

# Development of a Problem Based Learning Model Assisted by Wordwall to Improve Creative Thinking Skills

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## Article Info

### Keywords:

Problem Based Learning;  
Wordwall;  
Creative Thinking;  
Creative Economy;  
Equivalency Education.

## ABSTRACT

This study aimed to develop a Problem Based Learning model assisted by the Wordwall application to improve the creative thinking skills of Paket C students in creative economy learning at PKBM Mi'raajul Ummah. This study employed a Research and Development method using the ADDIE model, which consisted of analysis, design, development, implementation, and evaluation stages. The research subjects consisted of 15 eleventh-grade Paket C students. Data collection techniques included observation, interviews, questionnaires, documentation, and creative thinking tests. The results showed that the developed learning model was feasible for implementation based on material expert validation with a percentage of 81.25% and media expert validation with a percentage of 83.3%. The implementation of the learning model was also able to improve students' creative thinking skills, as indicated by the increase in the average pretest score from 7.9 to 12.2 in the posttest, with an N-Gain value of 0.55 in the moderate category. In addition, the questionnaire results showed a student response percentage of 91.1% in the very good category. Therefore, the Problem Based Learning model assisted by Wordwall was able to create more interactive and contextual creative economy learning and support the development of the creative thinking skills of Paket C students.

## Informasi Artikel

### Kata Kunci:

Problem Based Learning;  
Wordwall;  
Berpikir Kreatif;  
Ekonomi Kreatif;  
Pendidikan Kesetaraan.

## ABSTRAK

Penelitian ini bertujuan untuk mengembangkan model Problem Based Learning berbantuan aplikasi Wordwall untuk meningkatkan kemampuan berpikir kreatif peserta didik Paket C pada materi ekonomi kreatif di PKBM Mi'raajul Ummah. Penelitian ini menggunakan metode Research and Development dengan model ADDIE yang meliputi tahap analysis, design, development, implementation, dan evaluation. Subjek penelitian terdiri atas 15 peserta didik Paket C kelas XI. Teknik pengumpulan data dilakukan melalui observasi, wawancara, angket, dokumentasi, dan tes kemampuan berpikir kreatif. Hasil penelitian menunjukkan bahwa model pembelajaran yang dikembangkan layak digunakan berdasarkan validasi ahli materi dengan persentase sebesar 81,25% dan validasi ahli media sebesar 83,3%. Penerapan model pembelajaran juga mampu meningkatkan kemampuan berpikir kreatif peserta didik yang ditunjukkan melalui peningkatan rata-rata skor pretest sebesar 7,9 menjadi 12,2 pada posttest dengan nilai N-Gain sebesar 0,55 dalam kategori sedang. Selain itu, hasil angket menunjukkan respons peserta didik sebesar 91,1% dengan kategori sangat baik. Dengan demikian, model Problem Based Learning berbantuan Wordwall mampu menciptakan pembelajaran ekonomi kreatif yang lebih interaktif, kontekstual, dan mendukung pengembangan kemampuan berpikir kreatif peserta didik Paket C

## Article History

Received : 15/03/2026

Revised : 28/05/2025

Accepted : 21/07/2026

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## 1. Introduction

Education is one of the important aspects in improving the quality of human resources, especially in facing the development of society and the demands of the twenty-first century workforce [1]. Learning in the current era is not only oriented toward mastering subject matter but is also directed toward developing higher-order thinking skills, one of which is creative thinking ability. Creative thinking skills are important because students are required to generate ideas, solutions, and innovations that are relevant to real-life needs, particularly in the field of the creative economy [2]. Creativity is also considered an important skill that needs to be developed through technology-based and problem-solving-oriented learning [3].

Creative thinking ability is part of the twenty-first century skills that need to be developed in the learning process. This ability helps students generate new ideas, find solutions to problems, and develop innovations relevant to their surrounding environment. In economics learning, creative thinking skills are important because students are not only expected to understand economic concepts theoretically but also to develop business ideas and economic opportunities that can be applied in daily life [4], [5].

