



## Development of WordWall Media to Improve Learning Outcomes

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### ABSTRACT

One of the main challenges in vocational education, particularly in accounting learning, is students' low understanding of basic accounting concepts. This study aims to develop WordWall-based learning media integrated with the Self-Organized Learning Environment (SOLE) model and to examine its effectiveness in improving learning outcomes on Cooperative Accounting material at SMK Negeri 5 Madiun City. The research employed a Research and Development approach using the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. Data were collected through interviews, observations, questionnaires, and pretest–posttest learning outcome assessments. The developed WordWall media was validated by material, language, and media experts and met the feasibility criteria for classroom use. The implementation involved 30 students of class XI Accounting. Questionnaire results showed a feasibility and practicality score of 85.21%, categorized as feasible for implementation. Learning outcomes demonstrated a substantial improvement, with the average pretest score of 64 and learning completeness of 6.67% increasing to an average posttest score of 88 with 96.67% completeness after the use of the media. These findings indicate that WordWall media integrated with the SOLE model effectively enhances students' understanding and mastery of Cooperative Accounting concepts. The research results contribute practical benefits by providing interactive, engaging, and technology-based learning media that support active, independent, and collaborative learning, while also assisting teachers in creating a more effective and student-centered learning environment in vocational accounting education.

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## INTRODUCTION

Education plays a fundamental role in shaping students' character, competencies, and readiness to face the demands of the 21st century. The current era emphasizes the mastery of critical thinking, collaboration, communication, and creativity as essential skills in learning and working environments. Rapid technological development in the globalization era has transformed educational practices and requires continuous innovation in learning systems ([Novianti et al., 2022](#)). Learning is no longer centered solely on content delivery but on how students actively construct understanding. The quality of education is strongly influenced by the effectiveness of learning processes supported by appropriate media and methods. Educational innovation becomes

a key driver in producing competent and competitive graduates. Learning media development is therefore positioned as a strategic component in improving instructional quality. This condition establishes the need for adaptive and technology-oriented learning approaches.

**Situational Analysis** Educational quality is closely related to the integration of various components, including input, learning processes, and learning outcomes. Effective learning processes contribute directly to students' academic achievement and skill development. Quality education serves as a foundation for producing intelligent and skilled generations who contribute to national development ([Hariana et al., 2024](#)). However, learning processes often encounter obstacles that limit their effectiveness. Conventional teaching practices that emphasize explanation over interaction remain dominant in many classrooms. Such practices reduce opportunities for students to actively engage in learning. Learning media that fail to stimulate interaction and exploration further weaken the learning process. These conditions highlight the importance of improving instructional strategies and media use.

**Situational Analysis** One major problem in accounting education is students' low understanding of basic accounting concepts. This condition is commonly caused by learning approaches that focus heavily on theory with limited opportunities for application and practice. Students experience difficulties connecting accounting concepts with real workplace situations, which reduces their ability to solve contextual problems. Limited technological support and learning resources also influence students' comprehension levels ([Amril et al., 2023](#)). Low learning interest contributes to reduced concentration and participation during lessons. Learning motivation plays a significant role in determining students' engagement and academic success ([Lestari et al., 2023](#)). These challenges indicate that accounting learning requires interactive, relevant, and motivating learning media. Such needs become more prominent in vocational education contexts.

**Literature Review and State of the Art Findings** at SMK Negeri 5 Madiun City indicate that technology-based learning media have not been optimally implemented in accounting instruction. Many teachers still depend primarily on printed textbooks despite the flexibility offered by the Merdeka Curriculum. The curriculum allows educators to select learning media aligned with students' interests and learning characteristics. Teachers' limited experience and knowledge in developing digital learning media become a significant barrier ([Nabilah & Warmi, 2023](#)). This condition limits the variety of learning experiences provided to students. Learning activities tend to remain teacher-centered and less interactive. As a result, students' engagement and conceptual understanding are not fully supported. This situation encourages the exploration of practical digital media that are accessible to teachers.

**Literature Review and State of the Art** One digital learning medium that has gained attention is WordWall, a gamification-based application offering interactive quizzes and learning games. WordWall supports active participation through game-based tasks that engage students cognitively and emotionally ([Ningrum et al., 2024](#)). The platform allows teachers to design interactive worksheets that can be accessed online. WordWall also supports both individual and group learning activities with flexible content formats ([Monigir & Wakari, 2024](#)). Previous studies show that WordWall increases student interest and participation during learning. However, most studies focus on its use as an assessment or evaluation tool. The integration of WordWall into

structured learning models remains limited. This gap presents an opportunity for further instructional development.

