



The Development of Social Science Learning Media Based on Wordwall Digital Game in Elementary Schools

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

This study aims to (1) describe the need for the Development of social science learning media based on digital game word walls in elementary schools; (2) know the description of social science learning media design based on digital word wall games for elementary school students ; (3) know the description validity of digital game word wall- based social science learning media for elementary school students ; (4) knowing the practicability of social science learning media based on the digital game word wall for elementary school students ; (5) knowing the effectiveness of social science learning media based on the digital game word wall in improving student learning outcomes at Elementary Schools. This type of research is Research and Development (R & D). The research and development procedure used is 4-D: define, design, develop and disseminate. The subjects of this study were fourth-grade students at SD Negeri Minasa Upa Makassar, consisting of 31 students and two teachers. Data was collected through test techniques, observation, and questionnaires. The data analysis technique used is quantitative analysis according to the research and development stage. The results of this study indicate that : (1) The need to develop social

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science learning media based on the digital word wall games is a fundamental demand in the digital era in learning where challenging and fun interactions are needed in the form of word wall games for elementary school students; (2) Social science learning media based on the digital word wall games are designed through the stages of selecting games, compiling quizzes, selecting formats, initial design, and limited trials; (3) digital word wall game- based social science learning media has an adequate level of validity in all components. The display aspect of word wall game digital media, stages, and tests obtained the maximum value from the validator. (4) Social science learning media based on digital game word walls fulfill the practicability requirements through the positive response of teachers and students, which is marked by increased student activity in learning. (5) Social science learning media based on digital game word walls is practical for social studies learning, marked by increased student learning outcomes through pretest and posttest.

Keywords: Learning media; wordwall digital game; learning outcomes; social science.

1. INTRODUCTION

The Indonesian nation is entering the industrial revolution 4.0 era, where changes occurred so quickly. The use of increasingly sophisticated and modern technology is due to the rapid Development of Science, Technology, and Information, which influences the world of education, especially in the learning process. Education is the main factor determining the nation's progress towards a better, advanced, and quality. The new demands for life in education concerned the Development of electronic-based learning models, commonly known as e-learning. The era of revolution 4.0 requires every educational institution to be able to take advantage of advances in information technology in providing educational services to students, as a provision to face changes and developments in information technology, especially at the basic education level to a higher level of education [1] the urgency of using technology currently, the school always makes efforts to carry out learning following the demands of the current era, although it is still limited. Technology and information are expected to move the world of education in a more advanced direction, and communication will be more accessible. Learning innovation must be done to develop and facilitate the learning process. Educators must be creative by utilizing technology to support the success of learning objectives [2].

Like today, teaching and learning activities in the new average era are a big challenge for teachers. For example, because a) in the teaching and learning process, the teacher does not use engaging learning media in learning and teaching, sometimes the teacher pays less attention to the comprehension and abilities of students; b) students are less focused when

receiving lessons, for example often talking with their peers or doing other work; c) limited infrastructure; d) there is no visible learning innovation, for example in the application of innovative learning models/strategies so that the quality of the learning process has not been fully implemented optimally. This fact must force teachers to develop their teaching methods through creative and innovative processes to teach, especially social studies subjects in class so that social studies learning is not boring for students, especially in class IV SD. Based on the results of interviews and initial observations in January 2022 conducted at SDN Minasa Upa, the researchers found that media use was still limited. Teachers have not been using high technological developments optimally in using learning media. Supportive media will make students more active and make it easier to remember learning well. However, using media, which is still limited and seems monotonous, makes students less developed. The use of media in the IT field is still limited and underdeveloped; the use of media is around pictures, videos, music, and power points—utilization of the media by using the LCD. Most teachers use learning media in the learning process, namely LCD (Liquid Crystal Display).

Seeing the current game habits of children using Android makes researchers interested in using game media as something children like to include in the learning process. Games played later can be used mainly for entertainment or fun but can also be a means of learning and training. This game is expected to hone the intelligence and brain skills of students. Therefore, it is necessary to make educational games that direct students to be active and enthusiastic in learning activities [3]. Therefore, researchers are interested in developing digital game word wall-based learning media. The media is helpful in learning, namely

increasing student enthusiasm in participating in learning. One of the highlights of this word wall game is that it looks attractive and is easy for elementary school students to follow. Using digital games in learning also provides students with new, exciting, and dull experiences.

