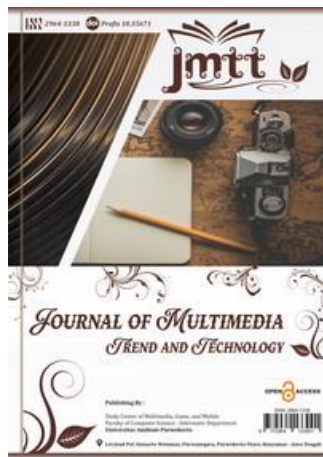


Interactive Game Model in Drill and Practice Learning to Increase Student Learning Achievement

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ABSTRACT

In order to enhance student learning outcomes, this research attempts to develop multimedia learning using a drill and practice methodology. The research and development approach, also known as research and development (R&D), was employed in this study. Assess the media's performance and determine how feasible it is to test this game in real-world settings. It is intended that this game would contribute to better learning outcomes for students. Along with determining students' opinions and interests in learning through drill-and-practice multimedia learning methods, this study also seeks to ascertain the viability and validity of the created interactive quiz game as well as students' evaluations of the multimedia. A field survey administered to middle school students and a student assessment questionnaire for interactive quiz games were the two types of questionnaires employed in this study. The study's findings showed that nearly all students responded favourably to learning that combined interactive quiz games with drill and practice multimedia learning models; additionally, students evaluated the interactive multimedia learning quiz games extremely well, scoring 91.979% on the assessment scale; and learning outcomes increased.

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INTRODUCTION

The development of information and communication technology has had a major impact on various areas of life, one of which is education or learning[1]. Education must think about and implement learning that suits students' needs and packages the learning process in a more meaningful, interesting way, follows developments in science and technology, and can help students improve their learning achievements[2]. In the learning process, computers have been involved as a learning tool[3].

Nowadays, computer-assisted learning media has developed in almost every subject. Computers have a role as auxiliary or supporting media in the learning process or commonly known as Computer-Assisted Instruction (CAI)[4].

There are many models offered by CAI, one of which is the drill and practice model. This method is very interesting to develop, especially when applied in the form of games[5]. Game technology can motivate learning and engage players, making the learning process more enjoyable. On the other hand, playing games is an activity that is familiar to most students. In fact, quite a few students play games as a hobby, as the results of a survey conducted by Walsh showed that 92% of children aged 2-17 years play video games and computer games[6][7].

(American) teenager will spend 10,000 hours playing games on the computer as long as he completes the required courses received at school. In connection with this idea, this research was carried out in order to create educational games as a medium to assist drill and practice learning. Interactive quiz games are software specifically designed to improve learning outcomes by creating practice questions and are presented in the form of games with certain rules and are expected to be used as learning media that can make the learning process more interesting so that students' interest and enthusiasm arises and so that they can improve student learning outcomes[8].

In multimedia principles, there are two things that must be considered in multimedia. The first is ease of navigation, which means a program must be designed to be as simple as possible. Second is cognitive content, where the program content must provide the cognitive experience (knowledge) that students need[9].

In connection with the criteria for multimedia, a field survey was also carried out among students to analysis the needs for multimedia to be developed from the user's perspective. In connection with ease of navigation, multimedia is expected to provide simple links or link buttons to make it easier for students to see the desired material and be responsive to student commands[8][10]. Regarding learning packaging in multimedia, multimedia is expected to be interactive, not boring, use language that is easy to understand, and provide intelligent solutions in solving problems contained in the material[11]. Regarding multimedia displays, multimedia is expected to be displayed in a form that is popular and popular with students. In connection with the experience that students want, multimedia is expected to provide a learning experience that makes it easier to understand material[12]. Multimedia must be interactive in the sense that students are directly involved in learning with multimedia, not just the presenter who acts actively. The material contained in learning multimedia is material related to the lesson[13].

