



Development of Educational Game-assisted Accounting Learning Media Based on Role-Playing Game to Improve Students' Analytical Abilities

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Abstract: This study aims to develop educational game-assisted accounting learning media based on role playing game to improve students' analytical abilities. This study uses the Research and Development (R&D) method with the ADDIE model with 32 students as research subjects. The data collection technique used is a questionnaire in the form of a validation sheet, a student response questionnaire, and a test sheet to measure the effectiveness of the media. The data analysis technique used is a descriptive technique. The results of this study showed that the educational game learning media developed is valid with an average score from media experts of 88%. Furthermore, the study of student questionnaires showed a positive reaction of 90% practical and effective with N.Gain 80. This study concludes that educational game media can improve students' analytical skills, especially on the subject of bank reconciliation.

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Introduction

Education must be adaptive to change to avoid gaps (I Putu Eka Indrawan, I Made Sutajaya, 2022). The development of the digital world today has an impact on various aspects of life, including the world of education, which can bridge the present with the future. Technological developments greatly influence teaching and learning activities, educators are required to keep up with current developments in the hope of being able to utilize existing technology (Arliza et al., 2019). The development of technology itself is an answer to educational needs, changes in the education system cause changes in learning activities. The changes that occur affect the role of teachers as educators. (Naimi et al., 2023).

One way to make the learning process interesting for students is to use digital-based teaching materials. (Al-Fitrie et al., 2023). Digital teaching materials can provide feedback to students and help them in decision making and improve performance during learning activities. (Nieto-Márquez et al., 2020). The provision of digital teaching materials is closely related to the use of media. Using the right media in conveying lesson material will provide good results. In the digital era like today, teachers and lecturers must have creative ideas related to learning media. Success will be achieved if students can easily receive information on the lesson material. (Akrim, 2018).

In today's digital era, teachers and students are no longer unfamiliar with gadgets with increasingly sophisticated and developing technology. The development of digitalization is expected to provide convenience and great benefits for education in Indonesia to access all information, develop all media and learning support tools and is expected to be part of the progress of Indonesian education today. (Fadhillah & Khairani, 2024a). Currently, the rapid development of smartphone technology allows for various features, not only as a means of



communication but also multimedia. Students in Indonesia also mostly have smartphones. Although there is a potential negative impact of smartphones on students, such as causing addiction, smartphones also have the potential to play a role in attracting student participation in learning activities. (Wijaya et al., 2024). Smartphones are also more flexible because they can be carried anywhere easily. (Indriyani & Mufit, 2023).

The use of smartphone technology can attract students to learn (Restyayulita et al., 2023). Therefore, smartphone media can be used as a means for implementing learning planning. In higher education, it is very important to use smartphone media. The use or development of media should be a concern for teachers or lecturers in every learning activity so that effective learning objectives can be achieved. (Sari et al., 2022) Accounting education as one of the fields that plays a major role in the world of business and economy must be able to adapt quickly to these changes. Conventional accounting learning tends to use lecture methods and textbooks, which are often considered less interesting and difficult.

Based on teaching experience, conventional accounting learning often faces challenges that hinder effectiveness and efficiency. In the teaching and learning process, many students complain about reconciliation of bank material. Students consider that bank reconciliation material is difficult to understand. In fact, one of the skills that accounting students must have is being able to analyze bank reconciliations. Conventional accounting learning often focuses more on theory than practice. This causes students to lack the practical skills needed in the world of work (Fadhillah & Khairani, 2024b). This gap between theory and practice is a major challenge in preparing graduates who are ready to work. Of course, this is not solely the fault of the lecturer in teaching, many other factors influence student success in learning. The application of educational games in the accounting learning process is certainly an effort to improve students' analytical skills in examining the financial activities of a company.

