Virtual Education with Puzzle Games for Early Childhood: A Study of Indonesia

Novera Kristianti(✉), Niwayan Purnawati, Suyoto
Universitas Atma Jaya Yogyakarta, Yogyakarta, Indonesia
noverara@gmail.com

Abstract—This paper is concern about using multimedia technology for virtual education with a puzzle for early childhood in Indonesia. A game is focused on the introduction of objects around the neighborhood by showing images that Generate Automatic can adjust the child's condition aggressive or not aggressive. It plays with android tab device to knowing respond of early childhood. This is due to early childhood conditions. In some cases, children have normal cognitive abilities of children with a different special character that has the capability of learning is slower. A game shows a question to a parent first. The level of games is from 0-1, 1-2, and 2-3 based on years old of early childhood. This study has the challenge to develop educational game conditions. As in the design phase, the visualization of colors, shapes, and the introduction of rules that will be applied to the system. In this paper, we present to make early childhood became more relaxed and not aggressive in these educational games.

Keywords—Multimedia Technology, Mobile Learning application , puzzle games

1   Introduction

Development of educational learning in early childhood increase along with the development of technology. In this case, the integration of educational technology and shows the connecting virtual learning in the real world. To do the integration of teachers thought some consideration of aspects of the design, and visual can increase interaction on the child. Increased interaction can be done by developing an educational innovation in down in the form of the game. Some of the games designed for exciting the interest of learning in children. With a design that is interactive as well as various, color visualization can become a child's introduction to the innovation in the outside world.

Learning that is packaged in the form of the game proved to be able to give a positive attitude not only on children but also on teachers. In developing countries with education which is still minimal educational games can be an effective solution [1]. Educational games can be easily accessed using a tablet this ease of teachers to give understanding to children about education being taught [2].

The use of educational games as a media tablet be an option because it can be used as one of learning either formal or informal education [3]. This makes the learning more flexible with many touches that make it easier. So that the child does not feel that the game is played is one form of early learning fun.

A lot of educational games for children with the media tablet is released. Including by combining education curriculum into fun designs like math [4]. Not only is it the game is also in the pack with the introduction such as Art Education such as history [5]. Another can be a thing that childlike as Alphabet, numbers, shapes, objects, the social, the planet and the environment that existed around the child. This can add insight into a child with way more innovation. An interactive child who repeatedly can give memories on the child so that the child can easily remember the objects in the external world.

The game focuses on the introduction of objects around the neighborhood by showing images that Generate Automatic can adjust the child's condition aggressive or not aggressive. In some cases, children have normal cognitive abilities of children with the different special character that has the capability of learning is slower. Expert system with forward chaining the applied on this game to determine a puzzle will automatically generate in accordance with condition children, i.e., divided into children with special needs as well as normal children, the child's interests are the flora and fauna, numbers, or incorporated over the three. To determine this is necessary the presence of expert system in this puzzle game.

Stages of knowledge representation are done with collecting data input that is used to get the results. Based on the input data, done the analysis that yields a review of puzzle games as well as users according to the user and user's eligibility to proceed to the next level in this puzzle game. After the system was designed and manufactured, testing is done on each appearance of the gaming scene, expert system with forward chaining inference methods in the game, as well as conducted the analysis of the algorithm has been applied. Testing in the expert system forward chaining in this puzzle game, done the calculations to measure the validity of existing rules.

1.1   Information Hiding

In early childhood with age range between 0-3 years, early recognition can be done with simple games like puzzle, of course with the guidance of a parent. Puzzle can increase mental rotation and spatial visualization where the multimedia approach can improve cognitive in early childhood [6]. This time the study has the purpose to know the behavior of early childhood on a favored son through a puzzle game.

This educational game certainly needs the guidance of parents who know the condition of the child. Specialized in children with special behaved the game can only be made on a condition with a full body condition (such as a hand that is not disabled). This is because as the game completely using the touch of hands-on media tablets. Parents have an important role to choose a game. The appropriate choice can help children to develop their cognitive ability.

