

Education Game Kit “Princess Stick and Color Sword” For Preschooler by Using Tcs3200 Color Sensor and Arduino Nano

Dwi Ratnawati¹, Vivianti²

^{1,2}*Information Technology Education, Faculty of Education, Humanities and Tourism
Univeristy of Technology Yogyakarta, Sleman Yogyakarta*
¹*dwiratnawati@uty.ac.id; ² vivianti@uty.ac.id.*

ARTICLE INFO

Article history:

Received October 20, 2018

Revised January 15, 2019

Accepted February 20, 2019

Keywords:

Color Identification

TCS3200

Arduino Nano

ABSTRACT

Introducing and teaching color is one of the important parts in learning in childhood period. One of the learning color methods that effective enough is identifying color from the concrete things in the environment with parent assistance to mention the color object. it becomes a limitation when children usually want to play and explore. This research aims to create a toy product which can be used as color learning media for children by still interacting with their environment. Therefore, the researchers will create toy products in the shape of sword and princess stick that can identify object color and produce voice based on the object. Voice output can be selected in Indonesian and English. The main program of this system is identifying object color and audio reading of object color that placed closed to the toy using TCS3200 color sensor and Arduino Nano.

I. Introduction

Introducing and teaching color is one of the important parts in learning in childhood period. Introducing color to children under three years old is the main basic learning of AVM (Auditory, Visual and Memory) that connects directly to the children intelligence development. The study result show that 74% of children intelligence development is gained from visual, 12 % from auditory, and the rest is gained from another thing. The study result is good as guidance for parents in educating children under three and five years old. [1]

Colors will support children growth and body nerves which at that age the brain nerves can be connected optimally. Identifying colors will make children excited and not bored when they are learning or exploring. One of the color learning methods that effective enough is by identifying color from the concrete things in the environment. It is in line with theory that nature or environment around us is media (tool) and complete learning source for human and for children. Preschoolers have strong curiosity to new things. They like adventure, like to try by touching, eating or throwing things and they have strong interest to observe the environment [2].

Introducing color to children can be conducted through parent's assistance in mentioning things around them. It surely becomes the limitation when children usually tend to play and explore by themselves. Learning using toys is one of the alternatives that allows children still play happily and they also have learning process.

Based on the problems above, the researchers try to create a toy product which can be used as color learning media for children while interacting with their environment. Therefore, the researchers will create a toy product in the shape of word and princess stick that can identify object color and produce voice based on the object color. Voice output can be selected in Indonesian and

English. The selection of toy shape is based on the consideration that boys usually like super hero character while girl like princess character.

II. Research Method

2.1 Early childhood education

Early childhood is the golden age which is very potential to train and develop various potentials of children multi intelligence [4]. According to NAEYC (National Association Education for Young Children) preschooler is a group of individuals that lay on age between 0-8 years old, at that age they are in the growth period [5].

Early childhood education aims to develop the whole children potential, so they can play their role in accordance with nation philosophy in the future [6]. The development of children potential can be carried out by giving appropriate stimulant. Giving stimulant for early childhood is different from adult. It occurs because preschooler is not a miniature of adult people, preschooler has different characteristics from adult people. Preschooler is very active, dynamic, enthusiast, and almost always curious to what they see and hear [5].

Nature or environment around us is media (tool) and complete learning source for us and children. Preschoolers have a strong curiosity to new things. They like adventure, like to try by touching, eating or throwing things and they have strong interest to observe the environment [2].

Based on standard of competence, basic competence and indicator of early childhood education, one of the early childhood learning competence is identifying color. Method in introducing color to children is various. One of them is by learning directly observing the environment.

2.2 Reference of RGB Color Data

RGB color data used as reference is as follows [7]:

Tabel 2. Refence of RGB Color Data

No	Red	Green	Blue	Color Identification
1	0	0	0	Black
2	14	92	23	Green
3	2	13	45	Blu
4	169	25	77	Hot pink
5	246	105	5	Orange Red
6	88	98	2	Yellow
7	31	8	7	Saddle Brown
8	16	52	110	Royal Blue
9	30	85	36	Forest Green
10	30	18	41	Indigo
11	113	151	51	Lime Green
12	92	33	91	Purple
13	127	16	59	Pink
14	159	19	24	Dark Red
15	106	109	122	Grey
16	109	83	6	Rod Gold

2.3 Research Method

Research method used in creating education game kit is Research and Development, means a process used to develop and validate the product [3].