Wordwall media is a type of learning media that can improve students' ability to master the material [4]. One of the efforts to improve the quality of the learning process, especially for social studies learning subjects in elementary schools, is the teacher's ability to create pleasant conditions for students when learning by using engaging learning resources/learning media in learning. Involving students in learning, mainly by bringing learning elements while playing to elementary school level children, can make learning fun for students. Based on this phenomenon, the researcher is interested in conducting research and Development. Hence, the researcher chose the title: "Development of social science learning media based on digital word wall games in elementary schools."

2. METHODOLOGY

This research is categorized as research and Development. The primary consideration is that this research focuses on product studies in the form of social studies learning tools through digital game word wall-based learning media to improve social studies learning outcomes for elementary school students in Makassar City. The development model used is the 4D model consisting of 4 stages: Define, Design, Develop and Disseminate. The reason for choosing this model is because it aims to produce a product in the form of a word wall game digital media. The products developed are then tested for feasibility with validity and product trials to determine how far students' social studies learning outcomes have increased after learning using digital media game word walls.

This research was conducted at SD Negeri Minasa Upa in the city of Makassar, which has complete infrastructure facilities that facilitate the implementation of learning. The research subjects were teachers and grade IV students who were randomly selected. Data collection techniques were carried out using tests, observation, and questionnaires for the research instruments with media validation sheets, learning achievement tests, observation sheets, and questionnaire sheets.

Data analysis techniques utilizing a) needs analysis to be carried out to find out the responses of teacher and student users regarding the needs of digital game media in learning; b) analysis of the level of validity where the items need to be validated to measure whether they are used in the field. In this study, the items validated were 1) digital game word wall media, 2) media use manuals, 3) Learning Implementation Plans, 4) LKM, 5) teaching materials, and 6) evaluation. c) analysis of the practicability level related to praxis development data analysis (user trials) is carried out to determine the product's practicality so that the resulting product is efficient to use in the learning process through an analysis of teacher and student response questionnaires. d) effectiveness analysis, where at this stage, analysis of effectiveness data is carried out based on the results of the pretest and posttest conducted by students.

3. RESULTS

The initial phase was to analyze the needs of social science learning media, especially at the elementary school education unit level. It is done to obtain accurate information on objective conditions in the field regarding the current needs of IPS learning media. Development research was first carried out using a 4-D development model, namely Define, Design, Development, and Dissemination Thiagarajan [5]. Some of the activities carried out in carrying out an analysis to find the need for the Development of social science learning media based on digital game word walls. The mechanisms carried out are initial and final analysis, student analysis, concept analysis, task analysis, and analysis of the formulation of learning objectives. The next phase concerns the design of digital game-based learning media in social studies learning. For the design results at this design stage, in addition to focusing on digital game word wall-based learning media. The following is the presentation of the results at the design stage, which are described as follows:

a. Results of the Selection of Wordwall Game Digital-Based Learning Media

The media used in this study is a word wall digital game-based learning media. Based on the research results on the Development of instructional media that has been carried out, it can be concluded that students are very interested in varied and fun games in the

learning process. The current trend of online games is making students more enthusiastic about learning. Ifenthaler et al. [6] suggests Assessment in game-based learning. Assessment using a game application makes it easy to assess the results of student work because the results of each group's quiz can be seen directly by the teacher.

b. Format Selection Results

The selection of formats that support the application of digital media word wall games is also supported by the selection of learning tools. Naidu, [7] states that learning with e-learning or web-based media requires guidebooks, procedures, and practices in using a media. The learning tools that support the form of digital media word wall games are equipped with guidebooks for using media for both teachers and students to facilitate the learning process with this media. In choosing the format of this learning device, the researchers focused on social studies learning for class IV in the early semester.

