

Science and Technology for Society: Electronic Game Device Implementation to Train the Memories of Kids in Playing Group

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Abstract – The activity offered in this community service is the implementation of a game device that children can use to train their memory. For teachers, the implementation of this activity is expected to increase the diversity of games in schools. Other activities that are also carried out are: asking for feedback to the teachers about activities that have been done in school. Based on the feedback, it turns out that the whole school hopes to hold further activities. Based on responses and participation of Islamic PG (Play Group) Maryam Surabaya can be concluded that the school was satisfied with the activities held and hoped for further activities.

Keywords – Community Service, Memory, Play Group.

I. INTRODUCTION

In general, everyone dreams of having a brain that is easy to remember things. Surely, in everyday life nobody wants to have a brain with low memory.

Improving brain memory is very important and should be done seriously, because a strong brain memory will greatly help us to do all the daily activities, such as work and study. Some ways that can be taken to improve memory, are: eating food for the brain, developing new habits, training with games, and sports [1].

Improving brain memory needs to be done early on. The child's memory can be honed through a fun way, through games that can train the brain. One thing to keep in mind is, children are able to learn optimally when they feel glad. Learning as well as playing like puzzles, counting games, board games like chess can create new neuron cells. In addition to improving memory, they also have fun and train the brain to the fullest [2].

Playgroup is an early childhood education unit on a non-formal education pathway that provides education for children under five years of age. The play group generally operates until noon only, and has a child nurse or volunteer staff. Play groups are believed to provide good stimulation to develop intelligence, social skills, and motor maturity of children.

The aim of the playgroup is to increase the creative power of children and to encourage them to learn about a variety of sciences through the approach of language, religion, social, emotional, physical, motor, cognitive, language, arts, and autonomy. All are designed to develop the thinking and role of the child in his life. This learning activity is made in the learning model while playing [3].

Train the memory of children playing groups using fun games is an exciting challenge that needs to be realized. Bachelor Program of Computer System Study in STIKOM welcomed the challenge by introducing an electronic game that can realize those expectations.

II. OBJECTIVES OF THE PAPER

The expectations of implementing electronic gaming devices are:

1. Teachers can operate electronic gaming devices.
2. Children can play electronic game devices.
3. Electronic game devices can attract children to play.
4. Electronic game devices can train children's memory.
5. Get repair suggestions for device enhancements.

III. PARTNER PROFILE



Fig. 1. Islamic Play Group Maryam Surabaya

School Name	: Islamic Play Group Maryam Surabaya
School Status	: Private
Head of School	: Nur Aini, S.T.
Address	: Manyar Sambongan St. 119 Surabaya
District	: Kertajaya, Gubeng
City	: Surabaya 60282

Phone/Fax : 031-5010835 / 031-5016647
 Activities : colouring, knowing the profession, knowing the shapes, punching the dots, knowing Hijaiyah letters, eating together, et cetera.

IV. METHODOLOGY

This community service is carried out by design method and practice. The design method is applied to the transformation of the game prototype into a game device. While the practice is done directly by introducing the game device as well as guide the game.

A. Realization of Implementation

Community service activities in the form of implementing playground for children and teachers at KBM Maryam Surabaya has been held on October 23rd - November 3rd, 2017, with details of schedule and material as follows:

TABLE 1. SCHEDULE OF COMMUNITY SERVICE IMPLEMENTATION

Date	Time	Material
23 October 2017	8 AM – 10 AM	Introduction with Play Group children.
24 October 2017	8 AM – 10 AM	Introduction to game devices and how to use them.
25 - 27 October 2017	8 AM – 10 AM	Practice using a game device.
30 October – 2 November 2017	8 AM – 10 AM	Data retrieval.
2 November 2017	8 AM – 10 AM	Closing.

B. Implementation Goals

This activity involves 22 (twenty two) children and 2 (two) teachers. The devotion team consists of two lecturers and one student. In this activity teachers need to be involved, so that the game device can be used in the following years. Thus the sustainability of this activity will be maintained internally by the school. In addition, teachers and the school will have proximity to Surabaya Stikom, for the sustainability of subsequent cooperation.