In the context of Paket C equivalency education, the development of creative thinking skills has high urgency because the characteristics of non-formal education students differ from those of formal school students. Paket C students come from diverse social backgrounds, learning experiences, and economic conditions, requiring more flexible, contextual, and participatory learning approaches. Therefore, learning in equivalency education should not only focus on delivering material but should also be directed toward developing skills relevant to students' daily lives and environments.

One of the relevant materials in economics learning for Paket C is the creative economy. Creative economy material is closely related to the development of creativity, innovation, and students' ability to identify business opportunities within their environment. Pangalengan District, Bandung Regency, has significant creative economy potential, such as coffee businesses, dairy farming, natural tourism, agriculture, and local processed products [6]. This local potential can serve as a contextual learning resource to help students understand

creative economy concepts more concretely and practically. However, this local potential has not been fully utilized in economics learning within equivalency education.

Based on preliminary observations at PKBM Mi'raajul Ummah, the economics learning process was still dominated by lecture methods and conventional learning media. Learning activities had not optimally utilized digital media, causing students to be less active in asking questions, discussing, and expressing opinions. In addition, students still experienced difficulties in generating creative business ideas and providing solutions to creative economy problems related to their surrounding environment.

Interviews with tutors revealed that students often felt bored during the learning process because instruction was still teacher-centered and learning media were limited to textbooks and whiteboards. Tutors also stated that digital learning media had not been optimally used in economics learning. Meanwhile, interviews with students showed that most students were more interested in learning activities involving digital media, educational games, and group discussions because they were considered more engaging and helpful for understanding learning materials. In addition, students expected creative economy learning to be more closely connected to the socio-economic conditions and local business potential of the Pangalengan area.

These problems indicate that creative economy learning in Paket C equivalency education requires a more innovative, interactive, and contextual learning model to improve students' engagement and creative thinking skills. One learning model considered suitable is Problem Based Learning (PBL). Problem Based Learning is a learning model oriented toward solving real-world problems, enabling students to think actively, discuss, collaborate, and generate solutions to learning problems. This learning model also provides students with opportunities to construct knowledge independently through contextual learning experiences.

Theoretically, PBL is closely related to constructivist theory, which emphasizes that knowledge is actively constructed through learning experiences and social interaction. In problem-based learning, students do not passively receive information but actively identify problems, explore information, and generate solutions to given problems. Therefore, the PBL model is considered

capable of helping students develop creative thinking skills, critical thinking skills, and problem-solving abilities [7].

In addition to learning models, interactive learning media are also needed to increase students' motivation and participation in learning activities. One digital learning medium that can be used is Wordwall. Wordwall is an interactive educational game-based application that can be used to create quizzes, matching games, spinning wheels, and other interactive learning activities. The use of educational game-based learning media is considered capable of creating a more engaging, enjoyable, and participatory learning atmosphere [8].

Previous studies have shown that the implementation of Problem Based Learning can improve students' engagement and thinking abilities through problem-solving-based learning activities. Research conducted by Pasaribu et al. (2024) showed that the use of Wordwall media assisted by the Problem Based Learning model was able to improve students' critical thinking skills because learning became more active and interactive. Research by Fitriana & Indriyani (2024) also showed that the use of the Problem Based Learning model assisted by Wordwall influenced students' thinking skills through discussion and problem-solving activities. In addition, research conducted by Agustin et al. (2025) showed that the Problem Based Learning model assisted by the Wordwall application influenced students' critical and creative thinking abilities.

However, research regarding the integration of Problem Based Learning assisted by Wordwall in Paket C equivalency education, particularly in creative economy learning based on the local potential of the Pangalengan area, remains very limited. Most previous studies still focused on formal education such as elementary and secondary schools and primarily measured critical thinking skills and learning outcomes [11]–[13].