The next stage, namely the development stage (develop), aims to produce learning tools that have been revised and are suitable for testing. Activities carried out at this stage are validating experts and practitioners, simulations, and

limited trials. The results of each activity at this development stage are described as follows:

3.1 Description of Expert Assessment of Learning Media

3.1.1 Media Games Wordwall

The results of validating the use of media in Table 1 show that the use of *wordwall game media* declared "very valid" because it is in category 3 $.6 \leq p \leq 4$, so it is considered feasible to be tested. These data show that using digital media word wall games is valid.

3.2 Validation of the User Guide for Wordwall Game Media for Teachers and Students

Based on the results of the validation carried out by the expert validator on the manual for using the media, it can be seen in the following table.

The results of the validation of the guidebook for using the media in Table 2 show that the guidebook for using the *word wall game media* both for teachers and students stated "very valid" because the average indicator above is in category three $.6 \leq p \leq 4$, so it is considered feasible to be tested. Based on these data, the Wordwall digital media games guidebook for teachers and students is declared valid.

Table 1. Expert assessment of wordwall game digital media

No.	Assessment Indicator	Validators		Average	Information
		V1	V2		
Display Quality					
1.	<i>Wordwall</i> media is interesting for students in learning	4.0	4.0	4.0	SV
2.	<i>Wordwall</i> media can support the achievement of learning objectives	4.0	3.0	3,5	SV
3.	Learning media supports the delivery of material	3.0	4.0	3,5	SV
4.	various types of learning <i>games</i>	4.0	4.0	4.0	SV
Attractiveness					
1.	Combine two or more audio, audiovisual, and animated images and videos	3.0	3.0	3.0	SV
2.	An interactive learning tool	4.0	4.0	4.0	SV
3.	Attractive animation and colors	4.0	4.0	4.0	SV
4.	Pictures, illustrations, various types of games / <i>games</i> that attract students' attention	4.0	4.0	4.0	SV
5.	Presenting quizzes becomes more fun	4.0	4.0	4.0	SV
6.	<i>Wordwall</i> game media can make students actively involved in learning	4.0	4.0	4.0	SV

Table 2. Results of evaluating the validity of media guidebooks for teachers & students

No.	Assessment Indicator	Validators		Average	Ket
		V1	V2		
Display Quality					
1.	Interesting presentation	4.0	4.0	4.0	SV
2.	Text or writing is easy to read	4.0	4.0	4.0	SV
3.	Handbooks for both teachers and students which are accompanied by illustrations and pictures related to the steps for using the <i>wordwall application</i>	4.0	4.0	4.0	SV
4.	Make it easy for students to understand the concept of learning material	4.0	3,5	3,5	SV
Manual Format					
1.	Clarity of instructions for using the media both for teachers and for students	4.0	4.0	4.0	SV
2.	Balance between text and illustrations	3,5	4.0	3,5	SV
3.	Interesting presentation	4.0	4.0	4.0	SV
4.	Compatibility with the steps in using the media for both teachers and students	4.0	4.0	4.0	SV
5.	Presenting quizzes becomes more fun	4.0	4.0	4.0	SV
6.	Easy to understand language	4.0	4.0	4.0	SV

The fourth stage is dissemination (dissemination). Before conducting field trials on using digital learning media based on word wall games, it was validated by experts or expert validators. After that, limited field trials and simulations were carried out using *word wall game media*, then carried out randomly by ten students in class IV B. At this limited field trial stage, this was carried out to observe student activities, student responses, student learning outcomes, and teachers' abilities in using the *word wall game media*. From the results of the deployment, several suggestions were obtained and used to revise the initial draft into the final draft as the final Development of *word wall game media* in class, for example, adding time to work on each game problem. The tools produced at the final stage of Development were then socialized or distributed in a limited way to teachers and grade IV students at SDN Minasa Upa.

Social science learning media based on *digital word wall games* also fulfilled the practicability requirements obtained from the positive responses of teachers and students regarding using word wall digital media games in the social studies learning process. It can be seen from the observations of teacher activities during the social studies learning process in class. Observation of the implementation of learning, in this case, is through the observation sheet of teacher activity in Social Studies learning in Fig. 1 below.

