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Development of Media *Role Play Game* (RPG) to Improve Student Problem Solving Ability

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ABSTRAK

Tujuan penelitian ini adalah memperluas medium Role Play Game (RPG) dalam rangka meningkatkan kemampuan siswa dalam memecahkan masalah. Jenis penelitian yang digunakan adalah penelitian pengembangan dengan model pengembangan ADDIE *(Analysis, Design, Development, Implementation, and Evaluation)*, dan subjek penellitian adalah siswa kelas VIII SMP Dharma Siswa Kota Tangerang, jumlah 33 orang. Teknik pengumpulan data menggunakan instrumen validasi, akuntabilitas, dan pemecahan masalah. Dari hasil penelitian diketahui bahwa media pembelajaran RPG layak digunakan berdasarkan hasil penilaian validator dan respon siswa setelah menggunakan media pembelajaran, selanjutnya media pembelajaran RPG dapat digunakan dalam pembelajaran untuk meningkatkan kemampuan pemecahan masalah siswa, kemampuan pemecahan masalah siswa meningkat dari 33,30% menjadi 75,75%. Hasilnya, dapat disimpulkan bahwa media pembelajaran RPG cocok digunakan di sekolah dan dapat meningkatkan kemampuan pemecahan masalah siswa.

Kata kunci: Media, *Role Play Game*, Kemampuan Pemecahan Masalah

ABSTRACT

This study aims to provide role-playing game (RPG) instructional materials to help students enhance their problem-solving abilities. The research method employed is development research using the ADDIE development model (analysis, design, development, implementation, and evaluation), with the subjects being grade VIII students at SMP Dharma Siswa Tangerang, totaling 33 subjects. Validation sheets, student response surveys, and problem-solving exam instruments are commonly used data collection approaches. According to the study's findings, RPG learning media is feasible to use based on the results of validator assessments and student responses after using learning media. Therefore, RPG learning media can be used in learning to improve students' problem-solving abilities, which increased from 33.30% to 75.75%. So it can be concluded that RPG learning media is suitable for use in the classroom and can improve students' problem-solving skills.

Keywords: media, role play game, problem solving capabilities

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Introduction

The COVID-19 pandemic has had a major impact on all sectors, including education. The impact caused by the COVID-19 pandemic in the world of education is that learning that can usually be carried out with face-to-face learning must change quickly to online learning (Alwadood et al., 2023). This has a tremendous effect where students and teachers must be able to utilize technology to carry out learning. Learning carried out in the Covid-19 pandemic is synchronous and asynchronous. To be able to carry out distance learning, students need devices in the form of laptops and mobile phones. Some of the

problems and conditions experienced during this online learning are that the learning carried out is not effective, some students' focus becomes divided so that they cannot receive learning properly (Effendi et al., 2021).

Based on a survey conducted that since the implementation of learning during the COVID-19 pandemic, students have used laptop/computer or mobile phone devices more to play *games* than study or find learning resources. This is certainly not good for student development. To reduce the habits of such students is not easy. But there is a way to overcome this, which is to invite students to learn while playing. So that the implementation of learning is more meaningful and students can use these devices properly and wisely. The way that can be used is to provide activities or learning while playing, by using game elements in the learning process.

The situation experienced resulted in *learning loss* which had an impact on not maximizing the student learning process. Addressing this problem requires a material selection strategy that suits the needs of students. This is in line with the Indonesian government's policy regarding the independent curriculum launched by the Ministry of Education, Culture, Research and Technology (Kemdikbudristek, 2021). In this context, it encourages teachers to bring out their creative potential in designing learning, including the development of learning media. Digital technology is very influential on learning today Learning is carried out offline and online learning requires learning media that are familiar to students, which students can use to find concepts and increase understanding.

Game-based learning is one option that can be used. According to (Citra & Rosy, 2020), using game-based learning media can help students learn more effectively. According to (Andari, 2020), using learning material in the form of games can boost student learning completion by 80%. Based on the opinion above, it is known that the use of learning devices in the form of game media can improve learning outcomes and student learning completeness.