2 Related Literature

In its growth, normal children and children have special learning processes behave differently. Basically, the child has a positive reaction to the game is played on the gadget. They can be more active when do touch the device [7]. A review of research suggests that the introduction of the child to the technology early on can effect positively for development. Especially in terms of social aspects, where the child can do the collaboration and interaction with other children [8]. The majority of the kids prefer innovation on games. This study will focus on games that are closely related to lessons for early childhood [9]. On the research of Crescenzi-Lanna & Grané-Oró have an understanding that in General visualization and application of content against the school curriculum is still low [10].

Couse & Chen [11] revealed that the use of a tablet computer and the tools that exist in it can be the beginning of a potential medium to learn writing in early childhood. In addition, the application on a computer tablet can increase response to the motoric activity in children. Changes in the form of sensory movement connected with visual motor skills in children. [12].

In some cases, interesting learning can be done in a collaborative learning process. A simple case such as the effects of the use of mobile instant messaging application against a part of the process of collaborative learning [13]. In the event that students are able to use mobile IM as the shared information in a media group. Shadiev Hwang, Tseng, & Huang understand that children in elementary school more easily solve fractions using multi-touch tabletop [14]. Where children can easily do the cancellation card fractions. In addition, children can also solve the problem of fractional together. This form of collaborative learning using technology can be done in other areas. As in the Ubiquitous application of Problem-Based Learning System (UPBLS). UPBLS was created to help students conduct research on science class either alphabets experiment or experience the outdoors [15]. On other research, Khaddage, Müller, & Flintoff [16] understand that the application of mobile learning as a medium of instruction should correspond with formal and informal conditions on approach to Science, Technology, Engineering, Art, and Mathematics (STEAM).

Elsaadany and Soliman add that the Internet of things has a significant impact on the environment of education [17]. According to Prifti, et al [18] the provision of learning support can be part of Education-as-a-Service (EaaS). It makes the IoT as one part of the study mainly on supporting early childhood with normal ability and special character. In previous research Tsai argued that [19] collaborative learning and pedagogy significant influence on students against students thinking and engagement until the end of the lesson.

3 Methodology

This study will have a concept for understanding the behavior of learning in young children's normal and special character. For that, it needs to be a system built with the concept of virtual collaborative learning. An introduction to environmental learning

system will be built in several stages in the form of a puzzle game. In a study, virtual learning environment (VLE) built to motivate students, especially in enhancing the learning process to be more effective [20]. The use of a tablet personal computer can also help increase the frequency of disability to spell words correctly [21]. A study by Pakprod & Wannapiroon, understand that the process of learning using learning objects for e-book using the tablet PC can form emotional intelligence in children with multiple stages 1) Orientation, 2) Elicitation, 3) Turning, 4) Application dan 5) review. Course on the use of the system must be accompanied by parents. Parents can as a teacher to direct the children especially in the use of educational games [22] [23].

In the same way, this study will implement these games on a tablet PC. The initial puzzle game will feature a question later answered by parents in accordance with the condition of the child. This is done because the role of parents as the most people to know the condition of his son. The question of the system will process and display the image that adapts to the child's condition (in this case the normal children and children of special character). After doing the kind of pictures then the child can play. The level of the game will be resumed based on the ability of the child complete the puzzle. Of those expected to be an emotional change in children. Where the child originally has no aggressive behavior can be aggressive after playing the puzzle game.
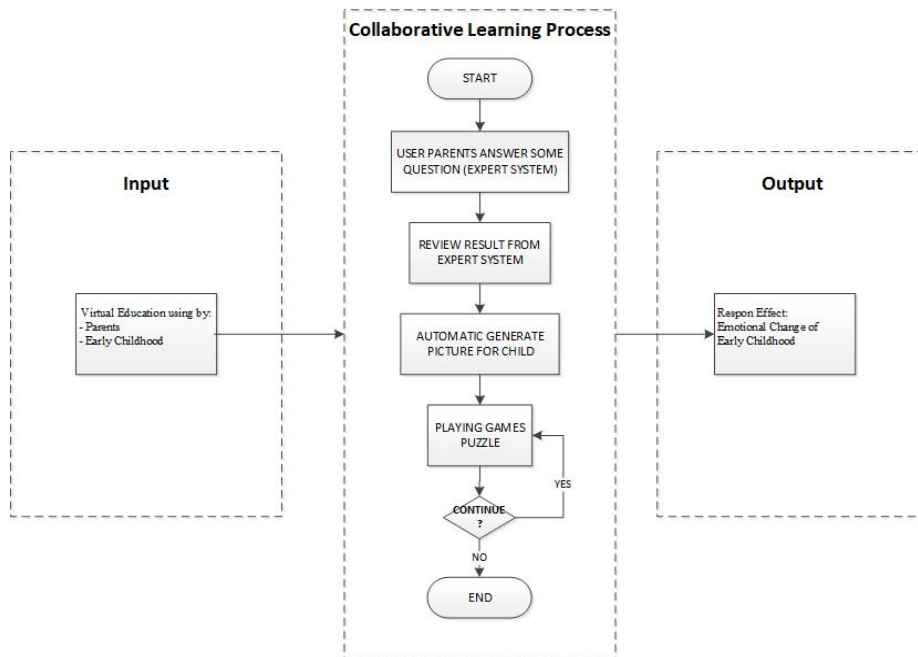
Fig. 1. Process application of Virtual Education Games Puzzle effect on emotional changes in normal children and children behave.