Based on these problems, an interactive and innovative learning media can be presented which can be created by utilizing information and communication technology which has developed rapidly in society, one of which is by using games. Game applications in smartphones can also be used in learning. These android-based games are often called educational games. Educational games can be a fun, enjoyable learning medium that has a series and can cause addiction. (Asriyatun & Nugroho, 2014).

One of the existing game genres is Role-Playing Game (RPG). Role Playing Game (RPG) can be used as a learning medium in accounting learning. Samuel Henry in (Asriyatun & Nugroho, 2014) menyatakan bahwa RPG merupakan game yang pemainnya akan berperan menjadi sebuah Characters. The development of an interesting storyline allows players to understand what is happening around the game characters. This creates an experience that sticks in the player's memory (Swadyaya, 2019). RPG (Role Play Game), is a game where the player can control one main character in a story. As the main character, the player can interact, explore, and play a full role in the story. In addition, RPG games are played like a drama using a long storyline to complete the mission of an RPG game. The advantage of RPG games is that they can display images in an interesting way (Rianto, 2020).

From the description, the author created a learning media by utilizing smartphone technology that is expected to overcome problems and contribute to the accounting learning process, namely by developing an educational game accounting learning media based on Role-Play Game (RPG) to improve the analytical skills of accounting education students.

Research Method



The method used in this research was the Research and Development (RnD) method using the ADDIE model which consists of five stages, namely Analysis, Design, Development, Implementation, and Evaluation (Sugiyono, 2015). The development in this study is used to produce a product by conducting several tests to obtain the results of the product being developed to be effective and attractive. The study attempts to design, compile, develop and create and even perfect the learning devices that have been implemented. The selection of this development model was based on the advantages of the ADDIE model, namely: 1) simple and structured development stages, 2) revisions at each stage, 3) non-linear stages, namely being able to return to the previous stage (Arliza et al., 2019). Due to the limited time for conducting the research, this research only reached the stage of limited trial implementation.

The subjects of the study were students of Accounting Education at the Muhammadiyah University of North Sumatra who had taken intermediate financial accounting courses, as many as 32 students and 3 validators consisting of 1 media expert (Information Technology lecturer, 1 material expert (Accounting Lecturer who is a member of a professional association) and 1 practitioner (Accounting Lecturer). The research instruments used in this study consist of: validation sheets by experts, and student response questionnaires. Validation sheets are given to media experts, material experts, and practitioners. While the student response questionnaire sheets are given to students who are the subjects of limited trials.

The data analysis technique for analyzing data from the development of accounting learning media development process was descriptive. (1) Descriptive techniques are data analysis techniques used to process qualitative data in the form of comments and suggestions. (2) The data analysis technique for analyzing the quality of media which includes validity, practicality, and effectiveness was a descriptive statistical analysis technique.

The formula used is : $P = \frac{\sum x}{n} \times 100\%$

Experts and students fill out the instrument with a scale, then the validation qualification results are converted into percentages.

Table 1. Product Validation Percentage Data Assessment Criteria (Maulida, 2022)

Percentage	Qualification
80% - 100%	Worth
60% - 79%	Decent Enough
50% - 59%	Less Feasible
< 50%	Not Feasible

Analysis of the level of students' analytical ability, derived from pretest and posttest scores can use normalized gain scores. Normalized gain can be calculated using the n-gain formula. The determination of the conclusions reached is based on the N-gain category and is explained in table 2.

Table 2. Interpretation of Modified Normalized Gain (Maulida, 2022)

Normalized Gain Value	Interpretation
-1,00-1,00 ≤ g < 0,00	There is a Decrease
g = 0,00	There was no increase
0,00 < g < 0,30	Low
0,30 ≤ g < 0,70	Middle
0,70 ≤ g ≤ 1,00	High

Results and Discussion



The Process Of Developing Accounting Media The Analysis Stage

The analysis stage is the initial step in determining solutions to the problem. At this stage, the researcher carried out two stages of analysis related to the research to be carried out, namely performance analysis, namely analysis of problems in ongoing learning. Based on the results of the interviews that have been conducted, it can be explained that the teaching materials used by lecturers are mostly still using references or books, journals from other people, as well as the learning media used by lecturers are still very limited to powerpoint and video displays from other people's work, so that students feel bored and fed up, from the results of this analysis and interviews it was also found that there were several students who had low academic abilities or had not reached the minimum value set by the lecturer at the beginning of the lecture, especially the subject of bank reconciliation.