The novelty of this study lies in the development of a Problem Based Learning model assisted by the Wordwall application in creative economy learning based on local potential within Paket C equivalency education. This study not only integrates problem-based learning models and interactive digital media but also connects learning activities with local socio-economic conditions, making learning more contextual and relevant to students' daily lives.

Based on the explanation above, this study aimed to

develop a Problem Based Learning model assisted by the Wordwall application to improve the creative thinking skills of Paket C students in creative economy learning at PKBM Mi'raajul Ummah.

## 2. Method

This study employed a Research and Development (R&D) method using the ADDIE development model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. The ADDIE model was selected because it provides systematic steps and is suitable for developing learning models assisted by digital media in equivalency education. This model enables researchers to develop, implement, and evaluate learning products gradually in order to produce learning models that meet students' needs.

The research was conducted at PKBM Mi'raajul Ummah, Pangalengan District, Bandung Regency, West Java. The research subjects consisted of 15 eleventh-grade Paket C students in economics learning with creative economy material. The study focused on developing a PBL model assisted by the Wordwall application to improve students' creative thinking skills.

The first stage, analysis, was conducted through preliminary observations, interviews, and learning needs identification. At this stage, the researcher analyzed the condition of economics learning at PKBM Mi'raajul Ummah, student characteristics, the use of learning media, and students' creative thinking abilities. The results of the analysis showed that learning activities were still dominated by lecture methods, the use of digital media had not been optimized, and students' creative thinking abilities were still relatively low. In addition, students showed interest in learning activities involving digital media and educational games.

The second stage, design, involved designing learning tools and media to be used in the study. At this stage, the researcher developed teaching modules, student worksheets, research instruments, pretest and posttest blueprints, assessment rubrics, and learning activities based on the PBL model. The researcher also designed Wordwall media adapted to creative economy material based on the local potential of the Pangalengan area, such as coffee, dairy farming, tourism, and local micro, small, and medium enterprises (MSMEs).

The third stage, development, involved the process of developing learning products in the form of a PBL model assisted by the Wordwall application along with other supporting learning tools. The developed products were then validated by material experts and media experts to determine their feasibility before implementation in learning activities. The material expert validation results obtained a percentage of 81.25% in the feasible category, while the media expert validation results obtained a percentage of 83.3% in the feasible category for learning implementation. The products were then revised based on validators' suggestions and feedback before being implemented with students.

The fourth stage, implementation, was carried out through the application of the PBL model assisted by the Wordwall application in creative economy learning for eleventh-grade Paket C students. The implementation was conducted in five meetings covering topics such as the concept of the creative economy, the creative economic potential of Pangalengan, creative business ideas, product marketing strategies, and creative product innovation. During the learning process, students were involved in group discussions, problem-solving activities, presentations, and the use of Wordwall as an interactive learning medium.

The fifth stage, evaluation, aimed to determine the effectiveness of the developed learning model. Evaluation was conducted through pretests and posttests of creative thinking skills, observation of student activities, observation of PBL implementation, student response questionnaires, and N-Gain calculations. The indicators of creative thinking skills used in this study included fluency and originality. The pretest and posttest results were analyzed using the N-Gain test to determine the improvement in students' creative thinking skills after the implementation of the learning model.

Data collection techniques in this study included observation, interviews, documentation, questionnaires, and creative thinking ability tests. The research instruments consisted of preliminary learning observation sheets, student activity observation sheets, PBL implementation observation sheets, interview guidelines, material expert and media expert validation instruments, student response questionnaires, and pretest and posttest questions on creative thinking skills.

The research data were analyzed using descriptive quantitative and qualitative analysis techniques. Data

from expert validation, observations, and questionnaires were analyzed using feasibility percentages, while pretest and posttest data were analyzed using the N-Gain formula to determine the improvement in students' creative thinking skills after the implementation of the PBL model assisted by the Wordwall application.