On figure 1 show the process stages in the application of collaborative learning in the virtual education process of puzzle games. Sample performed for children aged 0-3 years. On the stage of the above process is divided into three main sections:

1. Input: the input stage is involved with the system. Virtual education process input is done by users i.e. parenting and early childhood.
2. Collaborative learning process: is a stage of the process of collaborative learning by using tablet PC as the primary device.
3. Output: the output stage is objective this study i.e. emotional changes in early childhood is a normal and special character, be not aggressive.

4 Virtual Education Games Puzzle For Early Childhood

As in previous studies that the system can be built based on a combination of inter-active media and educational psychology. In this case, the virtual education is very closely related to the multimedia approach, such as the color, text, and images [24] [25].
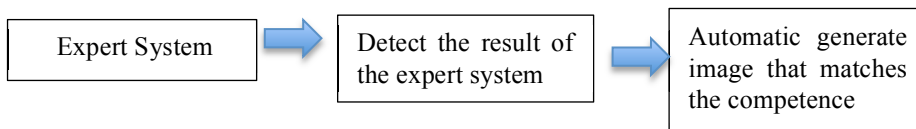

Fig. 2. Puzzle Detection Process

In the system being built, there are several available menus are available, among others, can be seen in figure 2 about the menu from the system, figure 3 about the contents of the system information menu, figure 4 is the previous puzzle menu contains questions regarding age, the favorite, and the everyday life of children whether active or not, and then from the results of the expert system will generate an automatic puzzle that matches the competence of children. Figure 5 is a menu entry when the user wants to place the note that desirable. Figure 8 is menu about copyright the system. And the last is a menu to exit the system.
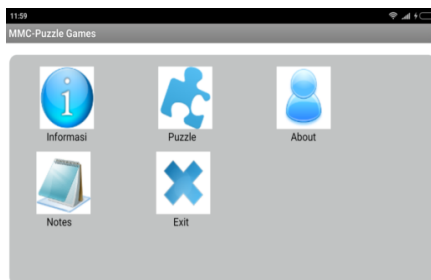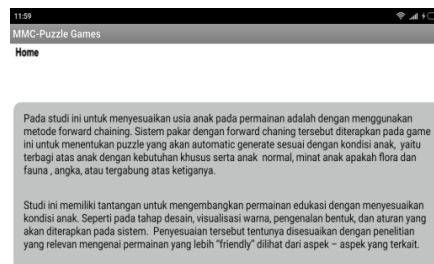

Fig. 3. The Menu

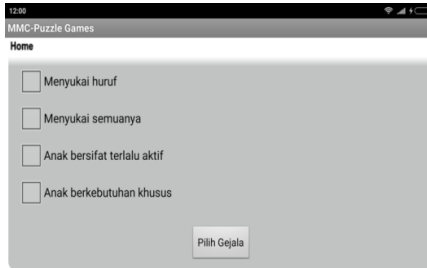**Fig. 4.** The contents of the first menu of system information

