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Integration of Problem-Based Learning, Flipped Classroom, And Do-It Model in Efforts to Develop Creative Thinking Capabilities of Junior High School Students

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Abstract

The condition of society in the era of the industrial revolution 4.0 is increasingly sophisticated. This condition, on the one hand, makes human life easier, but on the other hand, it causes many problems. The problems that arise are even more complex. Solving it requires creativity. Such environmental conditions need each individual to have high adaptability and creativity. As educational institutions, schools are responsible for preparing their students to have these abilities. The learning process carried out in schools must be able to develop students' abilitiesto adapt to an environment full of technology and have the ability to solve problems by creating the best solutions. The learning model that integrates the flipped classroom model withproblem-based learning strengthened by the DO-IT model is believed to be able to condition students' creative thinking skills. This study produces a problem-based flipped learning modelwith the syntax "Learn, Deepen, Apply, Reflect, and Evaluate." Based on this syntax, this model is called the Pedal Tere learning model. The model was developed using the Gall and Borg model. A formative evaluation was done to get users' input, followed by revisions. Basedon formative evaluation, the model was modified, concluding that the Pedal Tere learning model has been completely developed.

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BACKGROUND

The era of the industrial revolution 4.0 changed the order of people's lives. Various aspects of human life have changed a lot. On the one hand, it has provided an easy life, but on the other hand, it has often caused problems. This condition requires society to continue to change. Thereare new demands for prospective new workers to be able to take part in the new world of work. This condition is confirmed by the report of the US Department of Labor SCANS Commission(1991). In other words, new workers with new competencies will emerge. Meanwhile, old jobs, mainly mechanical ones, have been replaced by technology. That opinion is in line with the view of Brown, Ellery, and Campione (1998), who predicts that there will be changes in community demands caused by the development of knowledge and technology, as well as the needs of the world of work (Collins, 1999).

The complexity of life's problems in society requires solutions that are not easily formulated. Requires adequate hard skills and soft skills to be able to solve it. Among the skills that must be mastered by future society is the ability to learn independently, be innovative and collaborative,

think critically (Béres et al., 2012), and be incredibly creative thinking (Shively et al., 2018). Robles reported ten soft skills perceived by employers as a must-have for prospective workers. The ten soft skills are integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, group work, and ethics (Robles, 2012). They must get a relevant learning process to have a series of skills demanded. The learning process that can develop these skills must continue to be developed and implemented.

Various learning models have been developed to facilitate students mastering specific abilities. One model is often only effective in achieving and developing particular skills and could be more effective in developing other abilities. In other words, to teach students to master a specific ability, a new learning model is needed. It is because the competencies demanded by the community and the world of work are also very diverse and continue to grow. Therefore, the development of learning models will continue to be required.

The profile of Pancasila students, which describes Indonesian students' character, must receive special attention. To realize each character, it is necessary to stimulate a unique learning environment and ecosystem. The learning environment is to realize the character of independent students, in contrast to developing the character of global diversity. Likewise, to create students with the willingness and ability to work together, the learning process is different to develop critical and creative reasoning abilities.

Facing increasingly complex global challenges, students must be equipped with adaptive abilities. It means the ability that allows students to adapt to various demands and challenges. In addition, the ability to solve problems by providing various alternative solutions is a vital requirement. In this case, the ability to think creatively is needed because, with creativity, a person can adequately solve his problems. Those who can think creatively will be able to see problems from various dimensions, making it possible to obtain various alternative solutions.

Preparing students to have creative thinking skills, an environment and stages of the learning process that are supportive and distinctive are needed, namely a learning process that is challenging and provides more open opportunities. Students are accustomed to facing problemsand are guided to be able to solve them; They are given the freedom to express their opinion and provide solutions to the problems they face. In other words, to develop students' creative thinking skills, a particular learning model is needed.

Considering that the learning model developed so far is only to achieve specific competencies. In contrast, the competencies that students must master are complex, and a learning model that integrates two or more models is needed. The problem-based learning model is one of the alternative models used to give students the ability to solve problems. Major calls it a learning approach (Major et al., 2004), while Valdez & Bungihan also calls it an effective approach to implementing learning (Valdez & Bungihan, 2019). In addition, the PBL model can also be used to develop creative thinking skills, characterized by the ability to find different ways of looking at a problem and generating new ideas (Mustofa & Hidayah, 2020). The PBL model also has advantages in developing analytical skills, solving problems, growing interest in learning, and team spirit (Liu et al., 2019).