### **3. Result and Discussion**

#### *3.1 Needs Analysis and Development of the PBL Model Assisted by Wordwall*

The needs analysis stage was conducted to identify the initial conditions of creative economy learning at PKBM Mi'raajul Ummah and to determine learning needs that were appropriate to the characteristics of Paket C students. The analysis was carried out through preliminary observations, interviews with tutors, students, and PKBM administrators, as well as learning documentation studies.

Based on the results of the preliminary observations, it was found that the economics learning process was still dominated by lecture methods and the use of conventional learning media. Learning activities had not optimally utilized digital media, causing students' participation in asking questions, discussing, and expressing opinions to remain relatively low. In addition, creative economy learning had not been sufficiently connected to the socio-economic conditions and local potential surrounding the students.

The interview results with tutors indicated that students often felt bored during the learning process because the instruction was still teacher-centered and relied heavily on lecture methods. Tutors also stated that students were less active in expressing ideas and opinions during classroom activities. Digital learning media such as Wordwall had never previously been implemented in economics learning at PKBM Mi'raajul Ummah.

Furthermore, the interview results with students showed that most students preferred learning activities involving digital media, educational games, and group discussions. Students considered economics learning to be monotonous and overly theoretical, making it less interesting to follow. Students also stated that creative economy learning would be more engaging if it were connected to the local environment, such as coffee businesses, dairy farming, tourism, and local culinary products in the Pangalengan area.

Meanwhile, interviews with PKBM administrators revealed that the institution supported the use of digital learning media in the learning process. Most students already had smartphones and basic internet access that could support technology-based learning activities. The results of the needs analysis indicated that a more innovative, interactive, and contextual learning model was needed to improve students' engagement and creative thinking skills in creative economy learning.

Based on the results of the needs analysis, the researcher developed a PBL model assisted by the Wordwall application for creative economy material. The PBL model was selected because it encourages students to actively solve problems, discuss, collaborate, and generate solutions to real-world issues related to the creative economy within their environment. The development of the learning model was also adjusted to the characteristics of Paket C equivalency education, which requires learning activities that are more flexible, contextual, and student-centered.

At the design stage, the researcher prepared learning tools consisting of teaching modules, student worksheets, question blueprints, research instruments, assessment rubrics, and Wordwall-based learning media. The learning material focused on the creative economy based on the local potential of the Pangalengan area, such as coffee, dairy farming, local tourism, agriculture, and local micro, small, and medium enterprises (MSMEs). The learning activities were designed into five meetings covering topics such as the concept of the creative economy, regional creative economy potential, creative business ideas, product marketing strategies, and creative product innovation.

The development of Wordwall media was adjusted to learning activities and indicators of students' creative thinking skills. The developed Wordwall media consisted of several types of educational games, such as Match Up, Group Sort, Random Wheel, Quiz, and Open the Box. These games were used to help students understand creative economy concepts, identify local business potential, generate creative business ideas, and develop solutions and product innovations interactively.

In addition to media development, the researcher also developed supporting learning tools in the form of problem-solving-based student worksheets aligned with the steps of PBL. The worksheets were designed to assist students in conducting group discussions, identifying

creative economy problems, generating business ideas, and presenting solutions related to the local potential of the Pangalengan area.

The results of the learning model development showed that the integration of PBL and the Wordwall application was able to create a more interactive and contextual learning environment compared to previous learning practices. The development of this model also became one of the efforts to improve students' creative thinking skills through creative economy learning based on local potential within Paket C equivalency education.

### 3.2 Model Validation Results and Learning Implementation

The validation stage was conducted to determine the feasibility level of the PBL model assisted by the Wordwall application before its implementation in creative economy learning at PKBM Mi'raajul Ummah. Validation was carried out by material experts and media experts to assess the suitability of the material, learning procedures, media appearance, and the use of Wordwall in supporting the learning process.

The results of the material expert validation showed that the developed learning model obtained a percentage of 81.25% and was categorized as feasible for use in learning activities. The validator stated that the creative economy material was appropriate to the learning outcomes of Paket C and was able to support the development of students' creative thinking skills. In addition, the learning model was considered relevant to the socio-economic conditions of students in the Pangalengan area because the material was connected to local potential such as coffee, dairy farming, tourism, and local micro, small, and medium enterprises (MSMEs).

