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# The Effectiveness of the Guided Discovery Learning Model and Project-Based Learning in the Digital Beauty Design Course

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**Abstract**

This study aims to look at the effectiveness of the Guided Discovery Learning (GDL) and the Project-Based Learning (PjBL) model in terms of learning achievement, self-confidence, and students' critical thinking skills in the Digital Beauty Design course. This type of research is quasi-experimental. The subjects of this study were two classes of students from the Department of Cosmetology and Beauty Education, Padang State University who were randomly selected. Data analysis to test the effectiveness of the GDL model and PjBL model in terms of each dependent variable using the t test. While the data analysis technique to test the difference between the effectiveness of the GDL model and the PjBL model uses the MANOVA test. The results showed that, in terms of learning achievement, self-confidence, and students' critical thinking skills, it is known that the application of the GDL model in the Digital Beauty Design course is effective, the application of the PjBL Model in the Digital Beauty Design course is effective, and there is no difference in the effectiveness of the GDL model and the PjBL model. in the Digital Beauty Design course.

## A. Introduction

The impact of the industrial revolution era 4.0 requires a change in both teaching and learning. This is intended to produce graduates who are ready to enter society with qualified and highly competitive individual skills. The process of learning and teaching in the development of science and technology is increasingly encouraging renewal efforts in the use of technology in learning (Sari et al., 2022)[1]. Actually learning is a process that helps students to obtain information, ideas, skills, values, ways of thinking, and ways of learning how to learn. Learning must really pay attention to student involvement, especially student activity while participating in these learning activities. Learning problems in the lecture process are still found to be attainment that is not optimal or on a satisfactory scale. It was found that students' activeness and creative thinking skills were still relatively low (Sari & Angreni, 2018)[2]. The reasons include choosing an inappropriate learning model and learning activities that are fully carried out in class only or follow-up only to fulfill the completion of lecture activities. Therefore, a pattern or learning model is needed that can increase students' activeness and creative thinking abilities (Siswanto, 2018)[3].

Meanwhile, one of the important materials studied by students of the Department of Makeup and Beauty Education, Padang State University is Digital Beauty Design. Digital Beauty Design is a course that aims for students to be able to make a plan in designing in the world of digital beauty which requires the application of the basic concepts of beauty in the form of appropriate proportions in order to display an idea or work which can then be implemented and applied in a beauty display. Applying the right learning model is one of the strategies in learning to increase student learning activities so that the process can be effective and efficient (Syahputra et al., 2019)[4]. Selection of a learning model that is in accordance with curriculum objectives and student potential is a basic ability and skill that must be owned by an educator. Education and teaching in the lecture process are required to make a breakthrough in improving the quality of education (Kurniawati et al., 2022)[5].

Based on theoretical studies, there are various learning models that are thought to be suitable for student characteristics and are thought to be effective for increasing student learning achievement, self-confidence, and critical thinking skills, including the Guided Discovery Learning (GDL) model and Project Based Learning (PjBL). According to Astuti & Warlinda(2023)[6] in general the steps for learning activities in the GDL model are: (1) stimulation (providing information stimulation); (2) problem statement (problem identification), (3) data collection (data collection); (4) data processing (data processing); (5) verification (re-examination); and (6) generalization (conclusion).

The results of research conducted by Putri & Nugraheni (2022)[7] show that the GDL model can improve students' problem-solving skills, where problem-solving skills are a type of higher-order thinking skills. In addition, the results of research by Andromeda et al., (2023) show that the GDL model is effective in terms of student learning achievement. In addition, the results of Lutfiadi & Zawawi's research (2022)[8] support the study of the theory of this research which predicts that the application of the GDL model is effective in terms of student self-confidence, especially in indicators related to student independence.

Meanwhile, according to Made et al., (2022)[9] in general the steps of the PjBL model are: (1) the pre-project stage (planning project alternatives along with project supporting matters); (2) stage 1: identify the problem (Identify the problem and formulate the problem); (3) stage 2: design and project implementation schedule; (4) stage 3: carrying out preliminary research (finding the best specifications for the product to be made); (5) stage 4: compiling a product draft/prototype; (6) stage 5: evaluating and improving the product (presentation and evaluation of the products that have been made); (7) stage 6: product finalization and publication (product improvement and publication); and (8) the post-project stage (assessment of students' mastery of concepts).