Learning with the PBL model is carried out in groups by presenting a series of problems (Rogal & Snider, 2008) that students must solve. They are directed to explore problem situations to find gaps in their knowledge and skills. Based on that gap, they determine the information theymust obtain to

resolve and manage the situation they face (Major et al., 2004).

A classroom environment and an intense learning process under the teacher's guidance are needed to increase the effectiveness of students learning to find, formulate, and solve problems(Munir et al., 2018). With such a learning process, it allows students to ask questions and discuss the problems they face. For this reason, the learning process experienced by students, where students do several jobs at home, must be changed to be at school. The appropriate modelfor this purpose is the flipped classroom model (Blair et al., 2016), which is a learning model that transforms traditional learning systems by changing the classroom environment and learning process (Estrada et al., 2019). The change in the classroom environment in question is to make the classroom environment a place to deepen students' mastery of the required abilities. In contrast, the process of studying conceptual material is carried out at home or outside structured lesson hours.

A flipped learning pattern requires students to explore subject matter independently, using teaching materials prepared by the teacher and those obtained by themselves (Estrada et al., 2019). Thus students are accustomed and trained to have the ability to find sources of information that can be used to solve problems.

RESEARCH METHODS

The research was carried out using research and development methods with the Gall and Borg model (Walter R. Borg, 1983). This research is a follow-up research. Previous research has been done by producing a Problem-Based Flipped Learning model. However, the research series has only reached the stage of formative evaluation in the form of an expert review (Khaerudin, 2022). This study continued the model development process until the one-to-one and small-group formative evaluation stage. One-to-one and small-group formative evaluations were conducted by testing the model in class 7D of junior high school "Labschool" Cirendeu, South Tangerang City. In the one-to-one stage, three respondents were interviewed, consistingof 2 men and one woman. At the end of the trial activity, several students were interviewed.

Meanwhile, in the small-group stage, there were 13 respondents, seven men, and six women. The instrument used is the form of a questionnaire with an attitude scale. The data obtained from the formative evaluation are used as a reference in revising the model.

RESEARCH AND DEVELOPMENT RESULTS

The Pedal Tere learning model was successfully constructed based on a theoretical study on the flipped classroom, problem-based learning, and the DO-IT model. This model is an integration of the three models. Through this model, it is expected that the learning that occurs meets the following characteristics.

A. The learning process that occurs allows students to:
1. study and explore the material in his style
2. perform interactive and collaborative activities (synchronous and asynchronous)
3. acquire knowledge and skills through a progressive set of contextual problems, togetherwith learning materials and instructor support
4. Solve problems by using their knowledge and skills

5. learn to solve problems systematically and creatively, starting with the process of problem analysis and identification of facts relevant to the problem
6. Utilizing various learning resources when dealing with incomplete information, multi-interpreted questions such as unstructured case studies
7. Mastering problem-solving skills, creative thinking, teamwork, effective communication,time management, research, and computing

B. A learning process that allows for multi-way interactions (student-teacher, student-student, student-other learning resources) that encourage the development of student's creative thinking skills;

C. The learning process that positions the teacher as a facilitator, and

D. The learning process is student-centered, giving students great responsibility to complete and share their work and requiring them to think more creatively.

Pedal Tere Learning Model Syntax

The Pedal Tere learning model is a Problem-Based Plipped Learning model seen from the aspect of the learning stages. The problem-based flipped learning model is a learning model that has systematic learning process stages. This model has the following syntax: Early Learning, Main Learning, and Final Learning (Khaerudin, 2022). In Early Learning, students are asked to learn the subject matter by using teaching materials in the form of videos, also called the "Learn" stage. In Main Learning, students learn to solve problems to deepen and, atthe same time, practice applying the concepts learned previously. There are two main activitiesat this stage: the "Deep" and "Apply" stages. At the Final Learning stage, students are conditioned to do "Reflection," an activity to review what they have done and simultaneously strengthen the learning experience they got that day. In addition, at the Final Learning stage, "Evaluation" activities are also carried out to measure the learning process's success. Based onthe stages of activities carried out in this syntax, this model is also named the "Pedal Tere" learning model, which stands for in Learn, Deepen, Apply, Reflect, and Evaluate.

Formative Evaluation Results

Students and teachers carried out one-to-one and small-group formative evaluations. From theone-to-one evaluation by students, the information is summarized as follows.