Literature Review, State of the Art, and Novelty Learning models determine how learning media function within instructional activities. The Self-Organized Learning Environment (SOLE) model emphasizes student autonomy, collaboration, and inquiry-based learning supported by digital resources ([Novianti et al., 2022](#)). SOLE learning syntax includes posing guiding questions, investigating information collaboratively, and reviewing findings through discussion ([Roviani et al., 2023](#)). This model supports the development of critical thinking, communication, and problem-solving skills. However, SOLE implementation often lacks dedicated digital media that align with its learning stages. Previous research generally discusses the SOLE conceptually without focusing on media development. Integrating WordWall media into the SOLE model represents a novel instructional approach. This integration positions WordWall as an integral learning medium rather than a supplementary tool.

Problem Identification and Formulation Based on the situational analysis and previous studies, several problems can be identified in accounting learning. Students' understanding of Cooperative Accounting material remains low due to limited interactive learning experiences. Teachers face challenges in developing technology-based learning media aligned with student-centered learning models. Digital media that support inquiry and collaboration are rarely implemented systematically. The SOLE learning model requires media that facilitate independent exploration and group discussion. These unmet needs lead to less effective learning processes and outcomes. Therefore, the core research problem focuses on developing appropriate digital learning media. The formulation of the problem centers on how WordWall media can be developed and integrated with the SOLE model. This formulation guides the direction of the research development process.

Research Objectives and Urgency: This research aims to develop WordWall-based learning media integrated with the SOLE learning model for Cooperative Accounting material. The study also examines the feasibility, practicality, and effectiveness of the developed media. The urgency of this research lies in the increasing need for interactive digital learning solutions in vocational education. Teachers require learning media that are practical, engaging, and aligned with curriculum demands. Students need learning experiences that promote independence, collaboration, and conceptual understanding. The research addresses these needs through a systematic development approach. This study supports curriculum implementation that emphasizes student-centered and technology-enhanced learning. The research objectives respond directly to current instructional challenges in accounting education.

Importance, Benefits, and Contributions: The results of this research provide significant benefits for educators, students, and educational institutions. Teachers gain access to a structured and practical learning medium that supports interactive and collaborative learning. Students benefit from engaging learning experiences that enhance understanding and learning motivation. The integration of WordWall and SOLE supports character development, responsibility, creativity, and independence in learning ([Fikri & Amalia, 2022](#)). Academically, this research contributes to the development of instructional media studies in vocational accounting education. Practically, it offers guidance for implementing gamified digital media within inquiry-based learning

environments. The study strengthens the role of technology in improving learning quality. Overall, the research contributes to more effective and meaningful learning practices in vocational schools.

## METHODS

This research is a type of Research and Development (research and development that aims to create new products or make improvements to existing products. The development model used is ADDIE, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation ([Setiawan et al., 2021](#)). This method is carried out systematically and can be accounted for. Research and Development (R&D) is a method used to develop and test the effectiveness of a product. The aim is to analyze the needs and evaluate the effectiveness of the product so that it can be used optimally in the learning process ([Rustandi & Rismayanti, 2021](#)).

After the media were deemed feasible by experts, they were then tested in the field. The trial was conducted at SMK 5 Madiun City, and the data obtained from the study were analyzed descriptively and quantitatively. The Likert scale was used to assess the feasibility of the validation sheets of media experts, material experts, and student responses to the developed learning media. Table 1 shows the alternative scores of respondents' answers.

Table 1. Likert Scale Media Assessment

Answer Options	Score Weight
SS (Strongly Agree)	5
B (Good)	4
CB (Good Enough)	3
KB (Less Good)	2
SK (Very Poor)	1

Source: ([Paulus et al., 2023](#))

Table 2 shows the learning media feasibility criteria determined based on the total percentage of assessments from each expert through the validation sheet, while data analysis is used to assess the feasibility of WordWall-based learning media.

Table 2. Media Feasibility Criteria

% Feasibility	Eligibility Category
86% - 100%	Very Feasible
76% - 85%	Feasible
60% - 75%	Moderately Feasible
55% - 59%	Not Feasible
<54%	Not Feasible

Source: ([Paulus et al., 2023](#))

Calculation of validation result data is calculated using the following formula

$$NP = \frac{R}{SM} \times 100\%$$

Description:

NP : expected percent value

R : number of score values obtained

SM : total score of the maximum value

The ADDIE model begins with an analysis of the needs of students on the material of the history of cooperative development and the Cooperative Accounting learning process. The second stage is to develop a product design that will be used. Furthermore, at the development stage, the product is made according to the design that has been designed. The fourth stage is implementation, which is testing the product in the learning process. Finally, an evaluation is carried out to assess whether the learning media are effective in encouraging students to more easily master the material. This research uses primary data as a data source, which is information collected directly by researchers through observation, interviews, or questionnaires. In this study, primary data were obtained from respondents' responses to the questionnaire given. The material expert validation sheet is used to assess the feasibility of the material in the learning product and obtain suggestions and input. Media design validation aims to evaluate the appearance and model of the media to attract and motivate students. Meanwhile, the media expert validation process aims to evaluate the feasibility level of the media developed ([Rafi'y et al., 2023](#)). The main data in this study were obtained through questionnaires and interviews with students of class XI Accounting 1 SMK Negeri 5 Madiun City on the subject of Cooperative Accounting.