Role Playing Games (RPGs) are one sort of game that can be utilized to help with learning. RPG games are open map games that let users to create their own storylines while playing. According to (Amami Pramuditya et al., 2017), (Sari et al., 2014). RPGs are open-ended games in which players can play, interact, and decide what happens in the game. According to (Abror, 2012). A role-playing game (RPG) is a game in which players take on the roles of fictional characters and work together to create a narrative. Players select their characters' actions depending on their attributes, and the effectiveness of those acts is determined by the game's preset system of rules.

RPG games are games that can invite players to think about solving problems because players are presented with stories in the game that make participants have to find solutions to the problems they are facing. According to (Rizqiyah et al., 2019) (Budinurani & Jusra, n.d.) the use of RPG games in the

learning process can develop students' mathematical abilities, one of which is students' problem-solving abilities. Making RPG games can use the RPG maker application. By using the RPG maker application, game makers do not need to master programming languages to be able to make a game. because in RPG maker users can make games easily, because in RPG maker has prepared tools that can be needed to make the game.

The choice of this RPG game is because RPGs can invite players to complete open missions, meaning that players can choose their own solutions and paths to be able to solve the problems faced in the game. This can develop students' problem-solving abilities. Problem-solving ability is or a person's skills in solving problems at hand, how someone plans, takes action and evaluates in the problem-solving process (Sagge & Segura, 2023). In mathematics, problem solving is divided into two, namely 1) solving problems using the usual way; 2) solve problems using methods that you cannot. The second solution is a problem-solving skill, a problem is a problem solving that cannot be solved in unusual ways (Kurniawan, 2015) In problem solving consists of several stages, namely understanding the problem, planning the solution, implementing the solution and evaluating (Weng et al., 2022)

Game is derived from the English term and has the same basic meaning as game. The game here relates to the idea of "intellectual playability." Games can also be regarded as a setting in which players make decisions and take actions. A role-playing game (RPG) is a form of open-ended map game and role-playing game that focuses on the role or roles that the player plays in the game, typically the protagonist, which can change during gameplay. And progress in the way that the player desires. The growth in level typically determines a variety of criteria, such as the character's mental condition, speed and strength, increasingly powerful weaponry, and the number of friends and pets. RPG Maker is an application that allows you to create RPG games. Making RPG games is divided into three stages, namely *Mapping, Database using, Eventing*

Here's a look at RPG Maker

Figure 1. *RPG Maker Game Display*

Problem-solving skills are one of the abilities that a person must have, NCTM recommends that the mathematical ability that students must master is problem-solving ability (Buchori & Puspitasari, 2023). Problem-solving ability has two meanings, namely problem solving as a learning method and problem solving as a goal or ability to be achieved. According to (Sri Sumartini, 2016) (Bonotto, 2008; Umar & Ufi, 2022), there are five problem solving indicators, namely: (1) Identifying problems Solving data adequacy; (2) Build mathematical models and solve everyday problems; (3) Choose strategies applied to solve mathematical problems and/or problems outside mathematics itself; (4) Interpret and explain the results according to the original problem, and check the correctness of the answers; (5) apply mathematics meaningfully.

Research Methods

This research is Research and Development. Development using the ADDIE approach (*Analysis, Design, Development, Implementation, Evaluation*). The resulting product is a development media in the form of a *Role Play Game* which aims to develop problem solving for junior high school students. Research Design can be seen in the following chart:

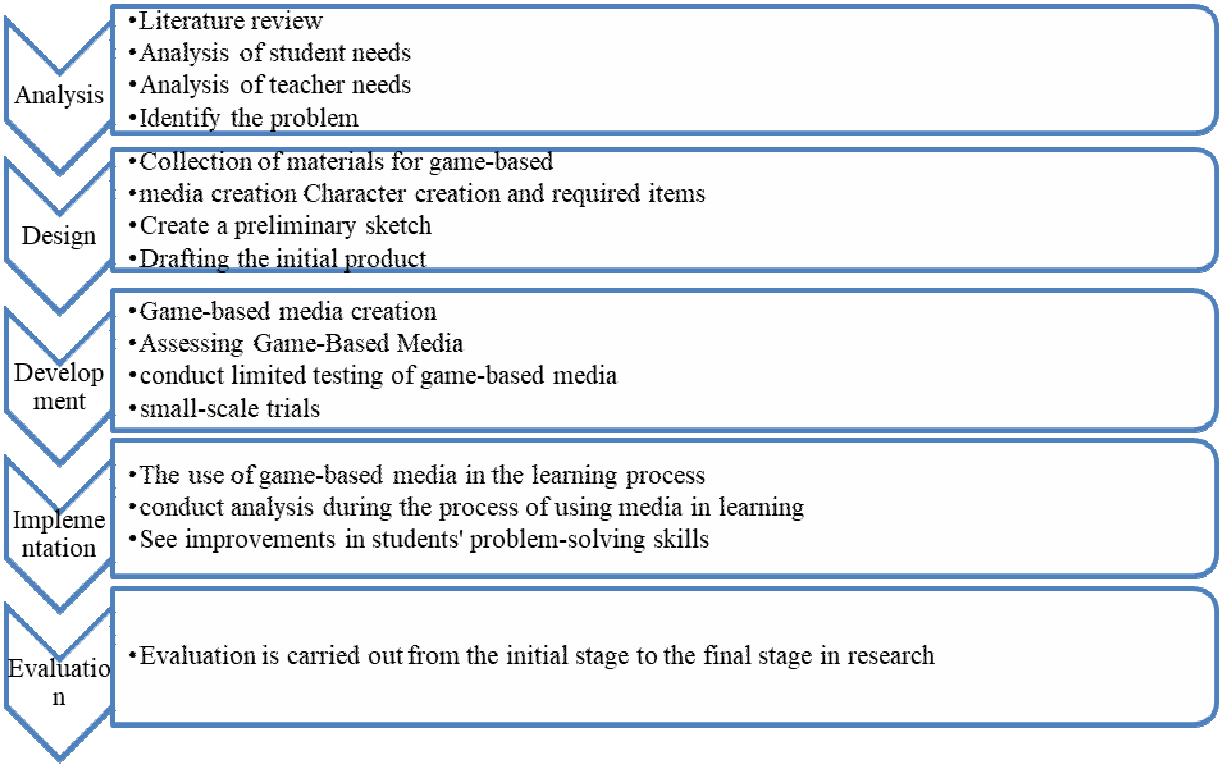

***Figure 2**. Research Phase* (Aldoobie, 2006)

The following are the stages of research carried out

***Table 1.** Development Steps*

Phase	Activities
Analysis	(a) Analysis of student needs (b) Analysis of teacher needs (c) Review of related literature
Design	(a) Collecting materials (b) Collecting the necessary materials Sketching (c) Create a story board
Development	(a) Develop based on initial design (b) Test validation
Implementation	Carrying out Learning using RPG media

The analysis stage is the initial activity in carrying out development, namely analyzing the needs and difficulties of students in the learning process more specifically related to the use of learning media. After analyzing student needs, an analysis of teacher needs for the use of learning media is carried out. From this analysis then proceed to identify problems in learning associated with literature reviews that support the process of research and product development (Abror, 2012) Furthermore, after the analysis stage is the design stage, the design stage is the stage to collect materials in making learning media, after the necessary materials are collected, an initial sketch or storyboard of the learning media is carried out

which will later become the initial product. The next stage is the development stage, at this stage the media has been developed based on the initial design, the finished product is then carried out validation tests and limited trials. At the development stage, validation tests were carried out to two experts, namely media experts and material experts, the instrument used was a validation sheet consisting of questions about recitation, display and language. After the product is declared valid, then proceed to the implementation stage, namely using media in the learning process to determine the impact of using learning media on students' problem-solving abilities (Irawan & Wirasasmita, 2019). At the implementation stage, tests are carried out on students and carry out learning with the instruments used are student response questionnaires and problem-solving ability tests.