The use of games in learning has been known to have various benefits for students and the learning process as a whole[14]. Games offer a fun and engaging learning experience, which can increase student engagement and motivate them to actively participate in learning. Games often challenge students to solve problems, make decisions, and think critically in order to achieve game goals[15]. This helps strengthen cognitive skills and problem solving skills. Games often provide opportunities for students to learn independently and independently, by providing immediate feedback and providing challenges tailored to individual skill levels[16]. Many games are designed to be played in

teams or groups, encouraging students to collaborate, communicate, and work together to achieve a common goal[2].

METHOD

The method used in this research is the research and development (R&D) method. The development method used is a method adapted from multimedia development methodology such as game design in general, which includes five stages, namely the analysis stage, design stage, development stage, implementation stage and assessment stage[1].



Figure 1, Research & Development Model

In making this interactive multimedia learning quiz game, several software are needed, including:

- (1) Microsoft Visual Basic is used as the main software in creating the interface and components needed to create an interactive quiz game.
- (2) Adobe Flash, is used as software to create animations to make the appearance more attractive.
- (3) Adobe Photoshop, is used to edit and manipulate images which will later be used as display designs and animations.

RESULT

From the results of the literature study and field survey carried out, a needs analysis was obtained as a general description for building interactive multimedia learning quiz games. The results of the needs analysis are as follows:

- (1) The interactive quiz game that will be built adapts the interactive quiz game type.
- (2) The interactive quiz game that will be built is interactive by providing challenges in the form of practice question games related to the lesson.
- (3) The interactive quiz game that will be built can evaluate student learning outcomes, namely how many questions were answered correctly.
- (4) The interactive quiz game that will be built can be installed and run on any computer and is easy to use or navigate.

Multimedia users of this interactive quiz game learning are pupils, students and the general public who use it as a tool for practicing questions.

To build an interactive quiz game, a flowchart is first created which will describe the sequence of user interface displays on the multimedia. The interactive quiz game flowchart is as follows:

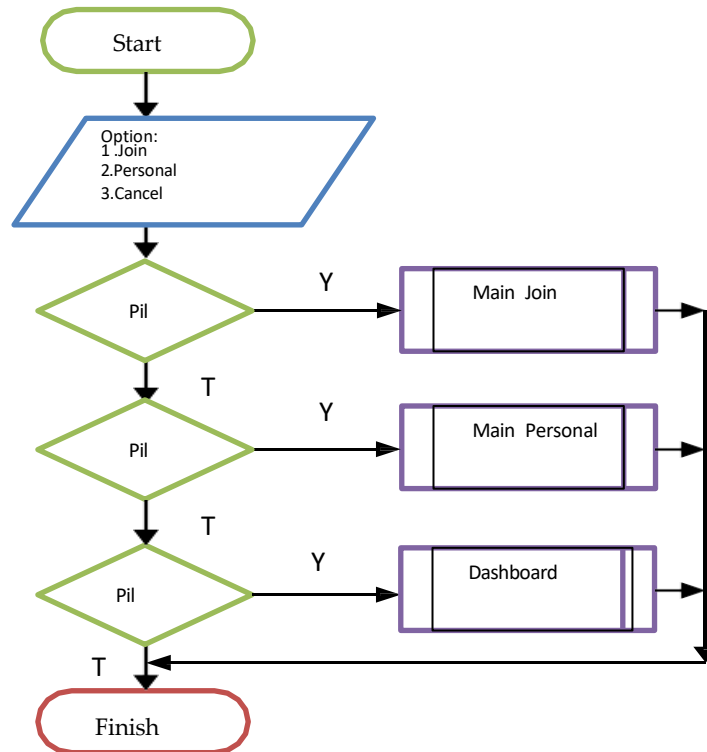


Figure 2, Interactive game design phase.

This storyboard design contains the storyline of this game which will be presented in the form of writing and images. The storyboard for the interactive quiz game is as follows:

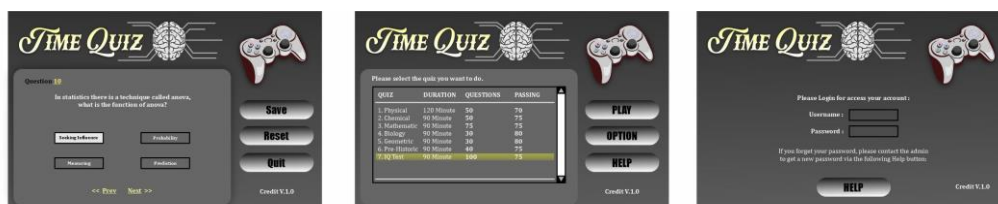


Figure 3, Game Interface Design Model.