1. The activities are engaging, challenging, and demanding.

2. In group work, the discussion is required. However, there is a slight problem during group work, and some friends do not watch videos. They become passive.

3. There are differences of opinion related to the problems that are followed, and to equalize opinions on the material watched.

4. If it is carried out continuously, it will lead to more confidence, communication skills, and more independence to learn. Moreover, the important thing is that watching the material at home saves time when learning in class, can focus more on practice, and when there are difficulties, the student can ask the teacher.

5. Not too challenging to think. Stress a little.

6. At the time of reflection, write down what is learned, express thoughts

Meanwhile, formative evaluation in the form of a small group was carried out in class 7D of junior high school "Labschool" Cirendeu, which was attended by 13 students consisting of 7 male and six female students. They were asked to fill out a questionnaire consisting of 15 statements describing the characteristics of the Pedal Tere learning model. The students were asked to state their attitude based on experience following the lesson using the Pedal Tere model. The results of distributing questionnaires in the context of small-group evaluation are as follows.

	PERCENTAGE (%) ATTITUDE OFRESPONDENTS				
Statement Number	Strongly agree	agree	uncertain	Disagree	Strongly Disagree
By following the Tere Pedal Learning model…					
1. allows me to study independently	46,2	38,5	7,7	7,7	0,0
2. encourage me to learn interactivelyand collaboratively	69,2	30,8	0,0	0,0	0,0
3. it helps me to learn to solve problems contextually	46,2	46,2	7,7	0,0	0,0
4. allows me to utilize previously acquired knowledge and skills to solve problems	53,8	38,5	7,7	0,0	0,0
5. allows me to learn to recognize and formulate problems (Define)	61,5	30,8	7,7	0,0	0,0
6. allows me to learn attitudes and waysof thinking more open (Open)	69,2	30,8	0,0	0,0	0,0
7. allows me to learn to identify various possible solutions to the problem at hand	61,5	38,5	0,0	0,0	0,0
8. allows me to learn to formulate and present the results of my studies(transform)	38,5	53,8	7,7	0,0	0,0
9. allows me to have teamwork, time management, self-confidence, and knowledge construction skills	69,2	23,1	7,7	0,0	0,0
10.allows me to interact more with the teacher and classmates in class	76,9	15,4	0,0	7,7	0,0
11.requires me to take advantage of various learning resources, both those prepared by the teacher and lookingfor myself	61,5	30,8	7,7	0,0	0,0
12.requires me to complete and share learning outcomes with friends	53,8	38,5	7,7	0,0	0,0
13.encourage me to continue to developmy creative thinking	84,6	15,4	0,0	0,0	0,0
14.makes me more enthusiastic to learn	61,5	15,4	15,4	0,0	7,7
15.I can follow the Learning Model ofPedal Tere well, even though it requires digital-based facilities and infrastructure	38,5	53,8	0,0	7,7	0,0

The data above shows all statements that indicate the characteristics of the Pedal Tere model are recognized (Agree and Strongly Agree) have been felt and experienced by students during learning with the Pedal Tere model, with a percentage above 76.9% or if the average reaches 92,8%. These statements are statements 1, 10, 14, and 15. Even statements number 2, 6, 7, and 13 were acknowledged by all students (100%). Meanwhile, those who disagree (Disagree and Strongly Disagree) with some of the statements above are relatively small, only 7.7% or one person out of 13 respondents.

Of the four statements agreed upon by all students (100%), three are directly related to the development of creative thinking, namely statements 6, 7, and 13. Agreeing with statement number 6 means that students feel the learning process of attitudes and a more open way of thinking. Meanwhile, statement number 7 shows that students experience a learning process that allows them to have the ability to identify and provide solutions to the problems they face. Likewise, statement number 13 is more explicit that the learning has encouraged them to thinkcreatively.

Meanwhile, the information obtained from the teachers can be summarized as follows.

1. The process of uploading videos is technically no problem; initially, there were concerns that the video needed to be watched by students.

2. There is no problem in making plans because it only changes slightly in the formulation of learning activities.

3. In learning, problems occur when children do not watch. Some students asked for the video to be played again. So it is not because of the syntax. It can be overcome by reminding them to watch the day before the class schedule.

4. If learning with this model is continued, the student's competence will develop better. Activities at home make it possible to become independent learners because they have to take notes on the material they deem necessary. This model also allows students to have the ability to collaborate and get used to giving assessments of friends objectively.