At the implementation stage, an analysis of the effectiveness aspect is carried out, the effectiveness aspect is assessed by testing students N-Gain.

To compare pretest and postes scores using the N-Gain Test to find out how much improvement in students' problem-solving abilities. with criteria for improving learning outcomes. The following are criteria for improving students' problem-solving abilities based on N-Gain scores.

Table 2 *Criteria for Improving Problem-Solving Ability*

Score Value	Criterion
N-Gain < 0.3	Low
0,7 ≥ N-gain ≥ 0,3	Keep
N-Gain > 0.,7	Tall

The subject of this assessment was grade VIII students of SMP Dharma Siswa Kota Tangerang consisting of one class with a sample of 33 students. Research subjects were used at the implementation stage to see improvements in problem-solving skills after using role-playing game (RPG)-based learning media. Subjects will carry out learning four times which begin with a pretest and end with a postest. This study used *a one group protest-pretest design* , which compares the results of pretests and posttests to see the improvement of students' problem-solving abilities using the N-Gain formula. The data collection techniques used were validation sheets, student response questionnaires and problem-solving ability tests.

Results and Discussion

Analysis

The analysis stage analyzes the problems and situations experienced. Problem analysis and situation analysis are carried out by observing students and teachers and looking at the learning process that takes place in class. From the observations, it was found that (1) students currently have a low focus on the learning process, this is due to students too often using smartphone devices to play games; (2) low ability of students in problem solving, this is known from the initial test conducted, students are given 5 test questions for problem solving from the test results obtained that 85% of students have not been able to solve problem solving questions; (3) Learning Tools are only limited to LKS and existing textbooks; (4) lack of utilization of learning media used in the learning process. Based on the above problems, to solve these problems and learning that is carried out effectively and efficiently, learning media in the form of Role Play Games is needed to develop problem solving skills.

Design

The design stage, the results obtained from the analysis stage are continued to design *Role Play Game* (RPG) learning media based on problem-solving abilities. Things that are done at the design stage are collecting material that will be included in learning media, compiling the structure of learning media, compiling validation sheets, compiling problem-solving ability test instruments. Here is the structure of the Role *Play Game* (RPG) learning media.

Table 3. *Role Play Game learning media structure*

Media Section	Fill
Splash Page	Log In Page
	Game Instructions
	Basic competencies
	Input player name
Contents Page	Game area
	Game Missions
	arithmetic
Cover	Competence Test

Development

The next stage develops, the development of *Role Play Game* learning media. Researchers develop media based on items that have been arranged at the design stage, the material chosen to be included in learning media is social arithmetic material, media include elements of daily life that aim to make mathematics usable and close to everyday life. The developed media can be used on Android-based mobile phones. The following is the display of media that has been developed:

Figure 4. *Basic competencies page view*

Figure 5. *Player name input page view*

Figure 6. *Play area view*

After being developed, the media goes through the validation stage to determine the feasibility and quality of the media that has been developed. The validation stage involves two experts, namely media experts and material experts. The validation results can be seen in table 3 below:

Table 4. *RPG Media Validation Results*

Aspects	Expert		Average	Criterion
	Material	Media		
Others	76	79	77,5	Good
Language	77	82	79,5	Good
Presentation	81	82	81,5	Good

Display	85	82	83,5	Good
Conclusion			80,5	Good

According to the validation results, the learning media validated by media and material specialists falls into the good category, indicating that the media is viable and appropriate for use in the classroom learning process. Prior to implementation in the media class, adjustments were made based on advice provided by media experts and material specialists.

