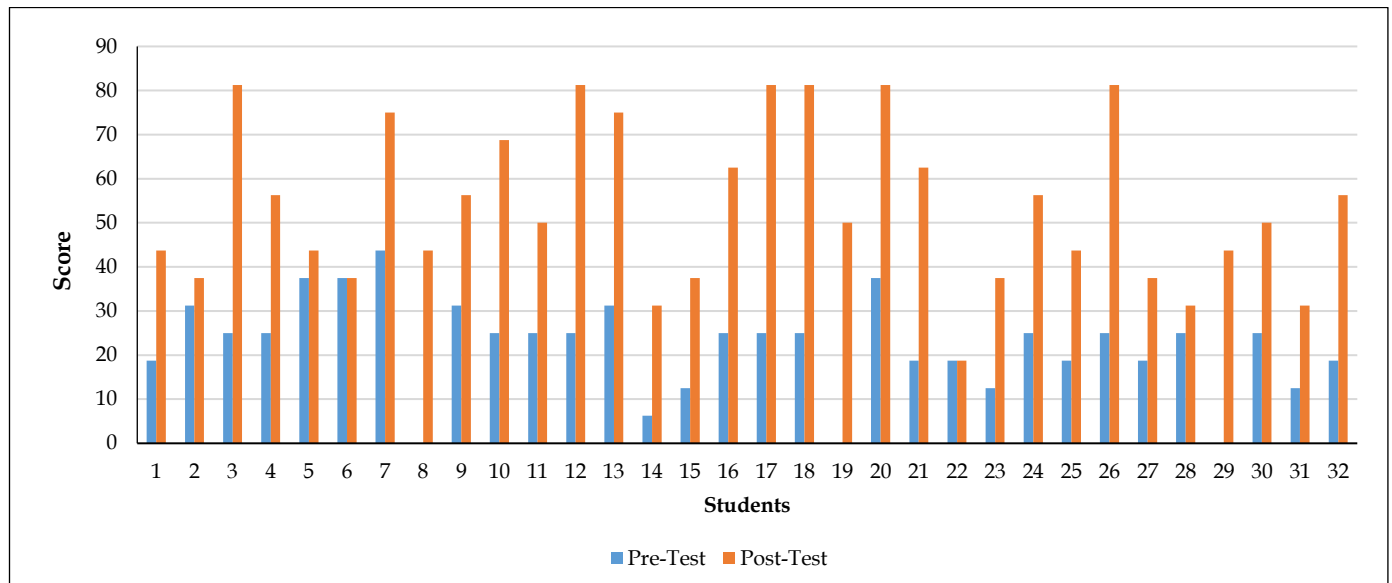


Figure 1. Pretest and Posttest Scores of Students

The pretest and posttest scores data obtained were then calculated using the N-Gain formulation.

The results of the calculation of students' N-Gain scores can be seen in Figure 2 below

