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Implementation of Whimsical Application Using Project Based Learning Model Integrated Flipped Classroom in Improving Student Self Efficacy

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Abstract

This study aimed to investigate how well whimsical applications with a project-based learning approach combined with a flipped classroom can raise student self-efficacy in educational digital psychology courses. This research is an experimental research with two sample groups, namely the experimental class which is given the effectiveness of applying the whimsical application using the project-based learning model integrated with the flipped classroom and the control class by applying project-based learning without using the whimsical application. A questionnaire was utilized in this study's data collection method to get information regarding students' self-efficacy both before and after the project-based learning model integrated flipped classroom was applied with whimsical apps. Hypothesis testing conducted in the study using independent-samples t test. The study's conclusion is that raising student self-efficacy in the educational digital psychology course can be achieved by the wacky use of the project-based learning model linked with the flipped classroom.

Keywords: Flipped Classroom; Project Based Learning; Self Efficacy; Whimsical

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1. Introduction

The rapid development of technology and information makes the delivery of learning activities from primary to tertiary levels must adapt to the times. As science and technology advance, it becomes easier and faster to deliver the necessary information (Fuldiaratman & Ekaputra, 2023). or learning activities to be adequately carried out, lecturers and students must adapt in order to carry out active learning, use interactive learning material, and use learning models. Students' ability to adapt to existing technology is very important (Falah et al., 2023). Adaptability makes learning more meaningful (Haryanto et al., 2023).

The implementation of monotone learning makes students bored and learning is less meaningful. Improving the quality of learning to achieve overall educational goals is needed, especially after the covid-19 pandemic (Hardiansyah et al., 2021). The implementation of learning that is carried out face-to-face makes students more accomplished, because students will find it easier to understand the material delivered by lecturers (Ramadhan et al., 2022). Researchers are attempting to increase the significance of learning through the implementation of the flipped classroom-project-based learning model in instructional activities.

A learning technique known as "flipped classroom" reverses the order of activities in the classroom and at-home assignments for the students (Rahmadani et al., 2022). The application of the flipped classroom learning model in learning activities is expected to make students have the opportunity to study lecture material from home, so that they will be better prepared to participate in learning activities. The positive impact of learning activities with the flipped classroom learning model is the provision of prior knowledge from home (Agustina & Naphiah, 2021). The use of the flipped classroom model can affect the improvement of science literacy (Pane & Dewi, 2022).

Observations made at students of the Chemistry Education Study Program at Jambi University show that students only know the material that will be studied in class, so that many students who take lectures have not prepared or

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studied the material that will be obtained during lectures. Lack of student preparation in attending lectures can make understanding of the material limited. Material concepts that are not maximally understood can lead to misconceptions of the actual material (Dewi et al., 2022). The solution to the problem of students' ignorance of the lecture material to be studied is to apply the flipped classroom learning model. Lectures that do not involve direct learning to students make learning less meaningful, so it is necessary to apply a project-based learning model to activate students in learning activities. The integration of the project-based learning model is expected to be a solution found in the field to improve student understanding and involvement in lecture activities. Combining the flipped classroom learning model with the project-based learning model can make students more active in participating in learning and increase collaborative attitudes between students (Ruiz et al., 2019).

The results of observations and interviews also show that the application of media in delivering material such as power point media that is communicated by writing makes students tend to be bored and less interested in attending lectures. One of the efforts to prevent student boredom in lecture activities is to apply media in the form of whimsical applications which are still rarely used, especially by lecturers at the Jambi University Chemistry Education Study Program. Whimsical is a visual collaboration application that makes it possible to easily create diagrams, flowcharts and wireframes. Learning can be conveyed in the form of concept maps and flowcharts, so that it can affect student learning achievement (Setiawan et al., 2021). This study challenge will center on the use of a project-based learning paradigm integrated with a flipped classroom using the Whimsical application in educational digital psychology courses.

2. Literature Review

2.1. Intergation of Project-based learning with Flipped Classroom

The combination of flipped classroom and project-based learning model can provide students with meaningful learning experiences and active participation in learning activities and discussions, thus reducing the possibility of student learning disabilities. An inventive teaching strategy that can engage students in learning activities and improve comprehension while learning is the adoption of the project-based learning model in conjunction with the flipped classroom learning model (Kamaruddin et al., 2022). According to Andrini et al. (2019), the project-based learning approach emphasizes student-centered learning, fosters robust group debates, and ensures that learning activities are dynamic. Students must collaborate with one another to develop answers to real-world problems as part of the project-based learning model's design process (Guo et al., 2020). The utilization of the project-based learning approach fosters the growth of creativity, communication skills, and interdisciplinary teamwork abilities (Warr & West, 2020).

2.2. Self Efficacy

Self efficacy is a person's belief in being able to overcome certain problems (Utami & Helmi, 2017). Self efficacy is an important component in determining a person's learning outcomes, because a person's perseverance and motivation can be influenced by their self-belief (Jatisunda, 2017). Low student confidence or confidence can be caused by several factors such as a low level of understanding of lecture material. The higher the understanding of the material taught will have a positive impact on self-efficacy and student learning outcomes. Self-confidence or student self-efficacy is closely related to student learning outcomes (Ekaputra & Asmiyunda, 2023).