**Table 1.** Material Expert Validation Results

Assessed Aspect	Percentage	Category
Material suitability	83%	Feasible
Material presentation	79%	Feasible
PBL-based learning	81%	Feasible
Relevance to creative thinking	82%	Feasible
Average	81.25%	Feasible

The validator also provided several suggestions for improvement, such as adding more variations of local creative economy business examples, clarifying the steps

of PBL, and increasing group discussion activities so that all students could participate more actively in learning.

In addition to material expert validation, validation was also conducted by media experts to determine the feasibility of using the Wordwall application as an interactive learning medium. The media expert validation results obtained a percentage of 83.3% and were categorized as feasible for use in learning activities. The validator stated that the Wordwall display was attractive, easy to use, and capable of increasing student engagement during the learning process.

**Table 2.** Media Expert Validation Results

Assessed Aspect	Percentage	Category
Media appearance	85%	Feasible
Ease of use	83%	Feasible
Media interactivity	84%	Feasible
Suitability of media for learning	81%	Feasible
Average	83.3%	Feasible

The media validator also suggested several improvements, such as improving color combinations, adjusting text size to make it easier for students to read, and adding more variations of educational games within the Wordwall application.

Based on the validation results, the researcher revised the learning tools and Wordwall media before implementation with students. The revisions included clarifying media usage instructions, adding examples of local creative economy businesses, and improving the appearance and game activities in Wordwall to make them more interactive and suitable for the characteristics of Paket C students.

After the revision stage was completed, the PBL model assisted by Wordwall was implemented in creative economy learning for eleventh-grade Paket C students at PKBM Mi'raajul Ummah. The learning implementation was conducted in five meetings covering topics such as the concept of the creative economy, regional creative economy potential, creative business ideas, product marketing strategies, and creative product innovation.

**Table 3.** Implementation of PBL Learning Assisted by Wordwall

Meeting	Learning Material	Wordwall Activity
1	Concept of creative economy	Match Up

Meeting	Learning Material	Wordwall Activity
2	Regional creative economy potential	Group Sort
3	Creative business ideas	Random Wheel
4	Product marketing strategies	Quiz
5	Creative product innovation	Open the Box

During the learning implementation, students appeared more active in discussions, asking questions, expressing opinions, and collaborating in groups compared to before the implementation of the learning model. The use of Wordwall also increased students' enthusiasm because the learning process became more interactive and enjoyable.

The observation results of student activities showed that students began to generate various creative business ideas related to the local potential of the Pangalengan area. In addition, students became more confident in presenting group discussion results and providing solutions to creative economy problems presented during learning activities.

The use of Wordwall in learning helped students understand creative economy material through engaging and interactive educational game activities. Students appeared more focused and actively involved throughout the learning process, especially during evaluation activities using Wordwall. The integration of PBL and Wordwall was also able to create a more contextual, collaborative, and student-centered learning environment compared to previous learning practices.

### 3.3 Improvement of Students' Creative Thinking Skills

The improvement of students' creative thinking skills was analyzed through the results of pretests and posttests after the implementation of the PBL model assisted by the Wordwall application in creative economy learning. The measurement of creative thinking skills in this study focused on two indicators, namely fluency and originality. The fluency indicator was used to measure students' ability to generate various ideas and responses, while the originality indicator was used to measure students' ability to produce unique and creative ideas.

The pretest was conducted before the implementation of the learning model to determine students' initial creative thinking abilities in creative economy material. The pretest results showed that students' creative thinking

skills were still relatively low. Most students still experienced difficulties in generating varied and innovative creative business ideas. Students' answers also tended to be simple and had not yet demonstrated optimal creativity in providing solutions to creative economy problems.