C. Location and Time of Activities

This community service program is implemented in the Islamic Play Group (PG) Maryam Surabaya. Activities are held from October 23rd to November 3rd, 2017. The devotion activities are conducted for 10 meetings with approximately 2 hours per meeting.



Fig. 2. Electronic Game Device

D. Arduino Algorithm Flow Chart for Electronic Game Device

This is the arduino algorithm flow chart for electronic game device:

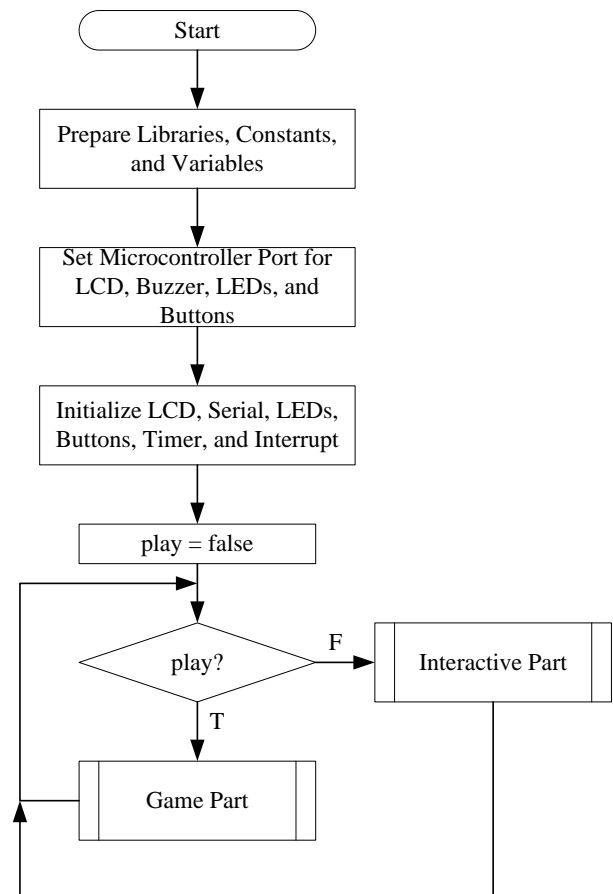


Fig. 3. Arduino's Main Algorithm

Figure 3 shows the main game device algorithm. It starts with preparing libraries, constants, and variables. Game device is equipped with LCD and uses the timer feature along with its Interrupt, so it takes libraries to make it easier to access. Game device will sound buzzer with a certain frequency, it needs to be declared many constants that store the tone frequency up to 3 octav. The main

variables are declared globally for easy access by all functions. Next set the Arduino ports to connect with various input and output devices such as LCD, Buzzer, LED, and Button. The final preparation is to initialize various equipment (LCD, LED, Button) and features (Serial, Timer, Interrupt) to be ready for use.

The main part of Arduino's algorithm is sorting out two different activities, namely Interactive Part and Game Part. The information used for sorting is Variable play. Interactive Part is executed if play is false, and Game Part is executed if play is true. At first play is given a false value for Interactive Part to run first.

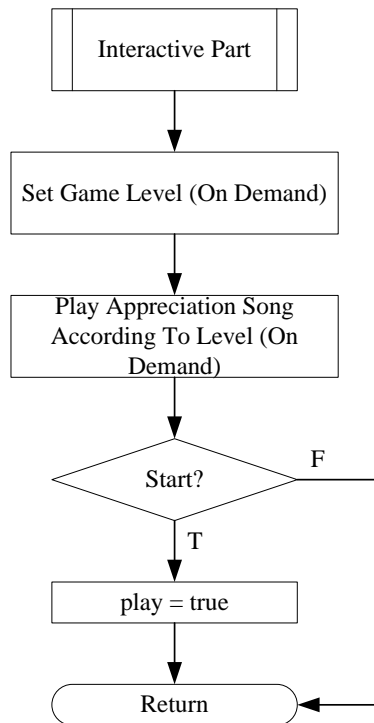


Fig. 4. Interactive Part Algorithm

Interactive Part works to set the game level and run features manually, and is the entrance to Game Part with Button Start emphasis. Figure 4 shows the activities performed by Interactive Part. Users can change the game level if desired. Users can play the award song according to the level chosen if desired. Finally, User can immediately enter Game Part by pressing Button Start. Pressing Button Start will change the play value to true, so in the next round will go into Game Part.