The lecturer's statement is the same as that expressed by other lecturers and the same thing was also conveyed by several students who took intermediate financial accounting courses. The limitations of learning media used in the learning process can certainly hinder the process of student understanding and can cause boredom in the learning process. The problems experienced by students certainly require solutions that can increase student motivation during learning, including the use of varied, creative and innovative learning media that can help students to be more interested in learning activities. After the problems in learning have been analyzed, the next step taken by the researcher is to look for various references related to the development plan that will be carried out by the researcher, whether from books, journals or e-books about developing learning media in the form of educational games.

Design Stage

The Design Stage in the ADDIE research and development model is a systematic process that begins with designing the product concept and content. At this stage, the researcher begins by creating a design concept for making media. In the design of the learning media, the researcher added features in the form of people talking about bank reconciliation and a soundtrack in the form of instrumental music that has been provided by the RPG application, with the hope of making it easier for students to understand the bank reconciliation material. Next, the researcher chooses the learning media that will be designed or designed, namely in the form of educational games. This is because the nature of the game that is designed is easy to play and fun to play, and the active response of students when the game is applied in learning. The material selected in this study is accounting material with the main topic of bank reconciliation. The learning media designed in this study is an educational game assisted by the RPG Maker MV application.



Figure 2. Cover

Figure 2 is the initial display (cover) of the media developed by the researcher. This display explains the Bank reconciliation material.



Figure 3. Background

Figure 3 is the background of the game application. The researcher selects the image to be added to the map in the group image. After selecting the image, click on the design section, the map will adjust to the selected image.

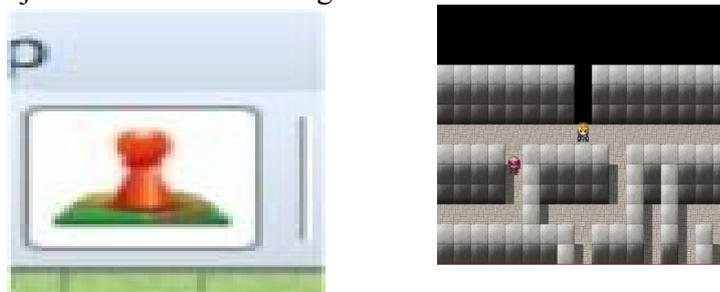


Figure 4. Even on the application

In Figure 4, the researcher entered an event. The event chosen in this game is the maze.

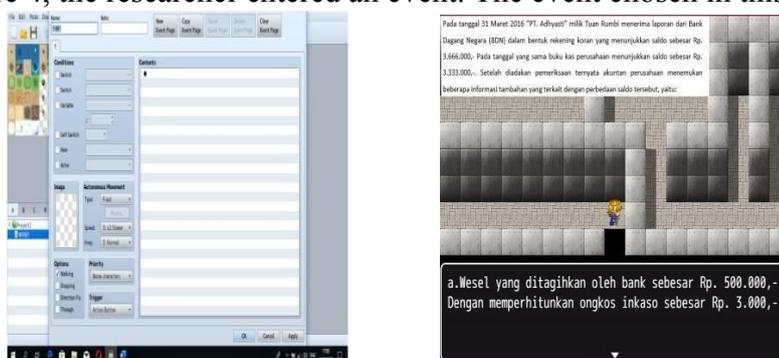


Figure 5. NPC or Characters in the game

In figure 5, the menu is used to display npc or characters other than players and create events such as displaying text asking questions or moving the main character to the next location. In the image column, it can be changed to a computer character that can talk or ask questions.