Wicaksana & Sanjaya (2022)[10] explain that in addition to being able to improve students' skills in solving problems, the PjBL model can also improve student learning achievement as measured by tests. The results of research by Nasution et al., (2022)[11] show that the PjBL model improves student achievement and attitudes. Other research that supports the theoretical study of this research is research conducted by Yudidana & Sari (2022)[12], whose results show that the PjBL model is effective in terms of conceptual knowledge aspects. The effectiveness of the learning model in this study was reviewed from achievement, self-confidence, and critical thinking skills students of the Department of Makeup and Beauty Education, Padang State University in the Digital Beauty Design course.

In theory, there are several characteristics similar to GDL, PjBL and PBL (Problem Based Learning). The three learning models emphasize learning activities that can facilitate students to be able to construct their own understanding. Therefore, research results demonstrating the effectiveness of PBL can be considered relevant to this study. The results of research by Hartono & Aisyah (2022)[13] show that the application of PBL is more effective than the application of conventional learning methods in terms of students' critical thinking skills. That is, the application of a learning model that is equivalent or similar to PBL has the potential to improve students' critical thinking skills.

Until now it has not been known empirically which of the two learning models is the most effective model for increasing learning achievement, self-confidence, and students' critical thinking skills, so this research needs to be done. The purpose of this research is to describe the effectiveness of the GDL and PjBL models, as well as a comparison between the effectiveness of the GDL and PjBL models in terms of learning achievement, self-confidence, and students' critical thinking skills in Digital beauty design courses.

The results of this study are expected to provide experience to researchers in managing lectures characterized by the GDL and PjBL models in Digital beauty design courses. In addition, it is expected to be an example of innovative learning activities at the tertiary level to improve learning achievement, self-confidence, and thinking skills of students of the Department of Cosmetology and Beauty Education who have the same or nearly the same characteristics as the subjects of this study.

## B. Research Method

This type of research is a quasi-experimental. The population of this study were all students of the Department of Cosmetology and Beauty Education, Padang State University class of 2022/2023. The sample of this study were two classes randomly assigned from the four available classes, namely class A and B. Class A which consisted of 58 students received the GDL model treatment while Class B which also consisted of 58 students received the PjBL model treatment. The minimum completeness criterion for PB is a score of 65 out of a maximum score of 100 in the posttest. The minimum completeness criterion for self-confidence is the achievement of good self-confidence criteria, namely a score of 61.21 out of a maximum score of 90. The minimum completeness criterion for critical thinking skills is a score of 65 out of a maximum score of 100 in the posttest. A learning model is said to be effective if the average scores of students in achievement, self-confidence, and critical thinking skills have achieved their respective minimum mastery criteria.

The data collection technique for the learning achievement variable is a test. The data collection instrument is a matter of description according to indicators of achieving competence in the Digital Beauty Design course. Learning achievement measurement tests are given to students in the form of pretest and posttest. The pretest is given before the learning model treatment is given to students while the posttest is given after the learning model treatment is given to students. Pretest and posttest are made based on indicators of achievement of the same competency.

The data collection technique for the self-confidence variable is a questionnaire. The data collection instrument from the questionnaire is a question equipped with answer choices in the form of a Likert scale. Meanwhile, the data collection technique for the critical thinking skills variable is a test. The data collection instrument is a matter of description in accordance with several indicators of competency achievement in the Digital Beauty Design course which requires the use of aspects of critical thinking skills. The critical thinking skills variables are also in the form of pretest and posttest.

The results of the reliability estimation of learning achievement test instruments, self-confidence questionnaires, and tests of critical thinking skills are based on the test results as follows.