Implementation

The next stage is implementation, the implementation stage is carried out in class VIIIB SMP Dharma students as many as 4 meetings with a total of 33 students. Students carry out learning using learning media. Before carrying out students were given pretest questions on problem solving skills, and at the end of the meeting were given post-test of problem-solving abilities, which aimed to compare the results of students' problem-solving abilities after using *Role Play Game* (RPG) learning media. After being given post-test, students were also given student response questionnaires to determine student responses to the use of RPG learning media. The following is data on the results of students' problem-solving abilities before and after using RPG learning media obtained from pre-test and post-test.

Table 5 *Troubleshooting capability results*

variable	Pre-Test	Posts
Average	57,80	84,75
MCC	10	25
Number of students	33	33
Completion percentage	30,30%	75,75%
Score N-Gain	0,73	

Table 6. *Results of RPG media student response questionnaire*

Aspects	**Media RPG (%)**
Fill	84
Language	87
Presentation	85
Display	88
Average	85,5
Conclusion	Excellent

From table 5, it is known that there is an increase in students' problem-solving ability after using problem-solving ability-based RPG learning media, this can be seen when the pretest results only 10 students can complete problem-solving abilities, namely by obtaining a score of Minimum

Completeness Criteria (MCC) 75 that has been set, after learning 4 meetings using student RPG media that are completed above MCC to 25 people. Meanwhile, when viewed based on the results of the N-Gain score of 0.73 is in the high category, so it can be concluded that the use of role play game learning media can improve students' problem-solving abilities. Furthermore, based on table 6, it is known that the use of RPG learning media received a very good response from students by getting an average score of 85.5%. For the results of each aspect get a score above 80 so that for aspects of content, language, presentation and display get a very good response from students. The final stage of media development is to evaluate, the evaluation of this media development is to perfect the media based on responses and input obtained from students after using RPG learning media.

Result

This research as a whole went through the analysis stage to find out the needs of students in the learning process, in the analysis stage it was found that students had difficulty in solving problem solving skills. Teachers have not developed interactive learning media so that learning takes place effectively and interestingly. From the results of the analysis, it is known the needs of students and teachers in the learning process, so RPG learning media was developed to improve students' problem-solving abilities. Media developed using the RPG maker MV application that produces RPG learning media. Media RPG contains media about arithmetic for grade VIII students with daily life settings. (Saidah et al., 2022) can be developed and used in the learning process.

The results showed that using RPG learning media can help pupils enhance their problem-solving abilities. According to the findings of (Lastuti, 2018), the utilization of teaching materials can help students enhance their problem-solving skills. This is backed by the belief (Gumilang et al., 2019) that learning through interactive learning media can enhance problem-solving abilities. According to the findings of research (Ramadani & Oktiningrum, 2020)the use of learning media can enhance students' mathematical skills.. This is because interactive learning media used in the learning process can encourage students to think systematically, beginning with identifying problems, planning strategies, implementing those strategies, drawing conclusions, and evaluating each stage that has been completed. The use of interactive learning media such as RPG games can invite students to more actively participate in the learning process, which is in line with the results of research conducted by (Baharuddin et al., 2020). The use of interactive learning media can increase student effectiveness in the learning process.

Conclusion

From the implementation of research that has been carried out from the initial stage to the final stage, it is known that a learning media is needed with the aim of a better learning process, so that RPG learning media is developed that aims to develop student problem-solving. Learning media that have been developed can be used and declared valid from the results of validator assessment with an average score of 80.5% which is in the good category, then the media is assessed from student responses obtained a score of 85.5 with a very good category, so that the use of RPG learning media to develop student problem solving can be used in the learning process. Furthermore, the implementation of media to improve problem solving ability is known that there is an increase in problem solving ability with an increase in the percentage of completeness from 33.30% to 75.75%. So that RPG learning media can be recommended for use in the learning process to improve students' problem-solving skills.

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