

Playing Follow the Color in Interactive Surface for Gross Motor Skill of Early Childhood

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ABSTRACT

This article discusses the development of a game that follows the color in the interactive surface for the gross motor skill of early childhood. The objective is to facilitate early childhood in learning through play with the use of interactive surface technology. The game requires the child to jump based on the color shown by the computer and reflected through the projector on the ground surface. The product combines software and hardware which integrated into a game. The software consists of following the color game, driver communication software, and hardware. The hardware includes Laptop/PC with Bluetooth feature, LCD/LED Projector, Wiimote, and InfraRed controller. The development method only applies three steps adapted from its model by Lee-Owen, which are analysis, design, and development. Therefore it is merely a test with a limited scale. The development of these products responded positively by a theoretical expert, instructional media expert, students and teachers. The result of the direct observation and interview shows that this product is attractive, fun, increasing motivation, also activating and encouraging children to learn collaboratively. Some matters to be concerned are the continuity, practicality and safety of the game devices in preparation, operation and post-operation.

Keywords: playing, follow the color, interactive surface, gross motor skill, early childhood

1. INTRODUCTION

More than 30 years ago, educational research proved that the most important period in human development is around 0-8 years old. This information is important to be comprehended in order to develop cognitive skills, good emotional, social competence and mental health physically. This development is aiming to construct a strong foundation for children's success in the future. Informal education falls in the middle of the childhood period, or kindergarten starts from the age of 3-5 years old or six years when they start entering elementary school [1]. During this period, stimulation and learning come from playing, reading, singing, and interacting with peers.

Playing is one of many activities that a man does besides learning, working and many others. Playing is done for self-necessity in an attractive way, not score-oriented, flexible, active and positive [2]. This definition is in line with Hurlock [3], [4], which stated that playing is an activity which is done willingly, and without any force or pressure. Based on both of the definitions can be concluded that playing is relevant to children during their early childhood period. Playing is one of the most important ways for early childhood to obtain knowledge and essential skills.

Playing for early childhood gives an opportunity for their growth and development, both physical and non-physical. Physical growth is related to parts of the body, while non-physical is related to spiritual, cognitive, and effective. One of the characteristics of early childhood growth signs is gross motor. Gross motor skill is the gross muscle constructed by skeletal muscle and is used for basic body movement that is coordinated by the brain. These basic movements, including, walking, jumping, kicking, throwing, hitting, pushing and pulling.

Some kinds of jumping skill in early childhood progressively developed based on its level [5], such as jump down from one foot to another, jump up by two feet, jump down by two feet, run and jump forward by two feet, jump down from one foot to two feet, run and jump forward by one foot, and jump through objects by two feet, jump from one foot to the same foot systematically.

Generally, always playing is closely related to outdoor activities, especially when it is connected to gross motor skills. Some research and development have been done to prove that playing is always done outdoor. Games such as *engklek* [6], *bakiak* [7], *gobak sodor* [8], *lompat ceria* [9], and *papan titian* [10] have been developed and proven to be able to enhance the gross motor skill of early childhood. All of these games are considered to be traditional games and played outdoor.

However, these games cannot be done when weather problems occur (rain, lightning, storm, etc.) or there is not enough space to do it.

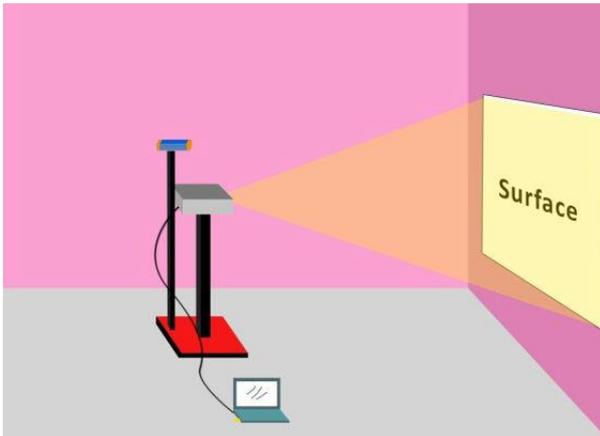


Figure 1 The Component Organization of Interactive White Board [13]

WhiteBoard on the market. Unfortunately, both of the development which has been done merely intended for the fine motor skill, therefore it needs further development for the gross motor skill.

