The Influence of Project-Based Learning Model on Visual Communication Design Learning Outcomes of Students at State Vocational School 1 Kotamobagu

Harry Septian Laute[1]*, Harrychoon Angmalisang[1], Hiskia K, Manggopa[1], Parabelem Tinno Dolf Rompas[1]

[1]Department of Master Vocational Technology Education, Graduate Program, Universitas Negeri Manado, Indonesia

*Corresponding author: ari.septianlaute1991@gmail.com

ABSTRACT

This study aims to determine the effect of implementing the Project-Based Learning (PjBL) model using the Kodular application on the creativity and learning outcomes of 11th-grade DKV 1 students in the Fundamentals of Visual Communication Design subject at SMKN 1 Kotamobagu. This study used a quantitative approach with a quasi-experimental design involving two groups: a control class and an experimental class, each with 20 students (a total of 40 students). The research instrument was tested for validity and reliability, with all items declared valid (r count 0.338–0.794 > 0.312) and reliable (Cronbach's Alpha 0.917). The descriptive analysis results showed an increase in the average pretest and posttest scores in the experimental class from 42.5 to 83.5, while in the control class, the score increased from 41 to 80.5. The normality test showed that the data were normally distributed (Sig. 0.227 and 0.731), while the homogeneity test showed that both groups had homogeneous variances (Sig. 0.214 and 0.331). The t-test indicated a significant effect of the Project-Based Learning (PjBL) model on learning outcomes, with a sig. 0.000 and a calculated t of 9.811. The F-test yielded an F-value of 96.259 with a significance level of 0.000, indicating that the model simultaneously influenced learning outcomes. The determination test obtained an R-square value of 0.717, indicating that the model explained 71.7% of the variation in learning outcomes. This study concludes that the implementation of Project-Based Learning (PjBL) using Kodular effectively improves student creativity, learning motivation, and learning outcomes in the Visual Communication Design subject.

166

The Influence of Project-Based Learning Model on Visual Communication Design Learning Outcomes of Students at State Vocational School 1 Kotamobagu
Harry Septian Laute, Harrychoon Angmalisang, Hiskia K, Manggopa, Parabelem Tinno Dolf Rompas

Keywords: Creativity, Kodular, Learning Motivation, Learning Outcomes, Project-Based Learning, Visual Communication Design.

INTRODUCTION

Currently, the teaching of Visual Communication Design skills in vocational high schools tends to focus on achieving material targets according to the curriculum or textbooks used as mandatory textbooks, rather than on understanding and mastering the material being studied. Based on researchers' observations in class during the learning process, students tend to memorize the concepts of the Basics of Visual Communication Design, often by repeating definitions given in textbooks, without understanding their meaning and content. Furthermore, teachers' habit of exclusively using the lecture method in learning activities results in students being passive. This lack of variety in learning can lead to student boredom. Furthermore, the still-standard classroom learning environment leads to ineffective learning and quickly leads to student boredom. This inevitably leads students to view the subject of the Basics of Visual Communication Design as extremely boring and tedious. This ultimately contributes to low student achievement.

One of the problems in teaching the Basics of Visual Communication Design is that the subject of Visual Communication Design skills is generally known as a subject that studies techniques that require specialized skills in the field of Design and Visual Communication. Monopolizing the role as a source of information, resulting in a lack of varied methods that can engage students. In studying Visual Communication Design, students are constantly faced with boredom due to uninteresting and monotonous teaching materials and methods. The packaging of Visual Communication Design learning materials is determined by the learning strategies implemented by the teacher. There are several factors that cause learning failure in the Basics of Visual Communication Design subject. When faced with problems in Visual Communication Design, for example, not a few students are able to solve them. This is because students only receive the lessons given but do not know how to use the knowledge they have gained. Students have difficulty determining what to do to solve the problems contained in the questions. This shows a lack of student understanding of the material given.

METHOD

Research Approach

The type of research used in this study is quantitative research with a quasi-experimental approach. This approach was chosen because the research was conducted in a real classroom setting where the researcher could not fully control all external variables, but still desired different treatments between the experimental and control groups. This study aimed to determine the effect of implementing the Project-Based Learning (PjBL) model based on the Kodular application on student creativity and learning outcomes in the Fundamentals of Visual Communication Design (DDDKV) subject in grade XI DKV 1 at SMKN 1 Kotamobagu (Istiatin & Sudarwati, 2021).