Based on the picture above, it can be concluded that the teacher's ability to manage learning by using digital word wall games in the learning process increases for each class meeting.

In addition, to see the practicality of learning devices using *digital learning media of word wall games* in social studies learning. Teacher response data to the use of *digital media word wall games* can be seen in the following table.

Table 3 below shows that the average value of the teacher's response to the use of *Wordwall game media* for the quality of the content/relevance of the material displayed in the game is very suitable for use in the learning process. The construction of knowledge using digital game word walls is also very suitable for students' Cognitive Development. Meanwhile, ease of access is included in the appropriate category because learning using digital game word walls is also hampered by sometimes obstacles from quotas. The instruments used to obtain data related to student responses in class using *digital media word wall games* can be seen from the results of the student response questionnaire in class, which can be seen in Table 4.

Based on the student response table below, the average student gets a positive response towards using a digital wordwall game from nine indicators. For more details, it can be seen in the graph of the results of the student response questionnaire recapitulation in Fig. 2 below.

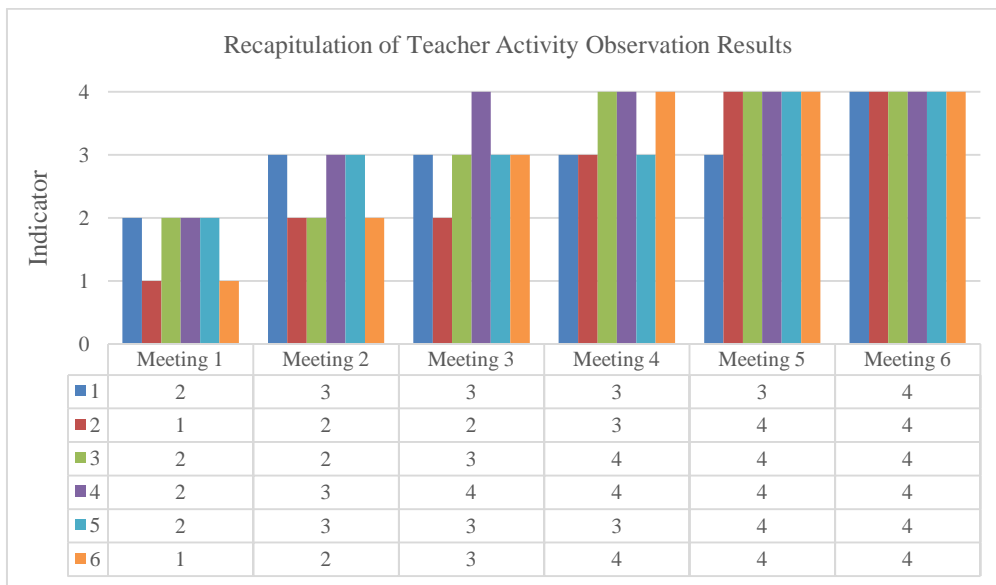


Fig. 1. Teacher activity in Social Studies learning

Table 3. Results of the teacher's response questionnaire to digital wordwall games

No.	Assessment Indicator	Average	Information
1	Quality of Content/relevance	3.80	SS
2	Knowledge Construction	3.75	SS
3	Ease of Access	3,33	S

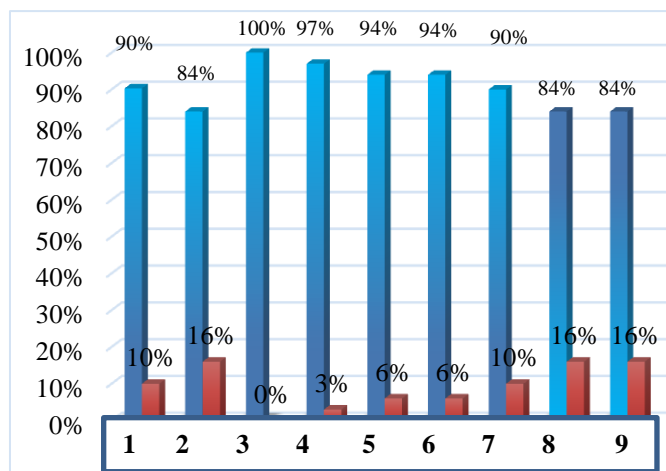


Fig. 2. Results of the student response questionnaire recapitulation

Based on the data in Fig. 2, it shows that most of the students gave positive and effective responses for them to use in the learning process related to the use of *digital game wordwall- based learning media* in social studies learning.