5. Other teachers argue that there are indications that students are becoming independent learners, especially during the transformation stage and when they are studying at home (watching videos). Among them, share tasks, interactive and collaborative. It can be seen from their answers that they allow creative thinking. They are free to express opinions until what the teacher does not think of becomes something they think of.

6. Active student activities are also seen during discussions. This condition allows for an increase in creative abilities because, at that time, students express opinions and solutions to the problems they face, and they express different opinions.

7. This model requires students to be disciplined, such as self-study. In other words, the model social system must be met.

8. The reaction principle also occurs when there is an opinion activity between students.

9. This model is not complex but relatively simple. If teachers get used to it, it can be a fun model. From the students' side, they are happy to follow and more challenged.

10. There are indications that students learn independently during the transformation stage. Also, what happens when they study at home (watching videos).

11. Among them, share tasks interactively and collaboratively. It can be seen from their answers that they allow creative thinking. They are free to express their opinions until whatthe teacher does not think of turns out to be thought of by them.

12. The social system is quite fulfilled because the discipline aspect still needs to be fulfilled. However, at the reflection stage, the student realized that if some of their friends did not watch, it would impact difficulties during discussions.

13. The required support system is manageable too. Just a matter of time before watching the video.

Observing the data and information obtained through one-to-one and small-group formative evaluations, it can be concluded that developing the Pedal Tere model has been completed. It is because there is no longer any significant negative information or opinion from respondents. It means that there is no longer any part of the Pedal Tere model that has to be revised.

Thus, this model already has and shows the learning steps: integrating the flipped classroom model, problem-based learning, and the DO-IT approach. At the same time, if used continuously, this model will likely develop students' creative thinking skills.

DISCUSSION

The Pedal Tere learning model, constructed based on theoretical studies, is expected to have several characteristics, including enabling students to solve problems creatively using their knowledge and skills. This characteristic is evident from the results of the formative evaluation, which shows that most students (92.3%) state that the Pedal Tere learning model encourages them to have problem-solving skills by utilizing previously acquired knowledge (flipped). Thisfinding is in line with the opinion of Dochy, F et al. (2003), who examined the effect of the PBL model on the possibility of habituation of students having problem-solving abilities (Liu et al., 2019). The characteristics of the Pedal Tere learning model above were also supported by all students (100%) who stated that they were conditioned to be open-minded learners and could develop creative thinking skills. This condition is in line with the findings of Kani Ulger(2018), who states that open learning that conditions students to be accustomed to solving non- routine problems allows the development of creative thinking (Ulger, 2018).

Another characteristic confirmed in the formative evaluation is that the Pedal Tere learning model, in which the stages apply the flipped model, allows students to carry out interactive andcollaborative activities (synchronous and asynchronous). All students (100%) agreed upon thischaracteristic and acknowledged that the Pedal Tere learning model enabled them to become interactive, collaborative learners. It is also in line with the findings of Taotao Long, John Cummins, and Michael Waugh (2017), which state that the flipped learning model can improve collaborative learning skills (Long et al., 2017)

Meanwhile, the characteristics of the Pedal Tere learning model that allow multi-way interactions (student-teacher, student-student, student-other learning resources) that encouragethe development of student's creative thinking skills are supported by empirical facts which

show that most students (92.3%)) stated that the Pedal Tere learning model they followed allowed them to interact with teachers and fellow students, as well as take advantage of various learning resources, both prepared by the teacher and self-searched. This condition is in line with the opinion of Deborah E. Allen et al (1996), which states that in problem-based learning,the teacher is not the only source of learning for students; on the other hand, the teacher is only a motivator who encourages students to explore various learning resources (Allen et al., 1996)

CONCLUSION

The Pedal Tere learning model is a learning model that has a Learn, Deepen, Apply, Reflect, and Evaluate syntax. This model is the result of integrating the problem-based learning model, the flipped classroom, and the DO-IT model. The integration of the strengths of each of these models makes the Tere Pedal Learning model an alternative model that can be used to stimulateand develop creative thinking skills. The Pedal Tere learning model has characteristics that allow students to have advantages, especially in creative thinking. These characteristics have been tested through formative evaluations which show as many as 100% of students stated thatfollowing the Pedal Tere Learning model allows them to learn attitudes and ways of thinking more openly, identify various possible solutions to the problems they are facing, and develop creative thinking.

Henceforth, this model needs to be followed up with a summative evaluation to test the model's effectiveness in achieving learning objectives and improving students' creative thinking.

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