3. Research Method and Materials

This study employs an experimental design with two sample groups: the experimental class, which is given the project-based learning model integrated with the flipped classroom application of whimsical application, and the control class, which applies project-based learning without the use of whimsical application. In order to gather data for this study, a questionnaire was utilized to compare the self-efficacy of students before and after they applied quirky applications that combined the project-based learning model with the flipped classroom. The study used the independent-samples t test for hypothesis testing. Next, the questionnaire's pre-learning findings are examined for homogeneity and normalcy. A parametric test using an independent-samples t test is used to assess the study hypothesis if the test results indicate that the sample class is normal and homogeneous. The use of whimsical

applications utilizing project-based learning paradigms integrated with flipped classrooms is successful in raising student self-efficacy if the results of the hypothesis test are less than 0.05.

4. Results and Discussion

The initial activity in this study was to distribute questionnaires to students before the application of the whimsical application using the project-based learning model integrated with the flipped classroom in the experimental class and the control class by applying project-based learning without using the whimsical application. The purpose of filling out the questionnaire by students at the beginning of the research activity is to find out the self-efficacy of students in both sample classes. The initial self efficacy data is presented in Table 1.

Table 1. The Initial Self-Efficacy Data

Class	Experiment Class	Control Class
Planning learning activities	75.00	69.05
Monitoring learning activities	73.81	72.62
Concentration in learning	75.00	70.24
Accepting suggestions	75.00	73.81
Independence	75.00	76.19
Motivation to learn	77.38	72.62
Learning contextual material	76.19	73.81
Responsibility for tasks	64.29	72.62
Confidence in ability	73,81	73,81
Using good and correct language	64.29	77.38
Making notes on material from home	69.05	73.81
Asking questions during discussion	72,62	69,05
Responding to questions	69.05	72.62
Presenting the results of the discussion well	70.24	64.29
Using illustrations in explaining the material	67,86	67,86
Helping friends in understanding the material	65,48	69,05
Skills to ask classmates	67,86	70,24
Skills to ask the lecturer	66,67	70,24
Ability to find effective ways to learn	72.62	67.86
Understanding of the material	73.81	67.86
Ability to study material effectively	76.19	75.00
Creating questions as discussion material	75,00	71,43
Ability to find answers to tasks	73.81	70.24
Understanding of the task	73.81	70.24
Problem solving skills	75.00	69.05
Average	71.95	71.24

Based on the initial self-efficacy data in Table 1, the experimental class obtained an average value of 71.95 and the control class of 71.24. These results are classified as low because there are several indicators that score less than 70 in both the experimental and control classes, such as the indicator of using illustrations in explaining the material and helping friends in understanding the material. Low self-efficacy ability shows that students are less involved in the learning process, such as not asking questions in the presentation activities carried out, not studying lecture material to the maximum, and not being actively involved in group discussion activities. This can be due to their low self-esteem and the low opportunities given to develop their abilities in completing a given project. Low self-efficacy will consider itself unable to do everything around it and easily give up on the tasks given (Lubis et al., 2018). The low initial self-efficacy results possessed by students, especially those taking educational digital psychology lectures, indicate the need for an effort to increase student self-efficacy. Efforts made in this study to increase student self

efficacy are focused on applying the application of the whimsical application using the project-based learning model integrated with the flipped classroom in the experimental class.

The project-based learning model applied in this study is because the project-based learning model facilitates and gives students the freedom to explore and develop their abilities with their group members to complete the assigned tasks. Learning with a project-based learning model makes students involved in complex learning, giving students freedom of expression when learning to explore lesson information and when creating projects (Indrawati et al., 2022). The application of the flipped classroom model can make students more prepared in participating in lecture activities, because they have studied the material before learning in class. The application of a flipped classroom can increase students' self-efficacy and readiness to participate in learning (Ekayana et al., 2021). The whimsical application that is applied can make it easier for students to learn the material because it contains a concept map of the lecture material.

Initial self efficacy data that has been obtained, then carried out a normality test. The initial normality test findings indicate that the experimental class has a significance value of 0.100, whereas the control class has a value of 0.117. Because it is more than 0.05, the results of the normality test indicate that the research data from the sample class is regularly distributed, allowing the homogeneity test to be conducted. The initial self-efficacy data from the sample class originates from homogenous data, as indicated by the homogeneity test results, which have a significance value of 0.138, or greater than 0.05.

After obtaining the initial self efficacy data, the application of whimsical application using project-based learning model integrated with flipped classroom and project-based learning without using whimsical application in the control class. Based on the results of the application of the whimsical application in the experimental class, it shows that students are more actively involved in learning and easier to understand the material provided. This is due to the advantages of whimsical applications that can present concept maps more interesting. The whimsical application makes it easy to visualize a concept and has powerful features (Sari et al., 2024). Students look more prepared in participating in lecture activities, because the project-based learning model integrated with the flipped classroom is applied in learning activities in the sample class. The possibility for student learning loss can be decreased by combining the flipped classroom and project-based learning models to give students relevant learning experiences and encourage them to participate actively in class discussions and activities (Ekaputra & Sanova, 2023).