**Table 1.** Instrument Reliability Estimation

| No | Instrument | Reliability | Mean |
|---|---|---|---|
| 1 | Pretest learning achievement | 0,671 | 2,11 |
| 2 | Posttest learning achievement | 0,623 | 2,16 |
| 3 | Self confidence | 0,778 | 3,83 |
| 4 | Pretest critical thinking skills | 0,56 | 1,21 |
| 5 | Posttest critical thinking skills | 0,56 | 1,29 |

Table 1 shows that the pretest learning achievement, posttest learning achievement, and self-confidence instruments have achieved high enough reliability criteria so that they are suitable for use in research. Meanwhile, the pretest of critical thinking skills and the posttest of critical thinking skills had not

yet reached a sufficiently high reliability criterion, so improvements were made so that they were suitable for use in research.

Meanwhile, the results of the content/construct validation of the research tools showed that the research tools, including the research instruments, were appropriate for use after being revised according to suggestions from the valodator. In addition, the results of construct validation based on the Total Variation explained table, there are 6 factors of self-confidence variables and are able to measure 74.622% of the variance for these variables.

The data analysis technique used in this research is descriptive and inferential analysis. Descriptive analysis to describe the situation before and after giving treatment to the two classes in terms of each of the dependent variables. Inferential analysis is carried out to draw conclusions based on the data that has been obtained during the research process. This inferential analysis consists of an effectiveness test and a comparative test of the learning model used.

Learning achievement, self-confidence, and critical thinking skills measurement results are described by comparing their average scores with the minimum completeness criteria set out in this study. The minimum completeness criteria for learning achievement and critical thinking skills are adjusted to the minimum completeness criteria that have been set for students of the Department of Cosmetology and Beauty Education, Padang State University, namely a grade of C or a score of 65. Meanwhile, the criteria for assessing self-confidence in this study were made by the researcher as follows.

**Table 2.** Self Confidence Assessment Criteria

| No | Score Intervals | *Criteria* |
|---|---|---|
| 1 | 75, 6 < X | Very high |
| 2 | 61,2 < X ≤ 75,6 | Tall |
| 3 | 46,8 < X ≤ 61,2 | Enough |
| 4 | 32,4 < X ≤ 46,8 | Low |
| 5 | X ≤ 32,4 | Very low |

## C. Result and Discussion

This research was carried out by giving a pretest to the two groups of research subjects, namely Class A and B. The pretests in question were the learning achievement, self-confidence, and critical thinking skills pretests. Furthermore, the Guided Discovery Learning model was applied for seven meetings in Class A and the Project Based Learning model was also applied for seven meetings in Class B. The observations showed that the researchers had succeeded in implementing both learning models well, namely more than 80%. Meanwhile the results of the pretest and posttest of the research subjects are as follows.

**Table 3.** Class Means

| Variable Bound | GDL | | Pjbl | |
|---|---|---|---|---|
| | Pretest | Posttest | Pretest | Posttest |
| Learning Achievement | 47,84 | 86,97 | 54,31 | 85,28 |
| Self Confidence | 60,66 | 62,78 | 61,72 | 62,69 |
| Critical Thinking Skills | 15,34 | 71,98 | 20,69 | 73,88 |

From Table 3 it can be seen that the application of the two learning models can improve student learning achievement, self-confidence, and critical thinking skills in the Digital Beauty Design course. After the assumptions of multivariate normality and homogeneity are fulfilled, the following are the MANOVA test results on the results of the research subject's pretest presented in Table 4.

**Table 4.** MANOVA Two-Group Test Results

| Test Statistics | Value | F | Sig. |
|---|---|---|---|
| *Hotelling's Trace* | 0,066 | 2,470 | 0,066 |

Table 4 shows that the F value is 2.470 and the significance value is 0.066. Because of the significance value, 0.066 > 0.05, it can be concluded that there was no difference in initial abilities (learning achievement, self-confidence, and critical thinking skills) between the two groups of study subjects before the GDL model and PjBL model treatment.

After the assumptions of multivariate normality and homogeneity are fulfilled, the following are the results of the t-test on the posttest results of the research subjects or the effectiveness test of each learning model in terms of each dependent variable which is presented in Table 5.