Game Part (Figure 5) works to run the game. The first step is to set the Random Seed according to Arduino's active period, so the random number generated is always changing at every opportunity. Random numbers are used to form game questions. The higher the level of the game, the longer the game. Problems that have been formed are displayed to the User through LED blinks (5 colors). Next

User responds by pressing Button (5 colors). The answer is considered true if the Button color sequence is the same as the color sequence of the LED.

If User's answer is correct, then the Stage variable will be updated. One level consists of 3 stages. If the stage is incomplete, then User will get a new problem at the same level. If the stage is complete, it will check the completeness level first. If the level has not been completed, then the level variable will be updated. The level has a maximum value of 10. Based on the current level, the corresponding reward song will be played, and back to the question.

If User's answer is incorrect, then the game ends and the last achieved level information will be displayed via LCD. Then the game waits until Start is pressed. The Start Emphasis is used to reset the stage and level values. Finally, the play value is changed to false, so in the next round will switch to Interactive Part.

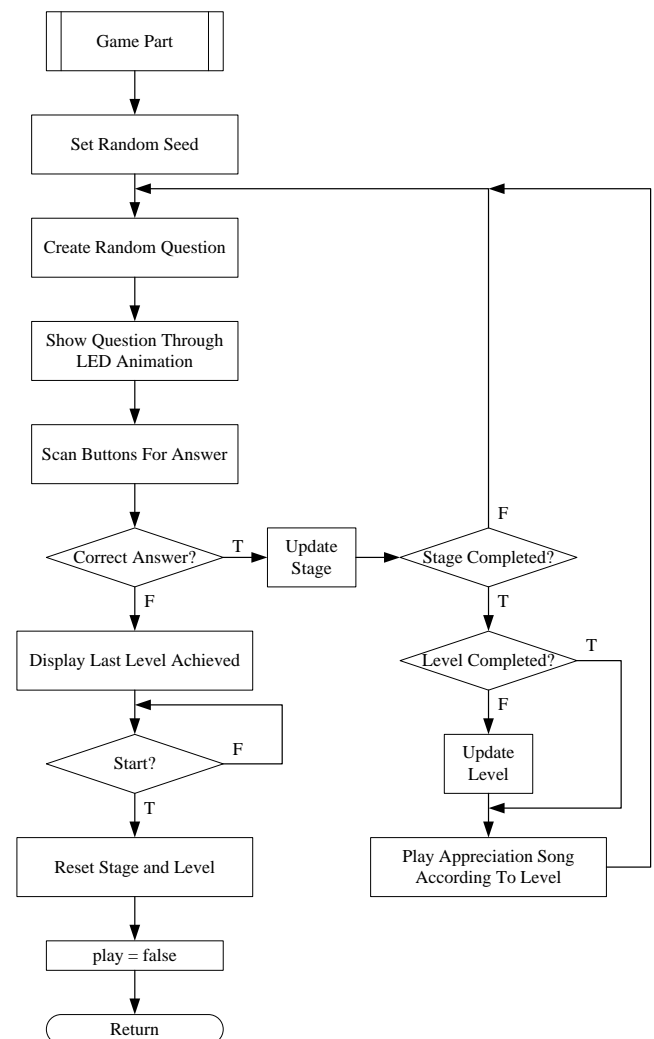


Fig. 5. Game Part Algorithm

V. RESULTS

A. Training Results

The results achieved are as follows:

1. In providing solutions to game devices encountered, children have been able to:
 - a. Recognize the parts of the game equipment, especially the indicator lights that must be remembered (as a matter of), the buttons to be pressed in response.
 - b. Recognize the colors of indicator lights, namely: red, green, yellow, blue, white.
 - c. Recognize the songs used on the game device, namely: opening songs, songs while leveling, songs when winning, and songs when lost. There are 10 songs at level level:
 - Balonku Ada Lima
 - Kasih Ibu
 - Anak Gembala
 - Cicak-Cicak di Dinding
 - Tik-Tik Bunyi Hujan
 - Dua Mata Saya
 - Naik Delman
 - Lihat Kebunku
 - Bintang Kecil
 - Panjang Umurnya
 - d. Play a game device guided by the teacher, especially in recognizing the flow of the game.
2. In providing solutions to the gameplay faced, Master has been able to:
 - a. Understand how to operate the game device.
 - b. Understand how to set game levels.
 - c. Accompanying the children while operating the game device.

3. Introduction of game devices.

The enthusiasm of children who are so high is visible from curiosity towards the game device. The team of trainers and Teachers will immediately respond to the curiosity by explaining all the pieces on the device.

4. Game process.

Children will be called to be guided to play the game device. There are children who want to play, but some do not want to, because the age difference.

B. Supporting Factors

Factors that support the implementation of this training is the support of programs and funds from the Institute of Business and Informatics Stikom Surabaya is embodied in the program of Community Service. Another very important factor is the positive response of the Islamic Play Group (PG) Maryam Surabaya that welcomes the program, especially the willingness of teachers to assist children in every game.

From the team side of the coach, the availability of experts from the Department of Computer Systems is a factor that greatly helped the success of this activity.

C. Inhibiting Factors

Age differences lead to a difference in absorption when operating a game device. This is evident in children aged 4 years will be faster to know how to operate the game device, while in children aged 2 and 3 years will have little difficulty. Even most 2-year-olds do not want to come into play, because they are shy, scared, or not interested.

D. Evaluation

Based on data in the field of Islamic Play Group Maryam Surabaya has students as much as 22 children. Of all the children there are 18 children (82%) who want to play with the device.

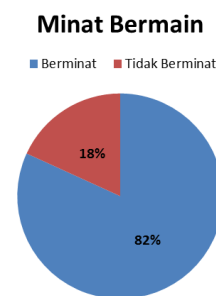


Fig. 6. Kids' Playing Interest

From the 18 children who want to play, there are 12 children (67%) who are interested in playing more than 1 time. Children who play more than 1 times will be observed development, with the category of development increased, stable, and declining. There is one child (8%) in the category of increase, 10 children (83%) in the stable category, and 1 child (8%) in the category decreased.

Minat Mencoba Lebih Dari 1 Kali

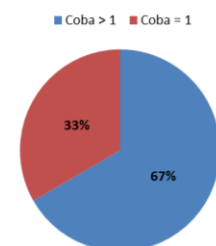


Fig. 7. Kids' Playing Interest More Than 1 Time

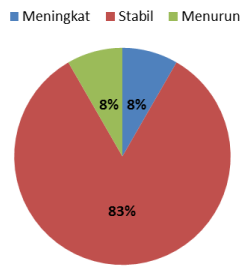
Kategori Perkembangan

Fig. 8. Development Categories

In the stable category, there were 6 children (60%) who only managed the game at level 1, and there were 4 children (40%) who managed to reach the game at level 2. The highest level ever achieved by children is the 3rd game at level 2 (Level 2-3).

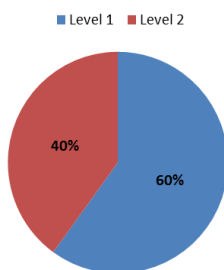
Kategori Stabil

Fig. 9. Stable Category



Fig. 10. One of the Kid Playing with Electronic Game Device

VI. CLOSING**A. Conclusions**

The conclusions of implementing electronic gaming devices in Islamic Play Group Maryam Surabaya is that based on responses and participation of Islamic Play Group Maryam Surabaya can be concluded that the school was satisfied with the activities held and hoped for further activities.

B. Suggestions

Suggestions that the team can convey to the stated objectives are achieved:

1. Increase the intensity of playing with this device.
2. Add the game device unit to be more evenly played by the children.

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