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The Implementation of Canva-Based Barcode Learning Media to Improve Learning Outcomes on Local Wisdom Material Using the PJBL Model at SMA Negeri 1 Mojotengah, Wonosobo

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ABSTRACT

This study aims to analyze the effectiveness of using barcode-based instructional media through the Canva application in improving students' learning outcomes on local wisdom material at SMA Negeri 1 Mojotengah. The research employs a descriptive quantitative approach with the Project-Based Learning (PJBL) method. By utilizing interactive instructional media, students can access information more flexibly and actively engage in the learning process. The findings indicate that the implementation of barcode-based instructional media using Canva enhances students' understanding and appreciation of local wisdom while promoting more innovative and collaborative learning. Thus, this model effectively supports the Merdeka Belajar (Independent Learning) concept and can serve as an alternative in developing technology-based teaching methods.

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1. INTRODUCTION

The rapid development of information and communication technology over the past decade has had a significant impact on various aspects of life, including the field of education. The integration of technology in the learning process is crucial to creating a more interactive, engaging, and effective learning experience. One emerging innovation is the use of barcode-based teaching media integrated with graphic design applications such as Canva. This approach allows students to access learning materials flexibly through digital devices, thereby increasing their engagement and understanding of the subject matter.

The implementation of teaching media based on local wisdom in the education curriculum plays an essential role in preserving culture and traditional societal values. Research by Ali et al. (2024) shows that teaching materials incorporating local wisdom effectively enhance students' understanding of scientific concepts and their critical thinking skills [1]. Similarly, studies by Widiyawati et al. (2023) and Wilujeng et al. (2024) affirm that a learning approach based on local wisdom can create more meaningful learning experiences, enabling students to relate acquired knowledge to their daily lives [2].

On the other hand, the use of graphic design applications such as Canva in creating learning media has been proven to improve student learning outcomes. A study conducted at SMPN 2 Labuapi revealed that the use of Canva media significantly enhanced the learning outcomes of Grade VII C students, with visually appealing

and interactive displays that increased their interest and motivation to learn [3]. Additionally, other studies indicate that the use of Canva in learning can foster students' creativity in understanding and presenting learning materials [4].

The Project-Based Learning (PJBL) method is a learning approach that emphasizes assigning projects to students to solve real-world problems, encouraging them to be active and creative in the learning process. Research shows that the application of the PJBL model assisted by Canva media can improve students' learning outcomes in Pancasila Education subjects [5][6]. This suggests that combining the PJBL method with technology-based learning media can create a more effective and enjoyable learning environment for students. In the context of SMA Negeri 1 Mojotengah, the implementation of barcode-based teaching media through the Canva application in local wisdom material is expected to contribute positively to improving students' learning achievements.

Through this approach, students not only gain knowledge about local wisdom but also develop the technological skills and creativity needed to face 21st-century challenges. Furthermore, this learning model aligns with the Merdeka Belajar (Independent Learning) concept, which emphasizes flexibility and independence in the educational process, allowing students to learn according to their interests and abilities. Thus, this study aims to analyze the effectiveness of using barcode-based teaching media through the Canva application in improving students' learning outcomes on local wisdom material at SMA Negeri 1 Mojotengah.

The findings of this study are expected to provide insights and recommendations for educators and educational institutions in developing innovative learning methods that integrate technology and local wisdom to enhance the quality of education in Indonesia.

2. METHOD OF THE RESEARCH

2.1 Research Approach and Design

This study employs a descriptive quantitative approach to analyze the effectiveness of using barcode-based teaching media through the Canva application in improving students' learning outcomes. The quantitative approach was chosen because it allows for an objective measurement of the impact of technology-based teaching media on students' learning outcomes using numerical data analyzed statistically [7]. The research design used is a quasi-experimental design with a pretest-posttest control group model. This design enables the study to compare the differences in learning outcome improvements between the experimental group, which uses barcode-based teaching media, and the control group, which employs conventional learning methods [8].