**Table 4.** Pretest and Posttest Results of Creative Thinking Skills

Data	Pretest	Posttest
Average Score	7.9	12.2
Category	Moderately Creative	Creative

Based on Table 4, the average pretest score of students was 7.9 and categorized as moderately creative. After the implementation of the PBL model assisted by Wordwall, the average posttest score increased to 12.2 and was categorized as creative. These results indicate an improvement in students' creative thinking skills after the implementation of the learning model.

The improvement in students' creative thinking skills could be seen from their ability to generate more varied and innovative creative business ideas compared to before the learning implementation. Students began to develop business ideas based on the local potential of the Pangalengan area, such as coffee businesses, dairy-based products, local tourism, and creative culinary products. In addition, students also showed improved abilities in providing more creative and contextual solutions and marketing strategies for products.

To determine the level of improvement in students' creative thinking skills, an N-Gain analysis was conducted. The N-Gain test was used to determine the effectiveness of the learning model implementation based on the improvement in students' pretest and posttest scores.

$$g = \frac{\text{Posttest} - \text{Pretest}}{\text{Maximum Score} - \text{Pretest}}$$

The N-Gain calculation results showed that the average N-Gain score of students was 0.55, which was categorized as moderate. These results indicate that the implementation of the PBL model assisted by Wordwall was able to provide a fairly good improvement in students' creative thinking skills.

**Table 5.** N-Gain Test Results

Average N-Gain	Category
0.55	Moderate

Based on the N-Gain test results presented in Table 5, the improvement in students' creative thinking skills was categorized as moderate. This indicates that the PBL model assisted by Wordwall was sufficiently effective in improving students' creative thinking skills in creative economy learning.

The improvement in students' creative thinking skills was influenced by problem-solving-based learning activities that encouraged students to actively discuss, exchange ideas, and generate solutions to real-world problems related to the creative economy within their environment. In addition, the use of Wordwall as an interactive learning medium also helped increase student engagement and enthusiasm throughout the learning process.

Through problem-based learning activities and the use of interactive media, students became more active in exploring creative business ideas, expressing opinions, and presenting the results of group discussions. Thus, the integration of PBL and Wordwall was able to create a more contextual, interactive, and supportive learning environment for developing the creative thinking skills of Paket C students.

### 3.4 Students' Responses toward the Learning Process

Students' responses toward the implementation of the PBL model assisted by the Wordwall application were obtained through questionnaires distributed after the entire learning process had been completed. The student response questionnaire was used to determine the level of interest, engagement, ease of understanding the material, and the effectiveness of using Wordwall in creative economy learning.

The questionnaire results showed that students gave very positive responses toward learning activities using the PBL model assisted by Wordwall. Students felt that the learning process became more interesting, interactive, and enjoyable compared to previous learning activities that were still dominated by lecture methods. In addition, the use of Wordwall was considered capable of increasing students' motivation and enthusiasm during the learning process.

**Table 6.** Student Response Questionnaire Results

Assessed Aspect	Percentage	Category
Interest in learning	92%	Very Good
Engagement in learning	90%	Very Good
Ease of understanding the material	91%	Very Good
Effectiveness of using Wordwall	91%	Very Good
Average	91.1%	Very Good

Based on Table 6, the aspect of interest in learning obtained a percentage of 92% in the very good category. These results indicate that students were more interested in participating in creative economy learning when using the PBL model and Wordwall media. Learning activities involving discussions, problem-solving, and educational games made students more active and less likely to feel bored during the learning process.

In the aspect of engagement in learning, a percentage of 90% in the very good category was obtained. Students appeared more active in group discussions, asking questions, expressing opinions, and presenting discussion results compared to before the implementation of the learning model. The use of Wordwall also helped increase student participation because learning activities were conducted through interactive educational game-based activities.

Furthermore, the aspect of ease in understanding the material obtained a percentage of 91% in the very good category. Students stated that creative economy material became easier to understand because the learning activities were connected to the surrounding environment and the local potential of the Pangalengan area. The use of Wordwall also helped students understand learning concepts through engaging and easy-to-use game activities.