At the end of the fourth meeting, students were asked to fill out the final self efficacy questionnaire again. The final self efficacy questionnaire aims to determine whether there is a change in self efficacy in the experimental and control classes. The final self efficacy results are presented in Table 2.

Based on the results of the final self efficacy questionnaire, the average self efficacy in the experimental class was 89.43, which means that there was an increase in self efficacy of 17.42. These results indicate that self efficacy in both sample classes has increased. The increase in self efficacy in the experimental and control classes was due to the fact that both classes applied the project-based learning model. This is in accordance with the research of Alhazizah et al. (2019) which states that the project-based learning model has an effect on increasing students' self-efficacy. Students in the experimental class experienced a higher increase than the control class, because the experimental class not only applied the project-based learning model but also used whimsical applications and implemented a flipped classroom model. This is reinforced by the results of the final self efficacy questionnaire in the experimental class with results above 90 on several indicators. The highest value is in the indicator of the ability to find effective learning methods of 96.43. This can be caused by the whimsical application and the flipped classroom model applied in the sample class. The whimsical application which contains a concept map of lecture material can make students easy to understand each submaterial and learning outcome. The application of the flipped classroom model provides an opportunity for students to study the material to be studied at home, so that students have readiness to learn in class and can search from various references from material that has not been understood. Flipped classroom is a procedure reversal learning model that is oriented towards learning outcomes by referring to student learning activities, so that it can facilitate students to learn according to the way they consider easy (Mubarok, 2017).

Table 2. The Final Self-Efficacy Data

Class	Experiment Class	Control Class
Planning learning activities	88.10	86.90
Monitoring learning activities	83.33	78.57
Concentration in learning	80.95	79.76
Accepting suggestions	84.52	79.76
Independence	85.71	79.76
Motivation to learn	88.10	80.95
Learning contextual material	89.29	76.19
Responsibility for tasks	90.48	84.52
Confidence in ability	89.29	83.33
Using good and correct language	94.05	78.57
Making notes on material from home	88.10	78.57
Asking questions during discussion	86.90	80.95
Responding to questions	85.71	78.57
Presenting the results of the discussion well	91.67	82.14
Using illustrations in explaining the material	89.29	83.33
Helping friends in understanding the material	89.29	85.71
Skills to ask classmates	92.86	79.76
Skills to ask the lecturer	91.67	88.10
Ability to find effective ways to learn	96.43	78.57
Understanding of the material	92.86	80.95
Ability to study material effectively	95.24	78.57
Creating questions as discussion material	94.05	79.76
Ability to find answers to tasks	90.48	79.76
Understanding of the task	88.10	78.57
Problem solving skills	89.29	79.76
Average	89.43	80.86

The final student self-efficacy levels for both the experimental and control groups were then compared using an independent-samples t test. 0.00 was the significant value found in the independent-samples t-test results. Since the results of this study are less than 0.05, it can be concluded that raising student self-efficacy through the use of humorous applications combined with a project-based learning paradigm and flipped classroom is successful. Students will learn more and have more opportunities for group discussions when the project-based learning model and the flipped classroom model are used (Yahya et al., 2020). flipped classroom- project-based learning model has a positive correlation with critical thinking skills (Ekaputra, 2023). Students' critical thinking skills can be improved using the project-based learning model in learning (Sungkono & Ekaputra, 2023). The increase in critical thinking in this study is evidenced by the increase in learning activities carried out. Increasing students' critical thinking skills in learning is in line with increasing students' self-efficacy. Critical thinking ability has a correlation with self-efficacy (Prajono et al., 2022). The conclusion of this study is that the application of whimsical applications using a project-based learning model integrated with a flipped classroom is effective in increasing student self efficacy.

5. Conclusion

In this study, self efficacy in the experimental and control classes experienced an increase, because both sample classes were given the application of a project-based learning model that could involve students directly, thereby increasing learning activities and self efficacy. Students in the experimental class experienced a higher increase than the control class, because the experimental class not only applied the project-based learning model but also used whimsical applications and implemented a flipped classroom model. This can be caused by the whimsical application and flipped classroom model applied in the sample class. The whimsical application which contains a concept map of lecture material can make students easy to understand each submaterial and learning outcome. The application of the flipped classroom model provides an opportunity for students to study the material to be studied at home, so that students have readiness to learn in class and can search from various references from material that has not been understood. Learning using the whimsical application using the project-based learning model integrated with the flipped classroom can involve students directly and make learning more interesting. In this study, it was concluded that the application of whimsical applications using a project-based learning model integrated with a flipped classroom was effective in increasing student self-efficacy, as evidenced by the results of the independent-samples t test of 0.00. The magnitude of the benefits and influence of the whimsical application using the project-based learning model integrated with the flipped classroom in learning activities, researchers hope that the use of similar media and learning models can be used in lecture activities, so that the improvement of students' cognitive abilities and skills has increased.

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