Table 1. Treatment and Group Division Table.

Group	Pretest	Treatment	Posttest
Experiment	Yes	Barcode-based teaching media (Canva)	Yes
Control	Yes	Conventional method	Yes

2.2 Population and Sample

The population in this study consists of all 11th-grade students at SMA Negeri 1 Mojotengah during the 2023/2024 academic year. The sample was selected using purposive sampling, choosing two classes with a balanced number of students based on academic achievement, learning motivation, and engagement in learning. Each class consists of 30 students, bringing the total research sample to 60 students. The sample selection ensures that the research results reflect real conditions in the school environment [7].

2.3 Research Instruments

The instruments used in this study include:

1. **Learning Outcome Test.** The pretest and posttest consist of multiple-choice questions that have been tested for validity and reliability. The questions cover cognitive aspects, such as understanding local wisdom concepts, application in daily life, and information analysis and synthesis.
2. **Student Response Questionnaire.** The questionnaire uses a Likert scale (1–5) to measure students' perceptions of barcode-based teaching media. The questionnaire indicators include accessibility, engagement in learning, and effectiveness in understanding the material.
3. **Observation.** Observations were conducted by teachers and researchers to record students' engagement levels during learning. The observation rubric includes indicators of participation in discussions, interaction with the material, and the use of teaching media.

All instruments were tested for validity using the Pearson Product Moment validity test and reliability using Cronbach's Alpha test to ensure a good level of consistency [9].

2.4 Research Procedure

This research was conducted in three stages:

1. **Preparation Stage.**

Development of barcode-based learning materials using the Canva application. Validation of learning materials by media and subject matter experts to ensure the quality of the materials. Testing of test instruments and questionnaires on students outside the research sample to ensure question clarity and data reliability.

2. **Implementation Stage.**

Pretest. An initial test was given to the experimental and control groups to assess students' prior understanding of local wisdom material.

3. **Treatment.**

The experimental group learned using Canva-based barcode media for four weeks. The control group learned using conventional methods, such as lectures and discussions, without interactive digital media. Teachers facilitated the learning process in both groups to ensure consistency in material delivery.

4. **Posttest.**

After completing the learning process, a posttest was given to both groups to measure learning improvement. The test results were compared to evaluate the effectiveness of the learning methods used.

5. **Data Analysis Stage.**

Pretest and posttest data were analyzed to determine students' comprehension improvement. The questionnaire was analyzed using descriptive statistics to describe students' responses to barcode-based teaching media. Observation results were analyzed qualitatively to assess student engagement levels in technology-based learning.

2.5 Data Analysis Techniques

Data analysis was conducted using the following statistical techniques:

1. **Normality Test.** The Kolmogorov-Smirnov test was used to ensure data distribution was normal before further statistical analysis [10].
2. **Homogeneity Test.** The Levene test was used to ensure variance equality between the experimental and control groups.
3. **T-Test (Independent Sample T-Test).** This test was used to determine whether there was a significant difference in learning outcomes between the experimental and control groups after the treatment [11].
4. **Descriptive Analysis.** Used to describe students' responses to barcode-based teaching media, including effectiveness in understanding the material and learning motivation.

Additionally, observational data were analyzed using qualitative descriptive analysis techniques to explore patterns of student engagement in technology-based learning.

2.6 Research Ethics

This study adhered to the following ethical considerations:

1. **Informed Consent.** Data were obtained from schools, teachers, and students' parents before the research was conducted.
2. **Confidentiality of Student Data.** Data confidentiality was maintained by anonymizing student identities in the research report.
3. **Research Objectivity.** Objectivity was maintained by using statistical methods in data analysis to avoid bias.
4. **Sustainability Principle.** The sustainability principle was applied by providing recommendations for schools regarding the future implementation of barcode-based teaching media.

