HOW CAN GAMES IMPROVE INTELLIGENCE FOR CHILDREN

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Abstract— This study aims to see how far the use of games can affect the level of intelligence in children. The concept of education for children is important. Aspects that must be considered are methods and learning media. As we know playing games is very liked by children. The use of games in the world of education has been carried out mostly at the basic level such as early childhood education. So far there has been no research on the effect of using the game on children's learning outcomes. The game material used is basic knowledge such as the introduction of letters, numbers and colors. A sample of 30 respondents were selected purposively, were kindergarten students. The method used in this study is the Research and Development method. Educational games are tested for their feasibility by material experts and media experts with the results of a decent educational game to be used by students. To test the effectiveness of educational games through pretest and posttest and student responses questionnaire after using educational games, with the test results there was a significant increase in learning outcomes after using the educational game. Based on the results of the evaluation, educational games are feasible and effective for use in learning basic knowledge for early childhood education.

Index Terms— Children, Education, Edugame, Game, Research and Development

1 INTRODUCTION

EDUCATION must be given early [1]. The benefits of early childhood education such as Play Group / Kindergarten (PG / TK) are helping to lay the foundation for the development of attitudes, knowledge, skills and creativity needed by students in adjusting to their environment and for future growth and development [2]. One of the material provided in early childhood education is the introduction of letters, numbers and colors through drawings and exercises that are made interesting. With the importance of early childhood education, mobile applications for introducing letters, numbers and colors based on Android are learning and playing [3]. The standard level of achievement of child development was stated by Minister of Education 58 of 2009 in the scope of cognitive development for children aged 3-5 years, on the concept of numbers, symbols 1-10 numbers and letters, namely mentioning numbers, recognizing number concepts, recognizing number symbols and recognizing symbols alphabet [4]. According to [5] the use of digital media has been compared to traditional methods for teaching cognitive skills, and found that digital media is more effective in certain cases. This is also reinforced by research conducted by [6] who expressed when learning activities or computer-based games were introduced to students, usually triggering curiosity and interest [7]. Educational games are one of the media used for learning, adding to the knowledge of users through an interesting media [8,9]. This type of media is usually intended for children, with games that have an image display, attractive colors. The use of an educational game is as a medium to assist in learning activities [10][11]. From the description above, it is necessary to have an educational game-based learning media for Early Childhood Education, so that later this learning media is expected to be able to increase interest, motivation, interesting and fun learning atmosphere, and facilitate understanding of the material in numbers, letters and colors.

2 PROCEDURE FOR PAPER SUBMISSION

The method used is Research and Development (R&D). The model used in this study is a development model consisting of stages of Analysis, Design, Development, Implementation and Evaluations (ADDIE). This development model can be used for various forms of product development such as models, learning strategies, learning methods, media and teaching materials [12].

2.1 Analysis

Analysis was carried out in order to obtain information on the needs of learning media to be made, namely educational games with letters, numbers and color recognition material for Early Childhood Education. In this stage, observations and interviews with classroom teachers at TK Tunas Harapan Tarogong Kaler Garut were conducted. With the aim of taking a temporary picture of the product that is made so that it fits the needs of teachers and students.

2.2 Design

At this stage RPP is designed, the navigation structure, application page views and evaluation tools. Unified Modeling Language (UML) is the most popular modeling language for the analysis, design, and development of software systems [13]. The Unified Modeling Language (UML) includes nine modeling diagrams including class diagrams, use-case diagrams, state-chart diagrams, activity diagrams, sequence diagrams, collaboration diagrams, object diagrams, component diagrams, component diagrams, and deployment diagrams [14]. The Storyboard and flowchart are made to describe a user interface design.

2.3 Development

Creating and collecting materials from games, namely, background, images, moving images, game objects, buttons, audio, all materials that have been collected and made will be implemented in a concrete form so that the game page views are intact. Then the coding stage or the function of some of the commands in the form of program code so that the learning media can be run in accordance with its functions.