2. METHOD

The development adapts the multimedia development model from Lee and Owens [14], which consists of the first step of needs analysis, and the next five steps are analysis, design, development, implementation and evaluation. This model suitable because the product of the development is in the form of multimedia.

The product development is divided into three parts, which in each part included all the steps explained in the model. The first part was the preparation that involved the identification of the needs (needs analysis) and the analysis. The second part was the design of the developed product. The third part was the development step of the designed product.

The first part began with the needs analysis, which was done by empirical observing and interviewing some pre-school teachers. The result was the importance of the developed product to solve the problems faced by the pre-school teachers in general when it came to gross motor skills. The next step was an analysis that involved audiences, technology, media, task, goals, critical moments, presentations, existed data, and problems. The analysis which has been done in general showed that developed product was essential. The multimedia product is the modified technology which the goal was to provide a facility for in-door playing activity for the gross motor skills of early childhood.

The second part was designing the product. The design referred to the first part in needs analysis with early childhood as the audience. Modifying the existed technology (Fig. 1) intended to provide a playing activity

in order to enhance gross motor skills. A task analysis was added to the software, and the goal was designed in the form of a game, Follow the Color. The content presentation was in the form of multimedia; as a result, the software has designed that the users not only interacted with the graphics but also with the sound or audio.

The third part was the developing stage with developing the product and the review of the product from the theoretical expert and multimedia expert. The development of the product used Rapid Application Development (RAD) software with the Integrated Development Environment (IDE) that programming-based. Regarded to the review from the experts, if some deficiencies or errors were found, the product should be revised based on the feedback. This stage would be repeated up to the point that the product was adequate. After all, the reviews from the experts showed no deficiency, and then the product was ready to be tested on the students.

Respondents for the empirical tryout were 20 students of pre-school A in TK PGRI Kalijembon, Jombang. This selection was based on the analysis of students in the rural area that far away from the city with middle to low economic backgrounds. From this analysis could be concluded that the students did not have many opportunities to reach technology-based games as they would be in the city.

3. RESULT AND DISCUSSION

This sub-part will provide an explanation, illustration, and documentation from the result of the tryout as well as the important findings. The result of this development is explained and illustrated in such ways to get the final picture of the developed devices, both related to the software and the hardware. The explanation about the validity test of the devices and equipment used in the learning by instructional media expert and theoretical expert. The presentation of the result of an empirical tryout and the findings during the tryout process. Additionally, the recommendation or findings after the tryout.

Two devices developed were software and hardware. The game software developed and operated on the computer. The hardware as the infrastructure was developed for the interaction between the users and the surface so that the surface would be interactive. Whereas the software consisted of two, which were software for communication between a computer and interactive system and the game software Follow the Color. A display while the software was being operated is shown in Fig. 2. Users start position was at the feet image, and it would be detected right away by Wiimote with calibrating verification in the software. The next stage would begin when the audio from the computer uttered

the name of a color, and the child had to jump according to that color.

The first tryout was conducted in the multimedia learning and workshop room of Educational Technology, Faculty of Science Education, Universitas Negeri Malang. A theoretical expert observed the tryout to give review and feedback about the developed product. The review written on the questionnaire revealed that the average scale is 3.25. This review was in the positive scope. However, some concerns were stated in the preparation of the Interactive Surface if it has to be done by the teachers themselves. Another concern related to the safety of the devices has also been stated, as the devices were not set permanently and considered to be unstable. Furthermore, the software obtained a positive review from the instructional media expert with an average scale close to 4. It can be concluded that the media expert gave a positive review of the overall developed product.



Figure 2 The display when software Follow the Color runs

The subject matter expert gave a positive response to the developed product for early childhood. His feedback and comment were related to the high-level attractiveness of the product for children, and at the same time, a concern addressed on the class management that maybe disturb by the game, which was designed individually. However, this challenge can be solved with good class management and the application of the suitable method, strategy and trick. The combination of audio and attractive pictures in the form of multimedia for early childhood got the highest score. Therefore, the attractiveness of the game Follow the Color motivated the students to try it. All of the points in the questionnaire got an average score of 4, and the subject matter expert claimed that the product was proper to be applied for the indoor activity of early childhood.