## RESULTS AND DISCUSSION

The analysis begins with analyzing the needs of students in class XI Accounting 1 on Cooperative Accounting material, which is an important practicum material in the Accounting department. The selection of material is based on the results of observations and interviews conducted with teachers. The analysis also includes reviewing the Core Competencies (KI) and Basic Competencies (KD) listed in the syllabus. The subject matter is then incorporated into the learning media in accordance with the learning objectives. This media presents information that will be learned in class. Vocational students, especially in the subject of Cooperative Accounting, have diverse learning needs. They need not only a deep understanding of concepts, but also learning experiences that are interactive, fun, and relevant to the world of work. Therefore, media that is visually appealing, easy to use, and able to help understand abstract material are needed. Learners also need to develop critical thinking, communication, collaboration, and problem-solving skills, which are key competencies in the 21st century curriculum. This approach encourages learners to learn actively, independently, and understand the material through discussion and interaction in a collaborative learning environment.

The learning media were tested on 30 students at SMK Negeri 5 Madiun City, with the test subjects selected based on the approval of the accounting education assistant lecturer. The trial began with a brief explanation of the material to be used, followed by giving pretest questions related to Cooperative Accounting. After that, the researcher explained the contents of the learning media and the procedure for using it to the students. After the pretest, researchers gave WordWall learning media to students, along with an explanation of the material and how to play. After the media trial was conducted, students took a posttest and filled out a questionnaire sheet. It is hoped that through this media, the material presented can be more easily understood by students.

At the Analysis stage, observations were made of the Cooperative Accounting learning process, including the need for learning media, analyzing the characteristics of students, and material that is suitable for interactive packaging. The lack of activeness in learning makes it difficult for teachers to assess learning success. Therefore, learning media is applied to make the learning process more active and support understanding in the classroom. At the Design stage, learning media is designed to be as interesting and innovative as possible to facilitate the learning process, by utilizing games that encourage students' activeness and interest. The materials compiled include the History of the Establishment of Cooperatives in Indonesia and the Characteristics of Cooperative Financial Statements, which will be displayed in the media. In addition, supporting instruments such as pretest and posttest questions, expert validation sheets, and questionnaires were also prepared. At the Development stage, the learning media is developed based on a website using WordWall, with all the components that have been designed inserted and adjusted into the platform.