In the aspect of the effectiveness of using Wordwall, a percentage of 91% in the very good category was obtained. Students stated that Wordwall made learning more enjoyable, interactive, and helped them stay more focused during the learning process. In addition, Wordwall was also considered capable of helping students generate creative business ideas through educational game-based learning activities.

The results of students' responses indicate that the integration of the PBL model and the Wordwall application was able to create a more active, interactive,

and contextual learning environment. The use of digital-based learning media also provided a more engaging learning experience for Paket C students, thereby increasing their engagement and learning motivation during creative economy learning activities.

### 3.5 Discussion

The results of this study indicate that the implementation of the PBL model assisted by the Wordwall application was able to improve the creative thinking skills of Paket C students in creative economy learning. This improvement was reflected in the increase in the average pretest and posttest scores from 7.9 to 12.2, with an N-Gain value of 0.55 in the moderate category. These findings indicate that the integration of a problem-based learning model with interactive digital media can positively affect students' creative thinking skills. The improvement was not only evident in test results but also in students' learning activities, such as their ability to express ideas, participate in discussions, solve problems, and generate innovative business ideas based on local potential.

Theoretically, the effectiveness of the PBL model in this study can be explained through constructivist theory, which emphasizes that students actively construct knowledge through learning experiences and social interaction. In a constructivist approach, learning becomes more meaningful when students are directly involved in finding solutions to problems. Through the PBL model, students were encouraged to identify problems, discuss, collaborate, and generate solutions relevant to real conditions in their surrounding environment. These activities enabled students not only to receive information passively but also to actively build knowledge and creative ideas throughout the learning process.

The findings of this study demonstrate that the PBL model was able to improve students' creative thinking skills because learning activities were centered on solving real-world problems related to the creative economy in the Pangalengan area. Students were given opportunities to explore various business ideas based on local potential, such as coffee businesses, dairy product processing, local tourism, and creative culinary products. These activities helped students develop the indicators of fluency and originality through more open and contextual thinking

processes.

The results of this study are consistent with previous research conducted by Ariyani et al. (2025), which stated that the implementation of the PBL model assisted by Wordwall media was able to improve students' critical thinking skills because learning became more active and interactive. In addition, research by Puspita & Setiawan (2025). also showed that the use of the Problem Based Learning model assisted by Wordwall was able to improve students' thinking skills through problem-solving activities and group discussions.

The effectiveness of PBL in improving creative thinking skills is also reinforced by the Higher Order Thinking Skills (HOTS) theory, which states that problem-based learning can help students develop analytical, evaluative, and creative abilities in solving learning problems. In this study, students were not only asked to understand creative economy concepts theoretically but were also required to generate creative business ideas and product marketing solutions based on local socio-economic conditions. This made learning more meaningful and relevant to students' daily lives.

In addition to the learning model, the use of the Wordwall application also contributed significantly to the improvement of students' creative thinking skills. Wordwall was used as an interactive learning medium that combined educational games, visuals, text, and digital activities, making learning more engaging and less monotonous. The use of Wordwall in this study helped students participate more actively in learning activities through Match Up, Group Sort, Random Wheel, Quiz, and Open the Box activities.

Theoretically, the effectiveness of Wordwall can be explained through Mayer's multimedia learning theory, which states that learning becomes more effective when information is presented through a combination of visuals, text, and interactive activities. The use of interactive media can increase students' attention, motivation, and engagement in the learning process. In this study, Wordwall was not only used as an evaluation medium but also as a tool for idea exploration and game-based learning activities that supported the development of students' creative thinking skills.

The results of this study are also in line with previous studies stating that the use of Wordwall can improve students' learning motivation, engagement, and thinking abilities because game-based learning makes students

more interested in participating in learning activities [16], [17]. Research by Rahayu also showed that the use of Wordwall assisted by the Problem Based Learning model could improve students' thinking abilities because learning became more interactive and students were more active in independently discovering learning concepts [18].