The main menu display when the first interactive quiz game is run has a menu and exit buttons. Click the menu button and a menu appears that users can choose from, namely info, score, how to play, add questions, and play. Interactive quiz writing animation and menu button animation when clicked the menu appears and hides when not clicked. Click the play menu then a form will appear as above and enter the name, click the OK button to start the game. Two options help discard two wrong answers and ask a friend. When the answer is correct, an answer will appear from the system with animated cartoon characters. Then in the game there is also a button sound when clicked.

The next stage is the implementation stage where the interactive quiz game that has been produced is tested on students to play it as users of drill and practical learning multimedia. This trial was carried out in the computer laboratory of one of the secondary schools. In the computer laboratory where this research was conducted, there are 20 computers that have the following specifications:

- ✓ Intel Dual Core 2.2 GHz processor
- ✓ 1 GB RAM memory
- ✓ 20 GB hard disk
- ✓ VGA 512 MB

In terms of hardware, these specifications are considered sufficient to be able to run interactive quiz games.

After using the interactive quiz game, students are given a questionnaire to assess the interactive quiz game with assessment aspects including navigation buttons in the interactive quiz game, the appearance of the interactive quiz game, ease of use of the interactive quiz game and the interactivity of the interactive quiz game. From the questionnaire given, the data obtained is presented in the following table:

Table 1, Recapitulation of User Validation Questionnaire

Aspects	Score	Criterion	Percentage
Navigation inside the interactive quiz game			
Navigation buttons are easy to understand	104	120	86%
Easy to understand display	105	120	85,44%
Attractive appearance	110	120	85%
Navigation buttons are easy to use	116	120	87,3%
Ease of Use of Interactive Quiz Games			
Easy to use	108	120	92%
Comfortable to use	112	120	92,4%
Interactivity is easy to understand	111	120	85,88%
It is interactive in helping to understand the material being taught	117	120	90,3%
TOTAL	883	960	

The criterion score or maximum score is $24 \times 8 \times 5 = 960$. With 24 being respondents who filled out the questionnaire, 8 is the number of statement items and 5 is the highest score for each item. If we compare the results of the student assessment questionnaire for the interactive quiz game with the criteria scores, we get $883 : 960 = 0.91979$ or a percentage of 91.979%. Based on this, it can be concluded that almost all students gave an assessment that could be categorized as Very Good on the interactive quiz game they had used.

CONCLUTIONS

Based on the results of the research and development that has been carried out, several conclusions can be drawn as follows, (1) The use of multimedia learning with drill and practice models with interactive quiz games can improve student learning outcomes. (2) Based on the results of the questionnaire, almost all students gave positive responses regarding learning that uses drill and practice multimedia learning models, in the context of which it can be beneficial, interesting, and can improve student learning out-comes.

From the research and design of the interactive quiz game that has been built, there are several suggestions that the researcher would like to convey, including the following: The interactive quiz game that has been produced still has various limitations both in appearance, in terms of interactivity and the features provided, therefore for future researchers who Regarding the development of drill and practice model learning

multimedia, more in-depth research and development is needed to produce learning multimedia that is more interactive, rich in features and useful. The effectiveness of the interactive quiz game produced is not yet known, therefore future researchers can use the drill and practice learning multimedia that has been produced to research the effectiveness of its use.