2.4 Development Stages

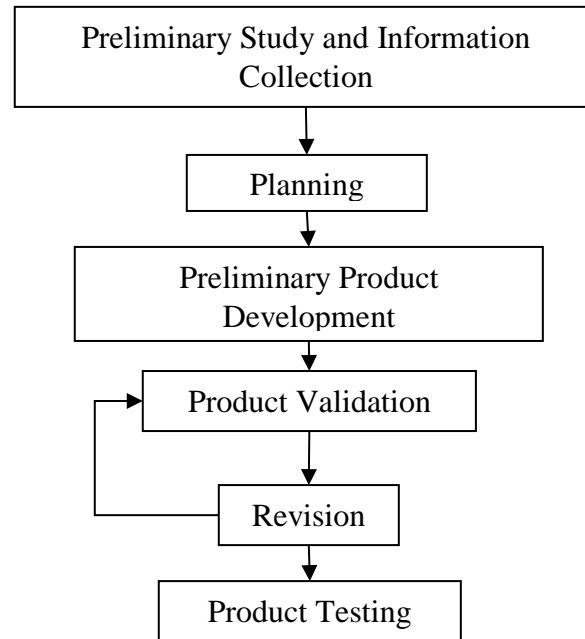


Fig.1. Development stages

2.5 Data Collection and Analysis Technique

Data collecting technique in this research is conducted through observation. Data taken during this stage will be analyzed in the further research. Data analysis technique in this stage is descriptive quantitative analysis. Analysis technique will present the frequency of success and failure of this product in identifying color object, so it can obtain the percentage of whole proposed product accuracy at the end of this research.

III. Result

A set of education game kit of color introduction can be seen in Fig. 1.

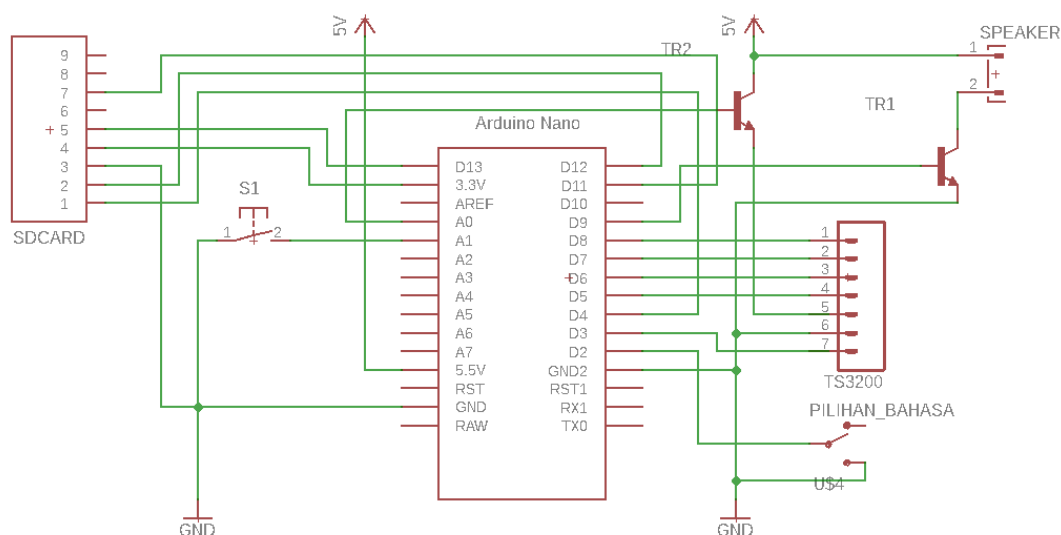


Fig. 2. Set of education game kit of color

Education game kit is divided into two main parts; the top and the bottom parts of the toy. There is color sensor at the top part of toy with connector cable of color sensor with other components at the bottom part of the toy.