The research design used was a Pretest–Posttest Control Group Design, involving two groups: the experimental class, which received treatment in the form of PjBL implementation using the Kodular application, and the control class, which used a conventional learning model. Both groups

were given a pretest to determine students' initial abilities, then a posttest after the learning process to measure changes and improvements in student learning outcomes and creativity (Caroline, 2019).

Research Location and Subjects

The research was conducted at SMK Negeri 1 Kotamobagu, specifically in the Visual Communication Design (DKV) expertise. The research is scheduled for the current semester of the 2025/2026 academic year, spanning the preparation, implementation, and data analysis stages.

Population and Sample

The population in this study was all eleventh-grade students in the Visual Communication Design (DKV) Expertise Program at SMKN 1 Kotamobagu during the academic year of the study. This population was selected because all groups shared characteristics relevant to the Fundamentals of Visual Communication Design (DDDKV) learning material and followed a uniform curriculum and learning process.

Overall, the study population consisted of two classes:
- Class XI DKV 1
- Class XI DKV 2

The sample was selected using a purposive sampling technique, which is based on specific considerations tailored to the research needs. These considerations include similar student characteristics, equitable student numbers, and a uniform learning process in the subjects studied.

In this study, both classes were selected as samples, with the following divisions:

1. Class XI DKV 1 served as the experimental class, which received treatment in the form of the Project Based Learning (PjBL) learning model based on the Kodular application.
   Number of students: 20
   Treatment: Implementation of PjBL using the Kodular application to produce a simple application-based design project.
2. Class XI DKV 2 served as the control class, receiving learning using the conventional model/lecture and practice.
   Number of students: 20
   Treatment: Not using Kodular, only following the regular learning method.

The use of two equivalent classes allowed researchers to objectively compare learning outcomes and creativity between the group receiving the Kodular-based PjBL treatment and the group receiving no treatment. Both classes were also given pretests and posttests to comprehensively measure student improvement.

Thus, the population and sample in this study met the requirements of equality, relevance, and representativeness, enabling scientifically sound research results.

Data Collection Techniques

The data collection techniques in this study were conducted using several complementary methods to ensure the data obtained were valid, reliable, and reflected the actual situation. The techniques used were as follows:

1. Tests (Pretest and Posttest)

168

Tests were used to measure student learning outcomes before and after the implementation of the Project Based Learning (PjBL) model based on the Kodular application.

a. The pretest was administered before the lesson to determine students' initial abilities in the Fundamentals of Visual Communication Design (DDDKV) subject.

b. The posttest was administered after the lesson to determine improvements in student learning outcomes after participating in the PjBL model.

Pretest and posttest scores were then compared to determine learning outcomes using the N-Gain calculation and tested using the t-test to identify significant differences.

2. Questionnaire (Student Creativity Questionnaire)

The questionnaire was used to measure students' creativity levels during the learning process. The questionnaire contained statements reflecting indicators of creativity, such as the ability to generate new ideas, originality of work, courage to try new things, and the ability to solve problems creatively. The measurement scale used was a Likert scale with five response options (Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree). The questionnaire data was then analyzed to determine the relationship between the implementation of the PjBL model and increased student creativity.

3. Observation

Observations were conducted directly during the learning process to observe student activities, engagement in group discussions, and their ability to design projects using the Kodular application. The observation results supported the questionnaire and test data, while also providing a qualitative overview of the effectiveness of the learning model implementation.

4. Documentation

Documentation was used to supplement research data by collecting documents such as student attendance lists, photos of learning activities, and project results completed by students using the Kodular application. This documentation data served as visual evidence and support in the analysis of the research results.

Research Instruments

Research instruments are the tools used by researchers to collect the necessary data. In this study, the instruments used included:

1. Learning Outcome Test Instrument

This test was designed based on competency achievement indicators in the Basics of Visual Communication Design subject. The test consisted of multiple-choice and short essay items that measured students' conceptual abilities regarding the material being taught.

Before use, the instrument was tested for validity and reliability:

a. Validity Test: All test items had a calculated r value > r table (0.312), thus declared valid. Example of validity test results:

X1 = 0.493 > 0.312 (valid), X9 = 0.794 > 0.312 (valid).

b. Reliability Test: The calculation results showed a Cronbach's Alpha value of 0.917, indicating that the instrument's reliability is in the very high category, thus making the instrument reliable and consistent for use.

169

2. Student Creativity Questionnaire Instrument

   The questionnaire was designed to measure aspects of student creativity, including originality, flexibility, elaboration, and idea fluency. The instrument consists of 10 questions with a Likert scale of 1–5.