3. RESULTS AND DISCUSSIONS

3.1 General Overview of Research Results

This study aims to analyze the effectiveness of using barcode-based teaching media through the Canva application in improving students' learning outcomes in local wisdom material at SMA Negeri 1 Mojotengah. Data were obtained through pretests and posttests in the experimental and control groups, as well as questionnaires and observations to assess student engagement in learning. After the treatment was applied, there was an increase in learning outcomes in the experimental group that used barcode-based teaching media. Meanwhile, the control group, which still used conventional methods, experienced a lower improvement.

3.2 Comparison of Pretest and Posttest Results

To measure the effectiveness of barcode-based teaching media, a comparison of pretest and posttest results was conducted in the experimental and control groups.

Table 2. Pretest and Posttest Results for Experimental and Control Groups.

Group	Average Pretest	Average Posttest	Improvement (%)
Experimental	65,4	87,2	21,8%
Control	64,9	76,5	11,6%

From the table above, it can be seen that the experimental group experienced an improvement of 21.8%, while the control group only increased by 11.6%. This difference indicates that the use of barcode-based teaching media is more effective in enhancing students' understanding of local wisdom material.

3.3 Normality and Homogeneity Tests

Before conducting the learning outcome difference test, a normality test was performed to ensure that the data were normally distributed, as well as a homogeneity test to determine whether the variance between the experimental and control groups was homogeneous.

1. **Normality Test (Kolmogorov-Smirnov Test).** After conducting the normality test, the results showed a p-value > 0.05, indicating that the data were normally distributed.
2. **Homogeneity Test (Levene's Test).** After conducting the homogeneity test, the results showed that the variance between the two groups did not differ significantly, so the data were considered homogeneous.

Since the assumptions of normality and homogeneity were met, a t-test was then performed to examine the differences in learning outcomes between the experimental and control groups.

3.4 T-Test (Independent Sample T-Test)

The T-test was conducted to determine whether there was a significant difference between the experimental and control groups.

Table 3. T-Test Results.

Statistical Test	Value
t-calculated	4,86
t-table (α = 0,05)	2,00
p-value	0,0001

Since the t-calculated value is greater than the t-table value and the p-value is less than 0.05, it can be concluded that there is a significant difference between the learning outcomes of the experimental and control groups. This confirms that the use of barcode-based instructional media with Canva contributes positively to the improvement of students' understanding.

3.5 Student Response Questionnaire Results

To understand students' perceptions of the use of barcode-based instructional media, a questionnaire was administered using a Likert scale (1-5).

Table 4. Student Response Questionnaire Results (Likert Scale 1-5).

Evaluated Aspect	Average Score (1-5)
Ease of access to materials	4,7
Engagement in learning	4,6
Increased interest in learning	4,5
Ability to understand the material	4,6
Overall learning experience	4,7

Most students gave high scores for ease of access, engagement, and material comprehension, indicating that the barcode-based instructional media greatly helped them learn more effectively and enjoyably.

3.6 Student Engagement Observation Results

During the learning process, observations were conducted to assess student engagement in the experimental and control groups.

1. **Experimental Group.** The experimental group was divided into three subgroups. 80% of students actively accessed learning materials through barcodes. 75% of students actively participated in group discussions. 85% of students showed improvement in completing project-based learning (PBL) tasks.
2. **Control Group.** The control group was divided into three subgroups. 50% of students relied solely on teacher-provided notes. 45% of students were less active in group discussions. 60% of students struggled to understand the material without the aid of interactive media.

These findings indicate that students in the experimental group were more active and engaged in learning compared to those in the control group.

3.7 Research Findings and Implications

Based on the study results, several key findings can be concluded:

1. **Improvement in Learning Outcomes.** The barcode-based instructional media significantly enhanced student learning outcomes compared to conventional methods.
2. **Increased Student Engagement.** Students were more motivated and engaged in technology-based learning compared to traditional lecture-based methods.
3. **Support for the Merdeka Belajar Model.** This learning approach aligns with the Merdeka Belajar (Freedom to Learn) concept, allowing students the flexibility to access learning materials anytime and anywhere.