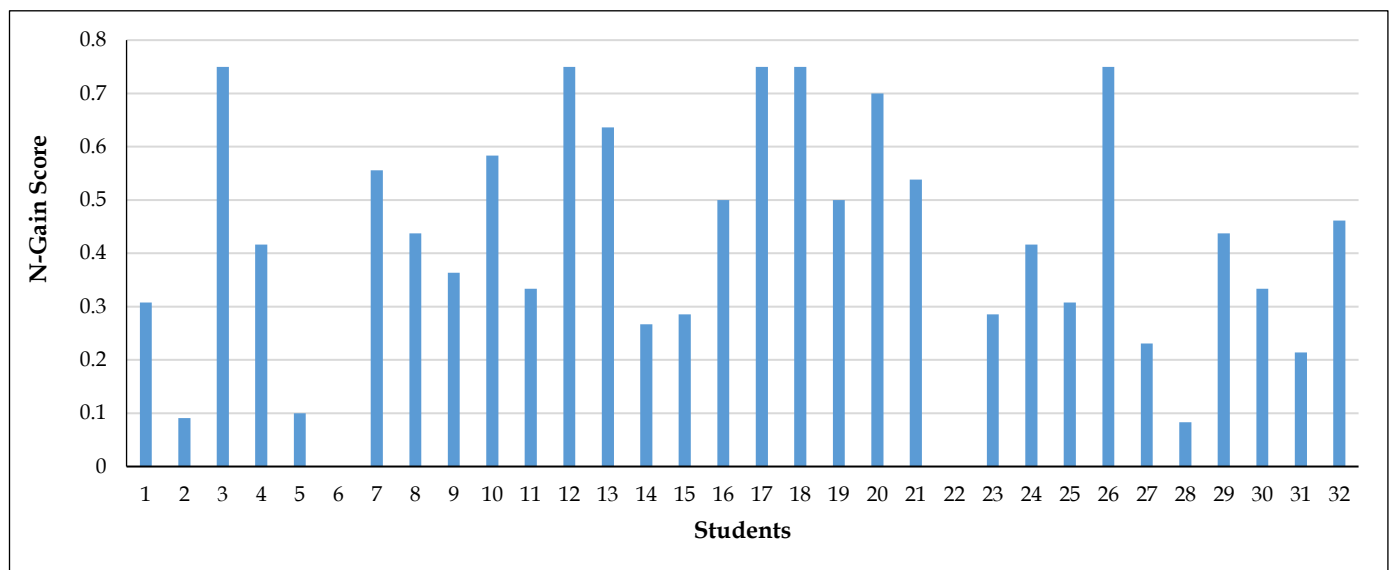


Figure 2. N-Gain Scores of Students.

The percentage of N-Gain scores obtained which then classified into high, medium, and low categories can be seen in Table 2 below.

Table 2. Classification of Students' N-Gain.

N-Gain Score (g)	Category	Students	Percentage (%)
$0.70 \leq g < 1.00$	High	6	19
$0.30 \leq g < 0.70$	Medium	16	50
$0.00 \leq g < 0.30$	Low	10	31

Based on the table, as many as 6 students with a percentage of 19% is in the high N-Gain category. The number of students who have medium N-Gain is 16 people with a percentage of 50%. The remaining 10 students have low N-Gain with a percentage of 31%. Based on the results of the pretest and posttest, it was found that the average N-Gain score of students' creative thinking skills was in the medium category with a score of 0.41. The N-Gain obtained for each aspect of students' creative thinking skills can be seen in Table 3 and Figure 3 below.

Table 3. N-Gain Scores for Each Aspect of Creative Thinking Skills.

Creative Thinking Skills	N-Gain Score	Average N-Gain	Category
Fluency	0.91	0.41	Medium
Flexibility	0.27		
Originality	0.13		
Elaboration	0.40		

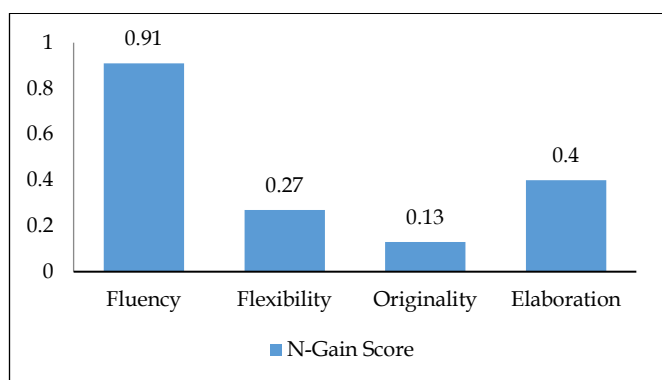


Figure 3. N-gain Scores for Each Aspect of Creative Thinking Skills.

Based on Table 3 and Figure 3, the aspect of creative thinking skills with the highest N-Gain of 0.91 is fluency. According to Leen et al. (2014), fluency is the ability to generate many ideas. The high N-Gain score on this aspect shows that through the video-assisted blended-flipped classroom model, students are able to think fluently and generate many diverse ideas on a given problem.