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REFERENCE

- [1] Q. Zhong, "Design of game-based collaborative learning model," *Open J. Soc. Sci.*, vol. 7, no. 7, pp. 488–496, 2019.
- [2] M. Minović, M. Milovanović, and D. Starčević, "Modelling knowledge and game based learning: model driven approach," *J. Univers. Comput. Sci.*, vol. 17, no. 9, pp. 1241–1260, 2011.
- [3] W. T. S. Putra, S. Zakir, Z. Sesmiarni, and others, "Desain Media Pembelajaran Game Edukasi pada Mata Pelajaran Sejarah Kebudayaan Islam Kelas X di MAN Sibolga," *Intellect Indones. J. Learn. Technol. Innov.*, vol. 1, no. 1, pp. 112–124, 2022.
- [4] N. A. M. Zin, A. Jaafar, and W. S. Yue, "Digital game-based learning (DGBL) model and development methodology for teaching history," *WSEAS Trans. Comput.*, vol. 8, no. 2, pp. 322–333, 2009.
- [5] X. Luo, X. Wei, and J. Zhang, "Game-based learning model using fuzzy cognitive map," in *Proceedings of the first ACM international workshop on Multimedia technologies for distance learning*, 2009, pp. 67–76.
- [6] D. Siegle, "Technology: Student Animation Projects: An Avenue to Promote Creativity and Learning," *Gift. Child Today*, vol. 37, no. 3, pp. 194–199, 2014, doi: 10.1177/1076217514532276.
- [7] K. R. Winatha and I. M. D. Setiawan, "Pengaruh game-based learning terhadap motivasi dan prestasi belajar," *Sch. J. Pendidik. Dan Kebud.*, vol. 10, no. 3, pp. 198–206, 2020.
- [8] W. Novayani, "Game genre for history education game based on pedagogy and learning content," *J. Komput. Terap.*, vol. 5, no. 2, p. 471321, 2019.
- [9] R. Herwina, L. Husnita, and J. K. Junaidi, "Pengembangan E-Modul Berbantuan Sigil Software Pada Mata Pelajaran Sejarah di Tingkat SMA," *J. Pendidik. Tambusai*, vol. 7, no. 3, pp. 20292–20300, 2023.
- [10] N. H. Khairunnissa, M. Akbar, and S. Sauda, "Development of Gate Game Applications Using the IMSDD Method," *J. Inf. Syst. Informatics*, vol. 2, no. 1, pp. 1–11, 2020.
- [11] M. Ahmad, "PENGARUH PENGGUNAAN MODEL PEMBELAJARAN SAINTIFIK TERHADAP MINAT BELAJAR SISWA MATA PELAJARAN BAHASA," *J. Inov. Media Pembelajaran*, vol. 1, no. 1, pp. 28–33, 2023.

- [12] A. Aruna, L. Inayah, M. F. A. Roziqin, and A. R. Prasetyo, "Rancang desain media pembelajaran berbasis game sejarah perjalanan jendral Soedirman dalam perang gerilya Kabupaten Pacitan," *J. Basicedu*, vol. 5, no. 5, pp. 3866–3882, 2021.
- [13] D. Atmajaya, "Implementasi Augmented Reality Untuk Pembelajaran Interaktif," *Ilk. J. Ilm.*, vol. 9, no. 2, pp. 227–232, 2017, doi: 10.33096/ilkom.v9i2.143.227-232.
- [14] N. S. Khairuddin and R. Mailok, "Pembelajaran Berasaskan Permainan Dalam Mata Pelajaran Sejarah Menggunakan Teknik Mnemonik: Game Based Learning in History Subjects Using Mnemonic Techniques," *J. Inf. Commun. Technol. Educ.*, vol. 7, no. 1, pp. 9–15, 2020.
- [15] S. C. Ying and S. Surat, "Keberkesanan Classcraft Berbasis Mobile Game Terhadap Motivasi Dan Pencapaian Akademik Pembelajaran Generasi Alpha [the Effectiveness of Classcraft Mobile Game on the Motivation and Academic Achievement of Alpha Generation in Learning]," *Int. J. Adv. Res. Islam. Stud. Educ.*, vol. 1, no. 4, pp. 58–79, 2021.
- [16] O. Olisna, M. Zannah, A. Sukma, and A. N. Aeni, "Pengembangan Game Interaktif Wordwall untuk Meningkatkan Akhlak Terpuji Siswa Sekolah Dasar," *J. Basicedu*, vol. 6, no. 3, pp. 4133–4143, 2022.