These findings suggest that schools should consider integrating technology-based instructional media into the curriculum, particularly for subjects requiring deep comprehension and active student participation.

4. CONCLUSIONS

Based on the results of the conducted research, it can be concluded that the use of barcode-based teaching media through the Canva application has proven to be effective in improving students' learning outcomes in local wisdom material at SMA Negeri 1 Mojotengah. Students who learned using this media showed a more significant improvement in their understanding of the material compared to those who used conventional methods. Additionally, barcode-based learning also increased student engagement and motivation, as they could access the material more flexibly and interactively.

This aligns with the Merdeka Belajar concept, which provides students with the freedom to determine their learning methods according to their needs and pace. With this technology-based learning innovation, students become more active in exploring the material and more interested in the learning process. Therefore, the use of barcode-based teaching media can be an innovative alternative learning method that supports the effectiveness of education in the digital era.

As a follow-up to this research, it is recommended that teachers and educators actively integrate technology into the learning process, especially in utilizing barcode-based teaching media and design applications such as Canva. Training and workshops for teachers on the use of technology in education are also necessary to ensure they are well-prepared to implement this method optimally. Furthermore, schools are expected to provide support by ensuring adequate infrastructure, such as stable internet access and digital devices that facilitate technology-based learning.

Further research should also be conducted with a broader scope, such as implementing this method at different educational levels or in other subjects. Additionally, studies on the long-term impact of using barcode-based teaching media on students' critical thinking skills, creativity, and problem-solving abilities are important aspects that can be further explored. With more in-depth development, barcode-based teaching media is expected to continue being an innovative solution in enhancing the quality of education in Indonesia.

REFERENCES

Muhammad Afdhaluzzikri: Pemanfaatan Aplikasi Canva sebagai Media Pembelajaran Bahasa Indonesia di SDN Reusak. Universitas Islam Negeri Ar-Raniry Banda Aceh, pp. 1-85 (2023).

Emda, A., Suriana, Mukhlis, & Hanim, N. (2024). Strategi Pembelajaran Berbasis Kearifan Lokal. Jurnal Kolaboratif Akademika, 2(1), 1-11.

Nut Mila, Nuralamsyah, Andi Naila Quin Azisah Alisyahbana, Nur Arisah, Muhammad Hasan: Efektivitas Pemanfaatan Canva sebagai Media Pembelajaran Daring. Prosiding Seminar Nasional Penelitian dan Pengabdian 2021, pp. 181-186 (2021).

Zulkarnaen: Penggunaan Teknologi Canva for Education dalam Meningkatkan Kreativitas Guru dalam Pembuatan Media Pembelajaran: Studi Kasus di MIM Sidokerto. Universitas Muhammadiyah Surakarta, pp. 1-12 (2024).

Mei, Sani Safitri: Efektivitas Model Project Based Learning terhadap Hasil Belajar Siswa di SMAN 2 Kayuagung. Jurnal Parameter, 35(2), pp. 89-98 (2023).

Tina Lisa Edtami, Rizka Andhika Putra, Ahyo Ruhyanto: Pengaruh Metode Pembelajaran Berbasis Proyek (Project Based Learning) terhadap Hasil Belajar Siswa pada Mata Pelajaran Ekonomi di SMA Negeri 1 Kawali. J-KIP (Jurnal Keguruan dan Ilmu Pendidikan), 4(1), pp. 56-61 (2023).

Sugiyono. (2021). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D.* Bandung: Alfabeta.

Creswell, J. W. (2020). *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research (6th ed.).* Pearson Education.

Arikunto, S. (2019). *Prosedur Penelitian: Suatu Pendekatan Praktik.* Jakarta: Rineka Cipta.

Ghozali, I. (2021). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 26.* Semarang: Universitas Diponegoro.

Rahmawati, N., & Kurniawan, R. (2022). *The Effectiveness of Interactive Learning Media in Improving Students' Learning Outcomes.* Journal of Educational Research, 15(2), 45–56.