The elaboration aspect has an N-Gain of 0.40 which is in the medium category. Elaboration is the ability to add detail to an idea (Leen et al., 2014). This shows that through video-assisted learning with a blended-flipped

classroom model, the ability of students to develop ideas and add detail in solving problems increases.



Figure 4. Learning Activity

Meanwhile, the aspects of flexibility and originality have an N-Gain score of 0.27 and 0.13 in the low category, respectively. Flexibility is the ability to produce many diverse ideas from various points of view. Meanwhile, originality is the ability to produce ideas that are unique, unusual, different from those in the book, or different from the opinions of others (Nurlaela et al., 2019). The low flexibility aspect shows that students still have difficulty changing their point of view in solving physics problems. In the question, students are asked to rank the amount of work due to gravity felt by the child and the child's speed on the surface of the water if the slide has a different path shape. Students tend to use the initial point of view which is the different shape of the slide and do not use other points of view such as the child's height from the water's surface. Students also still have difficulty in making their own ideas in solving problems. This can be seen from the low aspect of originality in Figure 3.

The aspect with the lowest N-Gain is originality. These results are in accordance with research conducted by Hanni et al. (2018). Research by Armandita et al. (2017) also shows that the lowest percentage of creative thinking skills aspect is originality. Based on the percentage score of the creative thinking aspect, the score of the originality aspect is the lowest compared to other creative thinking aspects such as flexibility and fluency (Jumi et al., 2018).

Originality is the most difficult aspect to train because it requires more complex thinking skills than other cognitive domains. This aspect is equivalent to creating (C6) in the cognitive domain of the revised Bloom's taxonomy. Creating is integrating elements into something new and whole or producing an original product/idea. The reason behind the low originality of students is that most teachers do not familiarize students with thinking until the evaluation stage (Hanni et al., 2018).

The low originality of students is also caused by the lack of students' sensitivity in answering the questions given. Basically, sensitivity to the questions is one of the factors needed in creating creative thinking skills so that they can come up with a new idea or ideas that have

never been thought of by others (Armandita et al., 2017). Students are also not used to answering open-ended questions, so students still have difficulty, confusion, awkwardness, and lack of confidence to work on the open-ended questions given. In addition, students rarely use other ways to solve a problem. Ideally, teachers should provide opportunities for students to conduct discussions, conduct laboratory experiments, work together in groups, either collaboratively or cooperatively, or occasionally carry out learning activities such as experiments outside the classroom, in an open environment to trigger students' creativity (Perry & Karpova, 2017). Not only that, but teachers must also build positive relationships between themselves and students, such as mutual respect, modeling creative attitudes, encouraging students to leave their comfort zones, and growing confidence in their own creative abilities (Davies et al., 2013).

Munandar (2009) states that the ability to think creatively is also supported by internal factors of students. Creativity is supported by three prerequisites, namely adequate intellectual ability, motivation and intelligence. Several factors increase the ability to think creatively, such as providing support to students so that they are more motivated to be active, encouragement, and support from the environment in the form of appreciation, giving awards, praise, and others. Other efforts in developing creative thinking skills are teachers must cultivate curiosity in students, provide challenges to students, and foster confidence that any problems can be solved (Sekar et al., 2015). Fluency and flexibility aspect affect the originality aspect of students. So, if these two aspects are developed optimally in learning, the originality ability of students will definitely emerge (Filsaime, 2008).

Based on the N-Gain score obtained, video-assisted learning using a blended-flipped classroom model that has been carried out can improve students' creative thinking skills. This is because there is an increase in the four aspects of students' creative thinking skills. This result is in line with the research conducted by Rahajeng et al. (2018) and Wannapiroon et al. (2020) which shows that the blended-flipped classroom is able to improve students' creative thinking skills.

Conclusion

The video-assisted blended-flipped classroom model that has been implemented can improve students' creative thinking skills. There is an increase in the four aspects of students' creative thinking skills. The results showed that the average N-Gain score of students' creative thinking skills was 0.41 in the medium category. The aspect with the highest improvement is fluency which shows the ability of students to think fluently and spark many diverse ideas on a given problem.

Meanwhile, the aspect with the lowest improvement is originality.

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