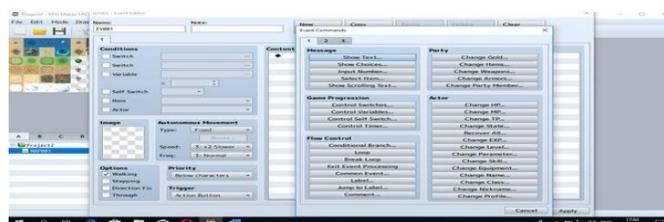


Figure 6. Content Column



In Figure 6, the researcher fills in the content column. This column can be filled with events such as displaying text, asking questions or moving the player's display.

Development

At this stage, researchers assess the products that have been designed to ensure that the product is innovative and ready to be implemented. To achieve this, validity tests and revisions are carried out if necessary. In addition, development tests and effectiveness tests were also carried out to ensure that the product has met the required standards. After the product is declared valid, it is continued to the next stage. Validation of educational game learning media assisted by RPG is assessed through a feasibility instrument given to material experts and media experts. The experts provide assessments, comments, and suggestions on the validation sheet used by researchers to develop the product. The validation results become a reference for improving media development. The results of the assessment of material and media experts are as follows:

Table 3. Recapitulation of Validator Values for Educational Game Learning Media

No	Assessment Stages	Total Score	Average Score	Percentage	Criteria
1.	Material Expert Assessment	99	2,83	71 %	Quite valid
2.	Media Expert Assessor	94	3,03	76%	Quite valid
3.	Practitioner Expert Assessment	104	3,00	74%	Quite valid
All experts' assessment				74 %	Quite valid

Based on the results of the first expert validation of educational game learning media, it was at 74% or declared valid with revision. Next, the researcher revised or improved the educational game learning media according to the suggestions of experts and practitioners. Based on the results of data processing from expert validation, the final result of this stage is data in the form of educational game learning media and questions that are suitable for testing (material for effective testing). The results of the assessment of educational game learning media by the validators can be presented in table 4.

Table 4. Recapitulation of Validator Values for the Revision of Educational Game Learning Media

No	Assessment Stages	Total Score	Average Score	Percentage	Criteria
1.	Material Expert Assessment	121	3,46	89 %	Valid
2.	Media Expert Assessor	113	3,4	91 %	Valid
3.	Practitioner Expert Assessment	119	3,65	85 %	Valid
All experts' assessment				88 %	Valid

Based on table 4, it can be obtained that the results of the assessment carried out by the experts, the average assessment of the experts is 88%, so based on the media validation criteria table presented in the recapitulation table of validator values for learning media, the educational game accounting learning media is at the first level with a validity level of "Feasible or good without revision" to be used in limited trials.

Implementasi

After going through the development stage and getting validation from experts, the next stage is the implementation stage. At this stage, a limited trial was carried out to find out how students responded to the educational game learning media. The limited usage test was conducted on 32 Economic Education students who took intermediate accounting courses at



the Economic Education Study Program at the Muhammadiyah University of North Sumatra. The following is a table of data from the limited trial results:

Table 5. Recapitulation of Student Response Questionnaire on Educational Game Learning Media

No	Assessment Stages	Total Score	Average Score	Percentage	Criteria
1.	Display aspect	432	3,60	90%	Valid
2.	Presentation of material	610	3,63	91%	Valid
3.	Supporting aspects of presentation	598	3,56	89%	Valid
4.	Communication and visual aspects	257	3,57	89%	Valid
5.	Usefulness aspects	352	3,67	92%	Valid
Average Percentage				90 %	Valid

Based on Table 5, it is known that the students' response to the game learning media is very good, which shows an average of 90%, based on the validation criteria table for the assessment of learning media, the educational game learning media is at the validity level of "Feasible or good without revision" so that the educational game learning media is suitable for use. The results of the media user practice, the assessor did not provide suggestions or input that were of an improvement nature to the game media. The assessor only provided a general response to develop the game so that more games can be played and used as independent learning media.