During social studies learning activities using *digital media wordwall games*, the results of data analysis of observations of student activities

show that the teacher always helps students in operating *wordwall games*, pleasant classroom situations in teaching and learning activities by using a *digital wordwall game*, students are getting more compact in finding answers in the game, students are also active in expressing opinions and asking questions between students and other students or between students and their teacher, learning material is presented in an interesting way, and finally the curiosity of

students is getting higher, this is in line with the opinion of Anastasiadis et al. [8] who argue that digital game-based learning presents games that can make students focus and concentrate in learning.

The stages in using *word wall game digital media* that need to be considered are as follows:

- 1) Stages of using *digital word wall games* for students:
 - a. The first step is to search for *word wall* by logging into *Google*
 - b. Then select 'log in to *Word wall*
 - c. Then please register or join; you can join directly using a *Google account*.
 - d. Alternatively, if you choose to use an application, you can download it first in *the Play Store*; after downloading, you can follow the third step, logging in via a *Google account*.
 - e. After logging in, it will look like this; you can access *the Word wall*
 - f. Furthermore, to access *games* related to learning, you can select 'community' and then search in the column 'public activity.'
 - g. However, you can access via a link that the teacher will share this time.
 - h. To change the theme and font, please scroll down.
- 2) Stages of using *digital word wall games* for teachers:
 - a. Open the *Word wall application* via *Google*, or
 - b. Download the *word wall application* via the *play store*
 - c. Register an account in the application or via the web <https://wordwall.net/>.
 - d. You can join using your *Google account* by selecting a *Google account* and entering your account password.
 - e. Select *Create an activity* or *Create an activity*, then choose one of the provided activity *templates*
 - f. To make a game, you can choose a *template* available on the web

- g. After selecting a *template*, enter the content or questions you want to create. Do not forget to fill the title column with the question's name or subject.
- h. After entering content or questions, click 'finished,' and the questions can be played.
- i. After the game is finished, you can share it with students via the link that you can get by clicking 'share' and then copy the link provided
- j. You can also share this game with the public.

Social science learning media based on the digital *word wall games* are practical for social studies learning which improves student learning outcomes as evidenced by increased pretest and posttest results, which can be seen in the following table.

Learning is said to be successful classically if at least 70% of students achieve a complete score. It shows that social science learning media based on the *word wall digital games* developed has been effective; this is reinforced by the data from Table 4 below, which shows that in the *pretest*, classical student passing reaches 71% and after *the posttest* achieves 100% student passing in social studies learning.

4. DISCUSSION

The research and development results explain theoretical and empirical studies on research findings and the Development of social science learning media based on digital game word walls. Sequentially the research findings are presented as follows: (1) the Need for the Development of digital game word wall-based social science learning media, (2) the design of digital game word wall-based social science learning media, (3) the Level of Validity of digital game-based social science, learning media word wall, (4) the level of practicality of word wall digital game-based social science learning media, (5) the effectiveness of the Development of word wall-based digital game social science learning media in improving learning outcomes at SD Negeri Minasa Upa.

Table 4. Description of completeness of learning outcomes

Score	Category	Frequency		Percentage	
		Pretest	Posttest	Pretest	Posttest
< 70	Not finished	9	0	29	0
≥ 70	complete	22	31	71	100

The purpose of the needs analysis carried out is to determine the learning that becomes the limit of media development. The initial stage in this research is Define the needs in the learning process and collect various information related to the product to be developed. In the first stage, it is conducting an analysis related to the needs of social science learning media based on digital game word walls so that several learning objectives can be analyzed through theoretical studies, empirical studies, and analysis related to media development needs.