   Example indicators:
   a. Students' ability to generate new ideas in design (originality).
   b. Ability to transform design concepts into visual forms (elaboration).
   c. Courage to try new ideas in project development (flexibility).

   The questionnaire was tested for validity and reliability, and the results showed that all items were valid and reliable.

3. Observation Instrument

   Observation sheets were used to assess student activities during project-based learning. Aspects observed included participation, teamwork, responsibility, and independence in completing project assignments. Observation results were used as supporting data to strengthen the questionnaire and test results.

4. Documentation Instrument

   The documentation instrument included collecting evidence of activities in the form of photos, videos, student design work, and learning activity notes. These documents were used to strengthen the description of the research findings.

Data Analysis Techniques

Data analysis techniques are a crucial step in research, transforming raw data into meaningful information that can answer research questions and test hypotheses. In experimental research involving the Project-Based Learning (PjBL) model, data analysis is conducted using two types of analysis: descriptive analysis and inferential analysis.

RESULTS AND DISCUSSION

This research was conducted at SMK Negeri 1 Kotamobagu, located in Kotamobagu City, North Sulawesi Province. SMK Negeri 1 Kotamobagu is one of the largest and most accredited vocational high schools in the region, offering a variety of competencies focused on technology, business, and the creative industry.

SMK Negeri 1 Kotamobagu's vision is to "produce graduates who are competent, have character, are creative, and are ready to compete in the world of work and technological developments in the industry." This vision is realized through competency-based learning, the use of adequate learning resources, and the strengthening of students' practical skills.

1. **Visual Communication Design (DKV) Expertise Program**

   The Visual Communication Design (DKV) expertise program is one of the school's flagship areas. The DKV expertise program emphasizes students' understanding of design principles, visual communication, creativity, and technical skills in creating works such as posters, logos, brochures,

170

illustrations, and other graphic media. The learning process is expected to produce graduates who are ready to work in the creative industries, advertising, printing, and digital media.

2. Supporting Facilities and Infrastructure

To support Visual Communication Design (DKV) learning, the school provides comprehensive facilities, including:

a. A Computer Design Laboratory with computers equipped with graphics software such as Adobe Illustrator, Photoshop, and CorelDraw.
b. A design studio where students can practice both manual and digital drawing.
c. LCD projectors and multimedia equipment in each classroom.
d. A student work exhibition space to display the results of their design projects.

These facilities enable teachers and students to implement practice-centered learning models, including the Project-Based Learning Model, the focus of this study.

3. Learning Conditions

Based on initial observations, learning in the Visual Communication Design subject tends to be dominated by conventional methods such as lectures, basic demonstrations, and assignments. This results in some students being less active, underdeveloped in creativity, and uneven learning outcomes.

Given these conditions, the implementation of the Project-Based Learning Model is deemed relevant for optimizing student engagement, enhancing visual creativity, and boosting their learning outcomes through hands-on experience in completing design projects.

4. Subjects and Learning Environment

The subjects in this study were 11th-grade students in the Visual Communication Design (DKV) Expertise Program, who generally have a strong interest in visual arts and graphic technology. The supportive school environment, competent teachers, and adequate facilities make SMK N 1 Kotamobagu an ideal place to implement project-based learning.

Pretest and Posttest Results

In this study, a pretest was administered before the learning process to determine students' initial abilities, while a posttest was administered after the treatment using different learning models in the control and experimental classes. The pretest and posttest results were then analyzed to determine improvements in learning outcomes and compare learning effectiveness.

Pre-test results

A pretest was administered to 40 students, consisting of 20 students from the control class and 20 students from the experimental class. Pretest scores provide an initial overview of students' abilities before receiving the learning treatment. See table 1.

Table 1. Pre-test result

Statistics	Control	Exsperimental
Maximum Value	70	70

171

Minimum Value	30	20
Average	42,5	41

Post-test Results

The post-test was administered to 40 students, consisting of 20 in the control class and 20 in the experimental class. Post-test scores provide an initial overview of student abilities before receiving the learning treatment. See table 2.

Table 2. Post-test result

Statistics	Control	Exsperimental
Maximum Value	100	100
Minimum Value	70	70
Average	83,50	80,50

The posttest results showed that both the control and experimental classes had the same maximum score, namely 100, and the same minimum score, namely 70. However, the average score of the control class was 83.50, slightly higher than the experimental class which had an average of 80.50. This average difference indicates that although both classes achieved the same range of final scores, the control class achieved slightly higher learning outcomes overall after the learning took place.