Evaluation

The implementation of the effective test was carried out on students taking intermediate financial accounting courses totaling 32 students. In this stage, the researcher used the N-Gain test with the aim of determining the improvement in students' academic abilities. The emphasis on the improved ability is the students' analysis ability. After students carry out learning with educational game media that has been developed previously, then students are given test questions to analyze financial transactions in the company. The test was carried out twice, namely before using educational game media and after using educational games. Based on the results of the study, there was a difference in students' academic abilities after using educational game learning media. This can be seen from the learning outcomes during the pretest and post-test in table 6 as follows:

Table 6. Results of Students' Analytical Abilities with Educational Game Media

Information	Pretest	Post-test	N-gain
N	32	32	32
Mean	49,69	80,22	.5850
Median	50,00	80,00	.67
Standard Deviation	10,772	7,308	.1331
Varian	116,02	53,40	.018
Range	8	2	.53
Minimum	40	25	.29
Maximum	40	65	.82
	70	90	

Based on table 6, the analytical ability shows that the pre-test results show the lowest score, which is 30. There were 7 students who got the lowest score, while 21 people got scores in the range of 50 to 65, and 4 people got a score of 70. After implementing educational games,



there was a change in the students' analytical skills or grades, namely out of 32 students who used educational games, 5 students got a score of 90, while 25 students got a score of 80, while the remaining 2 students got a score of 65. Although there are still students who get grades below the minimum passing criteria, their numbers are decreasing.

Discussion

The media developed by the researcher is an educational game media assisted by RPG for students' analytical skills. The results of the study indicate that educational game media assisted by RPG is valid, practical and effective to be used to improve the analytical skills of students in the accounting education study program. The use of educational games as a learning medium makes the learning activities carried out not monotonous and can prevent students from feeling bored because students feel more involved in learning activities so that students become more active (Saputra et al., 2023). As said by (Dwiyono, 2017) Educational games can encourage students to learn actively and creatively through several challenges provided.

The use of educational games as a learning medium makes learning activities less monotonous and can prevent students from feeling bored because students feel more involved in learning activities so that students become more active (Damarjati & Miatun, 2021). The use of games in learning can make learning more relaxed and can stimulate students to learn more actively in solving problems. Through educational games, the learning atmosphere becomes more interesting (Sutopo & Setyantoro, 2020). Games make students do fun gaming activities so that they can attract students' interest in learning (Supandi & Senam, 2019).

The use of educational games in the implementation of learning can also attract students' interest in learning. In line with this (Supandi & Senam, 2019) said that games make students do fun gaming activities so that they can attract students' interest in learning. Furthermore (Naputri et al., 2016) said that students' thinking ability can be influenced by learning interest. With a high learning interest, motivation will arise from within themselves which makes students more active and can develop their thinking ability in the learning process.

The development of this media is in line with the media development that has been carried out by (Asriyatun & Nugroho, 2014). The use of educational games based on RPG Maker XP can improve student learning outcomes. Furthermore (Nilza Humaira Salsabila, 2019) stated that the developed game media must be able to improve students' cognitive and affective aspects, such as understanding concepts and interest in learning. Improving the quality of learning by integrating technology is an important thing to do.

Conclusion

Based on the research result, it can be concluded that the educational game learning media developed is valid with an average score from media experts of 88%. Furthermore, the study of student questionnaires showed a positive reaction of 90% practical and effective with N.Gain 80. This study concludes that educational game media can improve students' analytical skills, especially on the subject of bank reconciliation.

Recommendation

This media development research develops accounting media with role play game (RPG) applications only on bank conciliation materials. For other lecturers, they can develop RPG application media on other materials that can improve students' understanding in accounting learning.



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