**Table 5.** Results of the Effectiveness Test of Each Model

| Group | Variable | t | Sig. |
|---|---|---|---|
| GDL | Learning Achievement | 14,698 | 0,000 |
| | Self Confidence | 1,765 | 0,041 |
| | Critical thinking Skills | 3,340 | 0,000 |
| PjBL | Learning Achievement | 12,560 | 0,000 |
| | Self Confidence | 1,963 | 0,027 |
| | Critical thinking Skills | 3,661 | 0,000 |

Table 5 shows that each sig. of each dependent variable in both the GDL and PjBL treatment models <0.05, it can be concluded that each learning model is effective in terms of each dependent variable. Meanwhile, the following are the results of the MANOVA test on the posttest results of the research subjects presented in Table 6.

**Table 6.** MANOVA Two-Group Test Results

| Test Statistics | Value | F | Sig. |
|---|---|---|---|
| *Hotelling's Trace* | 0,010 | 2,380 | 0,768 |

Table 6 shows that the F value is 0.380 and the significance value is 0.768. Due to the significance value, 0.768 > 0.05, it can be concluded that there is no difference in the effectiveness of the GDL and PjBL models in terms of students' learning achievement, self-confidence, and critical thinking skills. The results of data analysis showed that there were no differences in initial abilities (learning achievement, self-confidence, and critical thinking skills) between the two groups of study subjects before the GDL and PjBL models were treated. This is presumably because the two research subject groups (Class A and B) have been formed randomly by the Department of Cosmetology and Beauty Education, Padang State

University. This is also expected because the two groups of research subjects received almost the same experience when attending lectures in the Digital Beauty Design course, both in terms of the material and in terms of the tests carried out for the course.

In terms of material, the learning resources used by the two groups of research subjects were in the form of the same modules and teaching materials. Based on the applicable curriculum at Padang State University, it is known that the Digital Beauty Design course is a prerequisite and mandatory course in the Department of Makeup and Beauty Education. In terms of tests, the midterm exam questions and semester exams for the Digital Beauty Design course made by several lecturers supporting the course are validated by the same person, namely the scientific person in charge of the Digital Beauty Design course, so that the indicators to be achieved through the test and the level of difficulty relatively the same. These two reasons are expected to have a large impact on the absence of differences in the initial abilities of the two groups of research subjects.

The results of the data analysis show that the GDL model is effective from a student's learning achievement perspective. This is expected because there are phases of the GDL model that facilitate students to be able to master and understand the concept of Digital Beauty Design. In Phase 2, namely the Open Phase, the Lecturer guides students through questions on the Student Activity Sheet which directs students to find the information needed to find a concept. In Phase 3, namely the Convergent Phase, the lecturer guides students to use the information obtained to find a concept. In Phases 2 and 3, the lecturer only provides guidance as needed, so that students play a major role in constructing their own understanding of a concept. By constructing their own understanding, the concept lasts longer in the minds of students.

In addition to these two phases, there are other phases that are also thought to influence student mastery of the material or beauty design concepts that have been studied, namely Phase 4. In Phase 4 or Closing and Implementation Phase, there are activities in which students take individual tests, and this activity carried out at each meeting. These activities make students accustomed and trained to do the assignments given. These three phases are expected to have a major impact on the effectiveness of the GDL model in terms of student learning achievement (Allo & Sebayang, 2019)[14].

The results of the data analysis show that the GDL model is effective in terms of self-confidence students. This is expected because there are phases of the GDL model which can increase student confidence. In Phase 2, namely the Open Phase, the lecturer guides students through questions at the Student Activity Sheet so that students are able to complete assignments given regarding matters related to Digital Beauty Design that are being studied. This activity is carried out in every meeting, so students are accustomed or trained to express their opinions. In addition, in Phase 4, namely the Closing and Implementation Phase, as previously explained, students are trained to make designs in digital beauty design courses. This is also expected to increase student confidence in the assignments made. These two phases are expected to have a major impact on the effectiveness of the GDL model in terms of student self-confidence (Coendraad, 2021)[15].

The results of the data analysis show that the GDL model is effective in terms of the student's critical thinking skills. This is consistent with the results of research conducted by Nalurita & Jamaluddin (2021)[15] which shows that the GDL model can improve students' problem-solving skills, where problem-solving skills and critical thinking skills are both types of higher-order thinking skills.