Based on observations and student response questionnaires, the use of Wordwall was able to increase students' interest and engagement during the learning process. Students felt that creative economy learning became more enjoyable, easier to understand, and less monotonous compared to previous learning activities that were still dominated by lecture methods. The questionnaire results showed a student response percentage of 91.1% in the very good category. This indicates that the use of interactive digital learning media can create a more positive learning experience for Paket C students.

The improvement in students' creative thinking skills in this study was also influenced by a contextual learning approach that connected learning materials to students' socio-economic conditions in the Pangalengan area. Creative economy learning was not only delivered theoretically but was also linked to local potential such as coffee, dairy farming, tourism, agriculture, and local MSMEs. This contextual approach helped students understand the material more concretely and relevantly to their daily lives.

In the context of Paket C equivalency education, the implementation of the PBL model assisted by Wordwall has high relevance because Paket C students have different characteristics from formal school students. Paket C students come from diverse social backgrounds and learning experiences, requiring more flexible, interactive, and contextual learning models. Problem-based learning and the use of interactive digital media such as Wordwall are considered appropriate for the needs of non-formal education students because they can increase student participation and learning motivation.

Furthermore, the use of digital media in non-formal education has become increasingly important alongside technological developments and the demands of 21st-century learning. Based on interviews with PKBM administrators, most students already had smartphones and basic internet access that could support technology-based learning. These conditions indicate that the

implementation of digital learning media such as Wordwall has significant potential for application in equivalency education.

The novelty of this study lies in the integration of the PBL model and the Wordwall application in creative economy learning based on local potential within Paket C equivalency education. Previous studies generally focused only on the implementation of PBL or Wordwall in formal education such as elementary and secondary schools and mostly measured learning outcomes and critical thinking skills [19], [20]. In contrast, this study specifically focused on improving students' creative thinking skills in the context of non-formal Paket C education.

Another novelty of this study is the use of creative economy material based on the local potential of the Pangalengan area as the learning context. The integration of learning with local socio-economic conditions made it easier for students to understand the material and generate creative business ideas that were more relevant to their surrounding environment. This approach made learning more contextual and applicable compared to economics learning that focuses solely on theoretical concepts.

Therefore, the results of this study indicate that the integration of PBL and Wordwall was able to create creative economy learning that was more interactive, contextual, and student-centered. The implementation of this learning model not only improved students' creative thinking skills but also increased the engagement, motivation, and learning experiences of Paket C students in creative economy learning based on local potential. (arxiv.org)

#### 4. Conclusion

Based on the results of the research and development conducted, it can be concluded that the PBL model assisted by the Wordwall application is feasible and effective for use in creative economy learning for Paket C students at PKBM Mi'raajul Ummah. The material expert validation results obtained a percentage of 81.25%, while the media expert validation results obtained 83.3%, both categorized as feasible for learning implementation. These results indicate that the developed learning model and media were appropriate for the needs of creative economy learning in Paket C equivalency education.

The implementation of the PBL model assisted by

Wordwall was also able to improve students' creative thinking skills. This improvement was reflected in the increase in the average pretest score from 7.9 to 12.2 in the posttest, with an N-Gain value of 0.55 in the moderate category. The improvement in creative thinking skills could be seen in students' ability to generate creative business ideas, provide solutions to creative economy problems, and develop product innovations based on the local potential of the Pangalengan area.

Furthermore, the results of the student response questionnaire showed a percentage of 91.1% in the very good category. Students felt that learning using the PBL model assisted by Wordwall was more interesting, interactive, enjoyable, and helped them understand creative economy material more easily. The use of Wordwall was also able to increase students' engagement in discussion activities, problem-solving, and educational game-based learning activities.

Thus, the integration of PBL and the Wordwall application was able to create creative economy learning that was more contextual, interactive, and student-centered. This study also demonstrates that the use of problem-based learning models and interactive digital media has high relevance for implementation in Paket C equivalency education, particularly in supporting the development of students' creative thinking skills based on local potential.

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