2.4 Implementation

Questionnaire In this assessment instrument uses the System Usability Scale (SUS) to assess the usability of learning media based on the John Brooke method. Scale Usability System (SUS) is a questionnaire that is researched and used
extensively to assess the evaluation of the usefulness of a media [15]. Furthermore, a field trial was carried out by testing the application that had been made at TK Tunas Harapan Tarogong Kaler Garut in group B with the number of respondents 30 students.

2.5 Evaluations
The Evaluation was obtained from questionnaires from the results of validation by media experts, material experts and students' responses after conducting a trial of the use of 2D educational based learning media with letters, numbers and colors. The next step is improving the product based on suggestions and input, and calculating the results of research, making research reports and measuring the feasibility of educational game-based learning media. Also, the summative evaluation was carried out using the pretest and posttest as well as the student response questionnaire.

2.6 Analysis of Normality Test
To determine the effectiveness and student learning outcomes based on the results of the Pre-test and Post-test before using educational game-based learning media and after the use of educational game learning media, analysis techniques need for the Pre-test and Post-test value data. The initial stage of analyzing the data is to use the normality test. The normality test is used to determine whether the research data that has been done is normally distributed or not normal, this is done to determine the statistics that use in processing data.

3 RESULT AND DISCUSSION
As demonstrated in this document, the numbering for sections upper case Arabic numerals, then upper case Arabic numerals, separated by periods. Initial paragraphs after the section title are not indented. Only the initial, introductory paragraph has a drop cap.

3.1 Result
The Unified Modeling Language (UML) describes feedback from the learning media that is being developed, the intended feedback is the interaction of the learning media to the user.

3.2 Discussion
In the Research and Development (R&D) research method there are steps of development research in the form of field trials which include testing material experts, media experts, and students as the main field trials [16]:
1. Media Expert
   Overall, based on the results of the assessment, the facilitation aspect obtains results with a percentage value of 72.0% which is a category of "Eligible", while the display aspect obtains results with a percentage value of 85.0%, which is a "Very Eligible" category, then on the technical aspects, effectiveness the program obtained results with a percentage score of 76.0% in the "Eligible" category. The results of the final assessment by media experts on educational game-based learning media are said to be "Eligible" with the acquisition of an average value of 77.67%.
2. Material expert
   Overall, based on the results of the assessment of aspects of the quality of the content and the purpose of obtaining results with a percentage value of 84.0% which is a category of "Eligible", the instructional quality aspects obtain results with a
percentage value of 81.0% which is also a category of "Eligible". So that overall the results of the assessment by material experts on educational game-based learning media are said to be "Eligible" with the acquisition of an average value of the overall percentage of 82.5%.

3. Students’ Response
Overall the assessment of 30 group B class students, it can be concluded that the learning media in terms of attractiveness aspects get a value with an overall percentage of 70.7% which is the "Eligible" category, then the motivation aspect obtains a value with an overall percentage of 79.0% which is the category "Eligible", and in the aspect of ease of obtaining a value with a percentage of 81.0% which is the category "Eligible" so that the total results of the assessment conducted on the core subject of research respondents/students to learning media in the form of educational games are said percentage value of 77.0%.

4. The normality test of Pre-test and Post-test
Based on the results of the pretest and posttest using the normality test that the data is normally distributed, then with the T-test (paired sample t-test) with the results of Thitung = 2.0, then Calculate: Ttable 2.0 = 1.69. It can be concluded that there is a significant increase in student learning outcomes after using the Educational Game Application Introduction to Numbers and Color Letters.

4 CONCLUSION
Based on the results and discussions of the research that have been carried out, it can be concluded that the Educational Game Application for Introduction to Letters, Numbers and Colors is appropriate for use by students based on the results of questionnaires from material experts and media experts, and is declared effective because it meets the development goals of the Educational Game application Introduction to letters, numbers and colors. Based on the results of the pretest and posttest using the normality test it can be concluded that there is a significant increase in student learning outcomes after using the basic knowledge learning game application for early childhood education. Because the media is saw to be feasible and effective for students, the media can replace the previous learning media.

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