CONCLUSION

Based on the results of the research conducted on the application of the Project-Based Learning (PjBL) model using the Kodular application on the creativity and learning outcomes of 11th-grade DKV 1 students in the Fundamentals of Visual Communication Design subject at SMKN 1 Kotamobagu, the following conclusions can be drawn: 1. The application of the PjBL model using the Kodular application has been proven to significantly improve student learning outcomes. This is demonstrated by an increase in the average score from a pretest of 41 to a posttest of 80.5, representing an increase of 39.5 points. The t-test showed a t-value of 9.811 with a significance of $0.000 < 0.05$, indicating a significant effect of the PjBL model on learning outcomes. The N-Gain value of 0.67 also indicates an increase in learning effectiveness in the medium-high category. 2. The PjBL model effectively explains 71.7% of the improvement in student learning outcomes. Based on the determination test (R Square = 0.717), it was found that the PjBL learning model using Kodular contributed 71.7% to changes in student learning outcomes, while the remaining 28.3% was influenced by other factors such as individual motivation, the learning environment, and learning resources. 3. The research instrument was proven reliable and valid. A Cronbach's Alpha value of 0.917 indicated a very high level of instrument consistency. The normality test (Shapiro–Wilk) showed the data were normally distributed (Sig. 0.227 and 0.731). The data were also homogeneous (Sig. pretest 0.214, posttest 0.331) and there was no multicollinearity (Tolerance 1.000, VIF 1.000). 4. PjBL significantly enhanced students' visual creativity. Through the application development project activities in Kodular, students were directly involved in the creative thinking process, selecting design elements, arranging layouts, and producing

172

digital visual works. This activity demonstrated improved design skills, originality, and problem-solving abilities in students. 5. The Project-Based Learning (PjBL) model motivated students to be more active in the learning process. Observations and student responses indicated that the use of Kodular made students more enthusiastic, engaged in group discussions, and fostered a greater sense of curiosity. This is consistent with the results of the F-test (F = 96.259, significant 0.000), which indicated a significant impact of the overall learning model. Overall, this study demonstrates that the implementation of the Project-Based Learning model using the Kodular application significantly improves student creativity, motivation, and learning outcomes in the Fundamentals of Visual Communication Design subject.

Recommendations

Based on the research results and field findings, the following suggestions can be made:

1. For Teachers
   a. Teachers are advised to continue developing the Project-Based Learning (PjBL) model in Visual Communication Design (DKV) learning, as it has been proven effective in improving students' conceptual understanding and creativity.
   b. The use of the Kodular application can be used as an alternative digital learning medium that is easy for students to understand and supports project-based learning.
   c. Teachers need to provide more intensive guidance to students who lack a grasp of programming logic to ensure project quality is maintained.
2. For Schools
   a. Schools need to provide advanced training for teachers on the use of digital applications such as Kodular, Canva, Figma, and other design software to support creative learning.
   b. Computer laboratory facilities need to be improved to ensure optimal implementation of project-based learning.
3. For Students
   a. Students are expected to continue developing their creative thinking skills and visual design abilities through exploration of other digital applications.
   b. Students need to increase their active participation in group discussions, collaboration, and presentations to ensure project-based learning delivers optimal results.
4. For Future Researchers
   a. Research is expected to be conducted with additional variables such as learning interest, intrinsic motivation, or higher-order thinking skills (HOTS).
   b. Research can be expanded to other subjects in vocational or other expertise programs to assess the effectiveness of Project-Based Learning (PjBL) in various contexts.

REFERENCES

Amalia, I. R., & Dewi, N. R. (2024). Analysis of the Problem-Based Learning Model to Improve Students' Critical Thinking. PRISMA, Proceedings of the National Mathematics Seminar, 7, 281–289. https://proceeding.unnes.ac.id/prisma

Amelia, N., & Aisya, N. (2021a). The project-based learning model and its application to early childhood at TK IT Al-Farabi. BUHUTS AL ATHFAL: Journal of Education and Early Childhood Education, 1(2), 181–199.

Amelia, N., & Aisya, N. (2021b). The project-based learning model and its application to early childhood at TK IT Al-Farabi. BUHUTS AL ATHFAL: Journal of Education and Early Childhood Education, 1(2), 181–199.

Cahyani, V. D., & Pranata, O. D. (2023). A Study of Students' Science Learning Activities at SMA Negeri 7 Kerinci. Lensa (Lentera Sains): Journal of Science Education, 13(2), 137–148.

Damayanti, N. A. (2024). The Role of Teachers in Determining Project-Based Learning (PjBL) Models in Lower Grades: An Effort to Increase Students' Interest in Learning at School. Journal of Elementary School Teacher Education, 1(2), 14–14.