Based on the results of the analysis of the Learning Implementation Plan, these results provide clues that generally apply direct learning media. Based on these findings, social science learning media based on the digital word wall games adopt the Development of learning media as one of the basics in developing media. The results of interviews with several students and teachers of Minasa Upa Elementary School found several pieces of information, namely (1) students in social studies learning to use media in pictures, videos, PPT, and direct learning media. (2) Still limited in terms of facilities and infrastructure, for example, the number of LCDs or computers that are still limited, (3) teachers are not maximal in using information technology because of their limited ability.

Information about social science learning media based on digital game word walls at elementary school Minasa Upa was obtained through interviews and observations; some information was found, namely: Students have a great interest in the learning process that utilizes social science learning media based on digital game word walls. Based on these data, the integration of digital game word wall-based social science learning media is urgently needed. What distinguishes between previous and current research is that the games presented are varied, and there are more game templates (game backgrounds according to the themes discussed according to the lesson plan. Furthermore, the presentation of this game was, on average, carried out individually or for each student, which was carried out in schools with adequate facilities and infrastructure. In contrast, in this study, the researchers carried out this game not individually but in groups to increase student cooperation in groups and respect for each other. In addition, in learning after the implementation of digital word wall games, the teacher then holds quizzes in the form of questions and answers orally in groups and gives group awards so that students are

more enthusiastic about learning. Following [9] an exciting learning process can improve student learning outcomes, skills, and attitudes in the study.

Based on this information, developing digital-based social science learning media that introduces word wall games in a pedagogic context is a potential alternative. It becomes a fundamental requirement when learning enters the digital era and requires challenging interactions for teachers to create a fun word wall for elementary school students. It follows the opinion of Coman et al., [10], who put forward related to the Development of web-based e-learning media with concepts that can improve teachers' professional abilities in teaching in class.

The initial design stage begins with preparing a word wall game digital media application by preparing a quiz in the form of questions related to the learning objectives achieved on the theme "Various Jobs." The questions designed and game settings used in learning are also different for each meeting. Digital game Wordwall is a digital game application in the form of a web base that provides a wide selection of game features. The selection of media formats has its charm with the characteristics of each game. The Wordwall game digital media has been designed following the types of games designed in the Wordwall application through the PlayStore or via a Google account. After the teacher enters questions related to the material, there is a new feature in the Wordwall application related to templates. Teachers can change templates according to the game's theme/background, then share templates with students more efficiently, especially if using a paid application, so that this game is easier to play/access using Android phones and laptops that the general public can access. Digital word wall games have interesting media variations supported by animation and colors to make students happy with the displayed games. The game uses a digital game word wall, and the processing time for each question can be set so that students can solve the questions appropriately given. In addition, what is new in applying this digital game word wall is that the presentation is not done individually but in groups. Carrying out quizzes in groups using one device in the form of an Android cellphone is a challenge in implementing games because it requires student cooperation in the learning process so that the implementation of quizzes can run optimally.

The components of social science learning media are based on digital word wall games referred to [11]. There are five critical components as a description of the Development of learning media, namely (1) syntax, a sequence of activities in learning that can be called a phase, (2) the social system, namely the role of teachers and students, and the types of rules needed, (3) principles the principle of reaction, which is to give the teacher an idea of how to view or respond to student questions, (4) support systems, the tools and conditions required by the Development of the media, and (5) instructional impact and accompanying impact, student achievement after learning.

The results of the validity of social science learning media based on digital word wall games fulfill the requirements as valid learning media because all the constituent components were declared "valid" by the validator team. The validation test is intended to see whether a media is feasible or not to be used. Media experts carried out this media validation test. Based on the media expert validation of test results, it was obtained in the outstanding category with a few suggestions for improvement. Things that were corrected based on suggestions from the validator related to improving the vibrant background color on the image so that the writing is easy to read, the sound in the game is less audible, and there must be an explanation regarding the stages in using the digital word wall games and the working time given in working on the questions is also too fast. Based on these suggestions, then make improvements at an early stage to correct these deficiencies. The results of these suggestions for improvement then become a reference in idealizing digital game word wall products at the final stage.