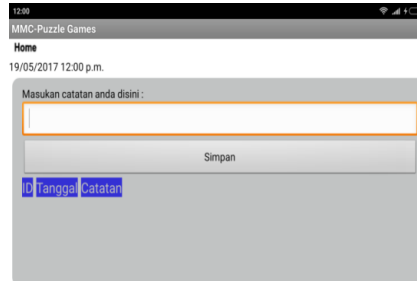**Fig. 5.** Expert system to generate the puzzle

Fig. 6. Entry menu

On the second menu is an expert system with forward chaining method that will generate the puzzle automatically in accordance with the competence of children, constituted from the answers to the questions asked in the expert system. Among others regarding age, favorite, and the level of liveliness children every day.
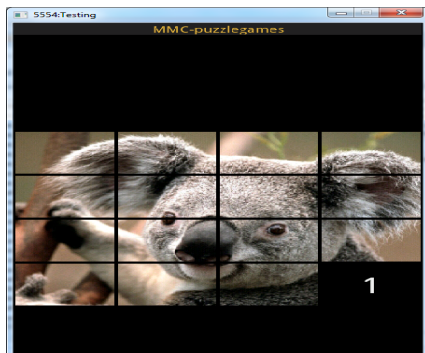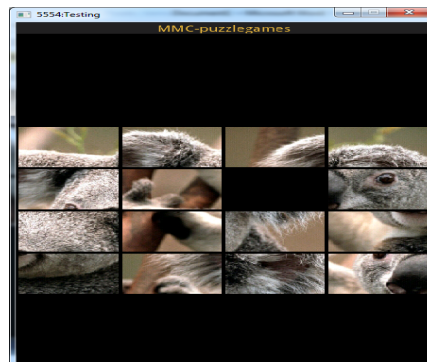

Fig. 7. Display the image before in puzzle
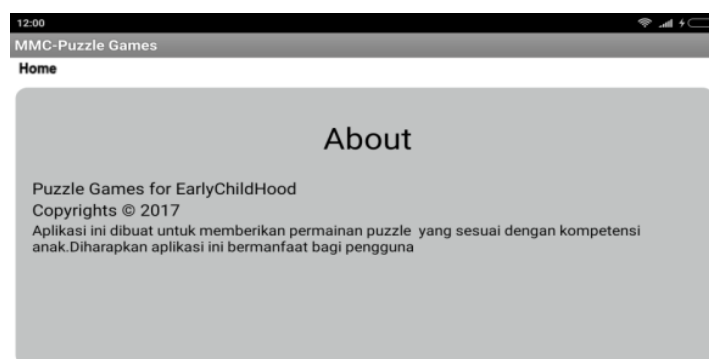

Fig. 8. Display the image in puzzle

Fig. 9. About copyright the application

Figure 6 displays the image that is produced when it is filled with question answers a child with 2-3 years of age as well as fond of fauna. Then after showing the initial images that have not been scrambled. The next figure 7 displays an image that has been scrambled and will be in the form of images in order to collate the previously shown. The last menu is about copyright the application (figure 8).

5 Conclusion

In this paper, we presented a study about virtual education with a puzzle for early childhood in Indonesia. A game is focused on the introduction of objects around the neighborhood by showing images that Generate Automatic from the answers to the questions asked in the previous expert system. Based on the input data, done the analysis that yields a review of puzzle games as well as users according to the user and user's eligibility to proceed to the next level in this puzzle game.

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7 References

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8   Authors

Novera Kristianti is a student of Master of Informatics Engineering , Atma Jaya University Yogyakarta, Indonesia. She received her Bachelor Degree in Universitas Palangka Raya, Indonesia. Her research interest in Soft Computing.

Niwayan Purnawati is a student of Master of Informatics Engineering , Atma Jaya University Yogyakarta, Indonesia. She received her Bachelor Degree in Universitas Palangka Raya, Indonesia. Her research interest in Enterprise Information System.

Suyoto is Professor in Department of Informatics Engineering at University of Atma Jaya Yogyakarta, Indonesia. He received his PhD from the National University of Malaysia, Malaysia. His research interests are multimedia, computer graphics, visualization, mobile application and artificial intelligence.