Dewi, A. C., Yahya, M., & Darmawang, D. (2022). The Effectiveness of Project-Based Learning Models in Vocational Learning Planning Courses. Jurnal Konsepsi, 11(2), 373–379.

Dewi, S. (2023). Application of Project-Based Learning Models to Improve Learning Outcomes. PTK: Jurnal Aksi Kelas, 3(2), 204–215.

Elendiana, M., & Prasetyo, T. (2021). The Effectiveness of the NHT Learning Model and the STAD Learning Model on Creative Thinking Skills in Thematic Learning. Jurnal Educatio FKIP UNMA, 7(1), 228–237. https://doi.org/10.31949/educatio.v7i1.932

Fadilah, L. N., A. R., M. M., & Armadi, A. (2025). The Effectiveness of the Project-Based Learning Model Containing Cambodian Culinary Ethnoscience Student Worksheets on Critical Reasoning Skills in Phase B of Elementary Schools. JIIP-Jurnal Ilmiah Ilmu Pendidikan, 8(1), 435–445.

Fariza, N. A., & Kusuma, I. H. (2024a). Implementation of the project-based learning model in enhancing elementary school students' creativity. Pubmedia Indonesian Journal of Classroom Action Research, 1(3), 10.

Fariza, N. A., & Kusuma, I. H. (2024b). Implementation of a project-based learning model to enhance elementary school students' creativity. Pubmedia Indonesian Journal of Classroom Action Research, 1(3), 10.

Fatah, A. (2023). Implementation of a Project-Based Learning Model or Project-Based Learning (PJBL) Through Creative Posters in Online Learning on Global Warming to Improve Scientific Communication Skills. Amerta Journal of Social Sciences and Humanities, 3(2), 45–54.

Gapur, S. S. N., & Ekohariadi, E. (2024). Design and Construction of Website-Based Learning Material Curation with Project-Based Learning to Improve Logo Design Competence in the Visual Communication Design Basics Subject for Grade X DKV Students at SMKN 6 Surabaya. IT-Edu: Journal of Information Technology and Education, 9(1), 137–146.

Ginon, J., & Setiawan, K. (2021). Implementation of Project-Based Learning in Creative Entrepreneurship Lectures in the Visual Communication Design Study Program. Socio E-Kons, 13(3), 261–269.

Heydemans, J. M. R., Palilingan, V. R., & Pajung, K. K. M. (2024). Implementation of a Project-Based Learning Model to Improve Learning Outcomes of Visual Communication Design Fundamentals

174

in Grade X Visual Communication Design Students at SMK Citra Bangsa Jakarta. Edutik: Journal of Information and Communication Technology Education, 4(4), 368–380.

Hikmah, H., Qodir, A., & Wahdah, N. (2022). Learning Activities and Learning Motivation: Are They Effective in Developing Students' Islamic Religious Education Learning Outcomes. Al-Thariqah Journal of Islamic Religious Education, 7(2), 340–358.

Ikhsan, A. N. (2025). The Effect of a Project-Based Learning Model Using the Canva Application on Students' Islamic Religious Education Interest and Learning Outcomes: A Study in Grade VIII of SMP PGRI Cisewu.

Imamuddin, Y., & Prasetya, D. D. (2024). Integration of Mobile Technology for Basic Graphic Design Learning: Development of a Project-Based E-Module for Vocational High Schools. Decode: Journal of Information Technology Education, 4(1), 138–153.

Ismail, S. (2022). "The Effect of Using the Project-Based Learning Model on Physics Learning Outcomes of Grade X Science Students at SMA Negeri 35 South Halmahera on the Concept of Straight Motion." Wahana Pendidikan Scientific Journal, 8(5), 249–255.

Iswantari, I. (2021). Implementation of a project-based learning model to improve science learning outcomes. Jurnal Paedagogy, 8(4), 490–496.

Kahar, L., & Ili, L. (2022). Implementation of project-based learning to improve student learning activities. Orient: Cakrawala Ilmiah Mahasiswa, 2(2), 127–134.

Kiranadewi, D. F., & Hardini, A. T. A. (2021). Comparison of the Effectiveness of Problem-Based Learning Models with Problem-Solving Models on Critical Thinking Skills in Civics Learning. Journal for Lesson and Learning Studies, 4(1), 1. https://doi.org/10.23887/jlls.v4i1.33860

Kristanto, Y. D. (2021). Training in designing digital mathematics learning activities using Desmos. Journal of Community Service, 27(3)