The level of the practicability of social science learning media based on digital game word walls can be seen through the implementation of media in learning. The implementation of the Development of social science learning media based on a digital word wall game was stated to be well implemented based on teacher responses and student responses to the Development of digital game word wall based social science learning media; this is following the opinion of Oktariyanti et al. [12]. Implementing the Development of social science learning media based on digital game word walls and learning management was stated to be "very well" and practical. These results were obtained

through a series of improvements/revisions carried out in stages. Based on the first trial, there were some technical problem improvements from observers/observers that needed to be considered for improvements in the implementation of learning, namely (1) the teacher should pay close attention to each learning phase according to the syntax/stages and time used in class, (2) optimizing the use of learning media, especially during face-to-face activities in class, (3) providing the right stimulus during the reconstruction of knowledge to students. All media components and learning management were stated to be implemented very well. The average value of the teacher's response to the digital game word wall-based social science learning media was 90.63% in the Practical category. The results of data analysis on teacher responses to the implementation of digital game word wall-based social science learning media indicate that the media is practical to apply in learning, where the assessment criteria are $\geq 70\%$ of teachers giving a positive response to the Development of digital word wall-based social science learning media. Student responses show that the average value of digital game word wall-based social science learning media is 92.16% in the Practical category. The results of data analysis on student responses to the implementation of word wall-based digital game social science learning media show that the media is practical for students, where the assessment criteria are $\geq 70\%$ of students giving a positive response to word wall-based digital game social science learning media implemented in terms of aspects of syntax, social systems, reaction principles, and support systems. Based on the test results, all components were carried out well.

The effectiveness of social science learning media based on digital game word walls can be seen based on the instructional impact and the impact of accompaniment on digital media word wall games [13]. Based on the results of the games obtained by students during the six meetings with different types of games, such as for the first meeting in the form of Air Plane, for the second meeting by opening the box (Open the Box), the type of game for the third meeting is Quiz, For the fourth meeting, the type of game is Unscramble, the fifth meeting, the type of game played is Find the match. Finally, the type of game played is Maze Chase (Labyrinth). From the six types of games, it has been shown that there is an increase in student learning outcomes through the implementation of quizzes given by

the teacher through digital word wall games in class. In addition, students are more compact in group learning. The results of learning by using the media experienced good Development. An increase in learning outcomes evidences it. The pretest results showed that the average student scored 71.22 in the appropriate category, with a percentage of 71% of students meeting the KKM score.

In comparison, in the posttest, the average student scored 88.26 in the outstanding category, with a percentage of 100% of students meeting the KKM score standard. Students are said to be successful (complete) if they get a KKM score 70. Learning is said to be successful classically if at least 80% of students achieve a complete score. It shows that the Development of digital game word wall-based social science learning media has been effective. Where the above is in line with the previous opinion that digital word wall games can: (1) increase awareness and increase motivation; (2) train skills in making decisions; (3) develop knowledge; (4) communication and collaboration; and (5) integrating learning experiences [14].

5. CONCLUSION

The results of the study indicate that: (1) the need for developing social science learning media based on Wordwall digital games is a fundamental requirement when entering the digital era in learning and requires fun, challenging interactions in the form of Wordwall games for elementary school students; (2) the social science learning media based on Wordwall digital game is designed with the stages of selecting the type of game, compiling a quiz, choosing a format, initial design, and limited trials; (3) the social science learning media based on Wordwall digital game has an adequate level of validity in all components. The aspects of the Wordwall game digital media display, stages, and tests obtained the maximum value from the validators; (4) the social science learning media based on Wordwall digital game met the practicability requirements obtained from the positive responses of teachers and students regarding the use of Wordwall digital media game in line with material and stages of using Wordwall media supported by students' activity in the learning process, and (5) the social science learning media based on Wordwall digital game is practical for social studies learning which improves the learning outcomes proven by the

quiz scores as well as increased pretest and posttest results.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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