The field trials were conducted in the afternoon at 11:00 A.M. in the provided classroom. Children and the teachers showed their enthusiasm while observing the installation of the devices for the whole 30 minutes. Therefore many questions out of curiosity were

addressed. Later, when the teacher offered the students to try playing in the game, one student stood up. As the installation of the shoe covers, all the students gathered around and observed it. At the beginning of this game, some problems arose as the receiver could not detect the radiation light of IR. This was caused by the previous laboratory tryout, which used college students as the model. As a result, the LED as a light transmitter could not be directed exactly at the IR light receiver. After some adjustment and the shoe covers placed on, eventually, the system ran well.

At the beginning of the tryout, merely one student was brave enough to try the game. Then after the others watched and observed his friend playing the game, their enthusiasm aroused. The empirical observation revealed that enthusiasm was reflected through the students' actions to play the game. This happened as the devices could only be played by a child at one moment. Although they have to play in turn, they were excitedly helping their peers to complete the game. During the tryout, one student preferred to play by himself and did not involve in the game. Furthermore, it can be seen that a game could support students to learn by playing collaboratively and in an exciting way. Hence, the exciting jumping activity enhances the gross motor skill of children [9].

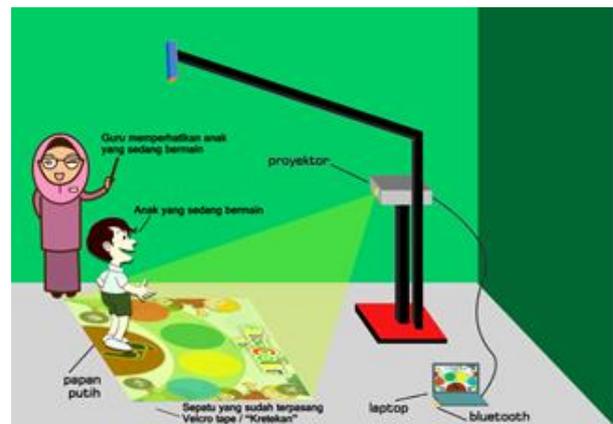


Figure 3 Illustration of Interactive Surface infrastructure Modification

While the students enjoyed the game, the teachers helped to manage the game so that all students experienced it. The teachers also observed the installed devices as it was fragile and sometimes did not work properly and needed to recalibrate (Fig. 3). The other teachers created activities for the students who waited for their turn to play. As time went by for more than 30 minutes, the students were impatient and disturbed the tryout.

In the closed interview, the students responded to the game positively. The attractiveness reached the highest response of all the points within the question of learning attractiveness, game display, game composition color, sound effect and back sound. The convenience got the lowest point, although within the positive scope. The

questions which mostly got negative responses were the continuity, conveniences and safety while the devices were operated.



Figure 4 Field Trial

The teachers responded to the game positively by addressing some suggestions (Fig. 4). Their responses were the game attractive, it was able to motivate the students, and the activity was able to attract the students. Further, their suggestion is classified into two: the suggestion to develop the devices and the suggestion to do learning activity through this game. Their suggestion to develop the game in Early Childhood Education was the game should be able to involve all the students at one time, besides the game should also be developed not merely covered the colors, but also shapes. Their suggestion to do the learning activity pointed at the safety and preparation before conducting the game, especially at the hardware installation.

4. CONCLUSION

The developed game was an activity for the children to play Follow the Color on the interactive surface to enhance the gross motor skill of early childhood. The specification was a game software which the display projected to the floor and children interacted through the InfraRed controller placed in the shoes. The development of the product adapted from the prior model of Johnny Chung Lee, which adjusted based on the needs. The installed infrastructure consisted of a Laptop or Personal Computer, a game software, a software controller of Wiimote communication, LCD/LED Projector, Wiimote

and shoe devices, which were modified to control the InfraRed. The theoretical expert, as well as the instructional media expert, responded positively to the game. The students, as the respondents of this development, also gave positive responses to the tryout, such as it was attractive, convenient, and can be played collaboratively. The teachers responded similarly to the game. In general, the teachers claimed that the game was attractive, able to enhance the motivation, and it was activating and encouraging the students. The overall suggestion and comment from the theoretical expert, instructional media expert, students' and teachers' responses pointed out that some aspects needed to be concerned in the implementation of the game. The continuity, convenience and safety of the game should be pointed out in the preparation, operation and post-operation.

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