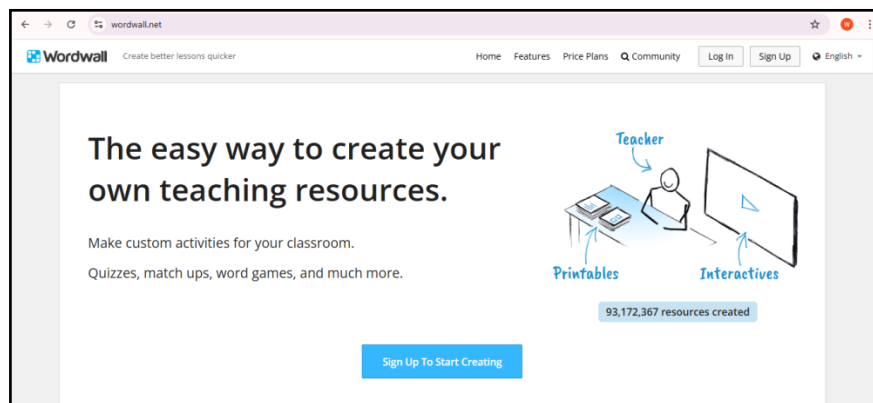


Figure 1. WordWall Login Page

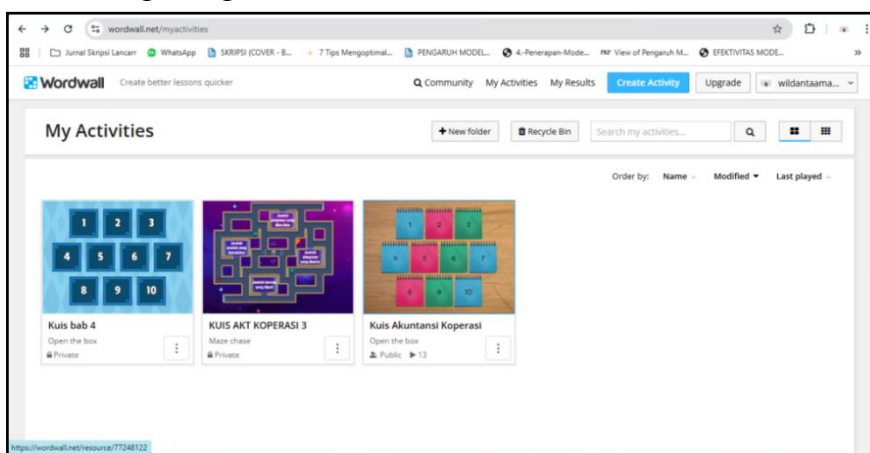


Figure 2. Wordwall Homepage



Figure 3. Quiz View

After the media is ready, a validation test is conducted by three experts. The results of this validation test show that the learning media developed meet the eligibility standards for use in the learning process. Table 3 shows the results of the validation test with the following results:

Table 3. Expert Validation Test Results

Assessment Aspect	Number of assessments	Percentage	Feasibility
Material	115	96,8%	Very Feasible
Language	55	100%	Very Good
Media	77	85,6%	Feasible

Source: Processed primary data (2025)

At the implementation stage, the learning media are applied in the classroom using the SOLE learning scenario. To assess the feasibility of the media, students filled out a questionnaire, the results of which showed a percentage of **85.21%**, and based on Table 3.5, included in the category *feasible to implement*. The results showed that in the pretest, the average score of students was 64, with 6.67% completeness (2 students were complete, 28 were not complete). After the use of learning media, the posttest score increased to an average of 88 with 96.67% completeness (29 students completed, 1 did not complete). This increase shows a significant increase in learning outcomes, which indicates that the learning media used has a positive effect on increasing students' understanding.

Table 4. Limited Trial Assessment Results

Group	Average Pre Test	Average Post-Test	Pre-Test Completeness	Post-Test Completeness
Limited trial	64	88	6,67%	96,67%

Source: Primary data processed (2025)

From Table 4, it can be seen that the development of *WordWall* learning media is able to improve student learning outcomes. This can be proven by a significant increase in the test results of students (Saputra, 2022). Before the application of *WordWall* learning media, students' test results tended to be in the low to medium category. However, after this media is used consistently

in the teaching and learning process, especially in the SOLE (Self-Organized Learning Environment) learning model, both in terms of this increase shows that WordWall media is not only visually appealing and interactive, but also able to encourage keterli, making it effective in significantly improving student learning outcomes (Wiriani, 2021). In addition to seeing the increase in learning outcomes, learning media is measured for practicality through questionnaires distributed to students, with the following results:

Table 5. Limited Trial Assessment Results

Group	Total score	Maximum score	Percentage	Practicality
Limited trial	3204	3770	4,99%	Practical

Source: Primary data processed (2025)

The evaluation stage is carried out to assess the effect of learning media on student learning outcomes. Based on the comparison of pretest and posttest scores in Table 4.5, there is a significant increase in achievement. WordWall learning media integrated with the SOLE model proved to have a positive effect on learning outcomes, with the completeness rate reaching 96.67%. Variations in students' level of understanding of the technology used, where not all students are accustomed to accessing digital media such as Word-Wall. Limited evaluation time, which caused some students to not maximize in completing all learning activities. An unstable internet connection during the implementation of online learning becomes a technical obstacle that disrupts the smoothness of the evaluation process. Students' involvement in the SOLE learning model that demands independence and collaboration, is also a challenge because not all students are accustomed to learning independently and taking initiative in groups. These obstacles are taken into consideration in making improvements and developing learning media in the next stage.

## CONCLUSION

WordWall learning media on Cooperative Accounting material is developed using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. In the analysis stage, observations are made of the learning process and the needs of students, including the characteristics of material that is suitable for interactive packaging. The design stage focuses on designing interesting and innovative media, with elements of games to increase interest in learning. The development stage is carried out by making website-based media using WordWall, adjusting all the components that have been designed. The implementation stage applies the media in class XI Accounting 1 with SOLE learning scenarios, involving 30 students. The evaluation stage is carried out to measure the effect of the media on learning outcomes, which is shown through an increase in the knowledge value of students. WordWall learning media was declared feasible based on the results of validation tests by material experts (96.8%), language experts (100%), and media experts (85.6%), all of which were included in the *good* category. This media also proved to be practical and effective in improving students' learning outcomes in Cooperative Accounting subjects, as seen from the increase in learning completeness from 6.67% in the pretest to 96.67% after the limited trial.

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