In addition, this is expected because there is a GDL model phase that can train students' critical thinking skills. In Phase 2, namely the open phase, as previously explained, the lecturer guides students through questions on the Student Activity Sheet, which questions require a student critical thinking skills. These questions train students to be able to judge the truth of things related to the concepts being studied. This phase is expected to have a major impact on the effectiveness of the GDL model in terms of student critical thinking skills, although it does not rule out the possibility that other phases that affect students' mastery of beauty design concepts or materials also have a positive impact on students' critical thinking skills.

The results of the data analysis show that the PjBL model is effective from a student's learning achievement perspective. This is in accordance with the results of the research by Misidawati & Sundari (2021)[16] which shows that the learning model is effective from the aspect of conceptual knowledge. In addition, this is expected because there are phases of the PjBL model which facilitate students to be able to master and understand the concept of beauty design. In Phase 4, namely the Information Gathering and Processing Phase, students collect the information needed to understand the concepts being studied as well as to be able to carry out projects. The lecturer provides the sources of information needed or can also be in the form of activities at the Student Activity Sheet so that students can collect and process information at the same time. Although not as many as the phases of the GDL model that have a positive impact on student achievement, the reality shows that Phase 4 of the PjBL model is able to have a positive impact on the effectiveness of the PjBL model in terms of student achievement.

The results of the data analysis show that the PjBL model is effective in terms of self-confidence students. This is expected because there are phases of the PjBL model that can increase students' self-confidence. In Phase 2, namely the Problem Identifying Phase, the lecturer provides activities at the Student Activity Sheet so that students are able to choose and design projects to work on according to their abilities. This is expected to be able to train students' confidence in their abilities, choose projects according to their wishes, as well as be responsible for the projects that have been chosen. In addition, in Phase 6, which is the phase of assessing and improving the product, students present the products they have made in front of their class mates. In this activity, students are required to be accountable for their products.

Furthermore, in Phase 7, namely the Product Finalization and Publication Phase, the Lecturer provides opportunities for students to improve their products if there are still deficiencies. This activity trains students to keep trying to improve their products so they can be better. These three phases are expected to have a major impact on the effectiveness of the PjBL model in terms of self-confidence students.

The results of the data analysis show that the PjBL model is effective in terms of student critical thinking skills. This is expected because there is a PjBL model phase that can train students' critical thinking skills. In Phase 2, namely the Problem Identifying Phase, as previously explained, in this activity, students try to identify the problems given by the lecturer, then choose the best project to solve the problem. In this activity students are trained to use their critical thinking skills to determine the best course of action to solve a problem. The results of this data analysis are supported by theoretical studies conducted by Antika & Nawawi (2017)[17].

The results of the data analysis showed that there was no difference in the effectiveness of the GDL model and the PjBL model in terms of students' learning achievement learning achievement, self-confidence, and critical thinking skills. This conclusion contradicts the results of the theoretical study and the results of the descriptive analysis which favor the PJBL model. This is expected due to some research limitations. One of them is that although the GDL model Student Activity Sheet and the PjBL model Student Activity Sheet have been made according to the phases of each of these models, the material content remains the same, that is, comes from sources of knowledge or information from the same Digital Beauty Design module. The results of the data analysis show that the different phases of the implementation of the two models are not able to make the effectiveness of the two models significantly different. Although there is no difference in the effectiveness of the two models, the results of data analysis show that the GDL and PjBL models are equally effective in terms of student learning achievement, self-confidence, and critical thinking skills. Thus the two models are feasible to be applied in Digital Beauty Design lectures and to students who have characteristics equivalent to students who are the subject of this research.

## D. Conclusion

The results showed that, in terms of learning achievement, self-confidence, and students' critical thinking skills, it is known that the application of the GDL model in the Digital Beauty Design course is effective, the application of the PjBL model in the Digital Beauty Design course is effective, and there is no difference in the effectiveness of the GDL model and the PjBL model. in the Digital Beauty Design course.

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