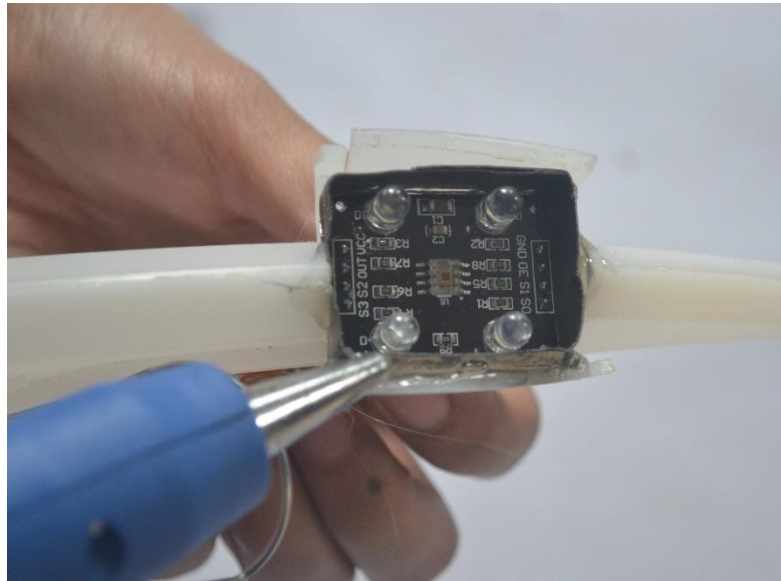


Fig. 3. The Installation of Color Sensor at The Top Part of The Toy

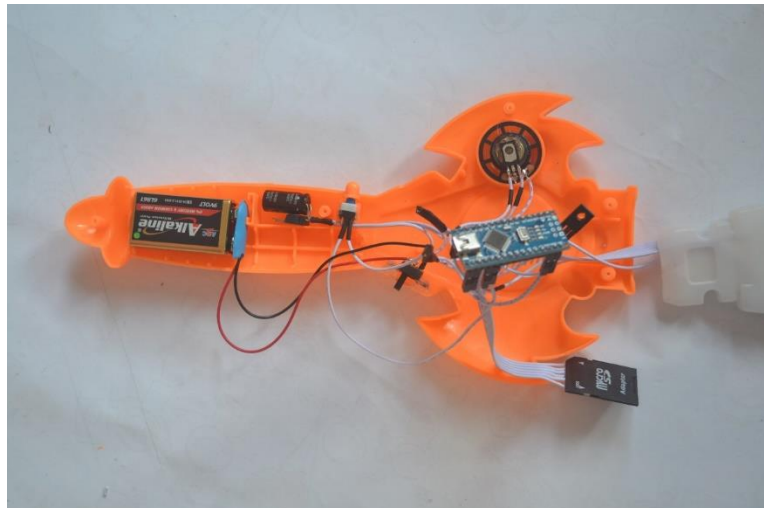


Fig 4. Set of Education Game Kit of The Bottom of The Sword

Output from TCS3200 sensor is duty cycle which has minimum score 0 and maximum score 750. Scale adjustment is needed to obtain score based on the range of GRB color valued 0 to 255. Method used in this stage is mapping method.

One of the most important stages in this research is color sample collection stage that aims to choose color range which can be detected by the developed education game kit of color introduction. Based on the testing that has been conducted, the data of color range read by education game kit of color introduction are as follows;

Table 1. Color Range of Education Game Kit of Color Introduction

No	Color	Color Range (Red, Green, Blue)			
1	Orange	$R \geq 220$	$G \leq 200$	$R > G > B$	
2	Pink	$R \geq 190$	$G \leq 230$	$B \leq 100$	$R > G < B$
		$R \geq 170$	$G = 0$	$B > 80$	$R > G < B$
3	Grey	$80 < R < 190$	$G > 80$	$80 < B < 200$	
4	White	$R \geq 250$	$G \geq 250$	$B \geq 250$	

No	Color	Color Range (Red, Green, Blue)			
5	Black	$R = 0$	$G = 0$	$B = 0$	
6	Red	$R \geq 170$	$G \leq 20$	$B \leq 80$	
		$R > 0$	$G = 0$	$B = 0$	
7	Green	$R \leq 150$	$G \geq 100$	$B \leq 150$	
		$R = 0$	$G > 0$	$B = 0$	
8	Yellow	$R \geq 200$	$G \geq 210$	$B \leq 240$	
9	Brown	$220 > R \geq 200$	$60 \geq G > 10$	$60 \geq B > 10$	
		$170 \geq R > 0$	$80 \geq G > 0$	$B \leq 80$	
10	Blue	$200 > R \geq 0$	$G \geq 0$	$B > R$	$R < G < B$
		$R = 0$	$G = 0$	$B > 0$	
11	Purple	$R > 0$	$R < B > G$	$R > G$	$B \geq 100$
		$200 < R > 0$	$G = 0$	$B \geq 100$	

IV. Conclusion

Education Game Kit can be used as education game tool to identify color and it can be developed further.

References

- [1] Sujiono and Yuliani Nuraini. *Konsep Dasar Pendidikan Anak Usia Dini*. Jakarta:PT. Indeks, 2009
- [2] Andrianto, D. *Memfaatkan Lingkungan Sekitar sebagai Sumber Belajar Anak Usia Dini*, 2011
- [3] Brog, W.R., & Gall, M.D. *Educational Research: An Introductions*, Fourth edition. New York: Logman, 1983
- [4] Rasyid, Harun, dkk. *Asesmen Perkembangan Anak Usia Dini*. Yogyakarta: Multi Pressindo, 2009
- [5] Hartati, Sofia. *Perkembangan Belajar pada Anak Usia Dini*. Jakarta: Depdiknas, 2005
- [6] Suyanto, Slamet. *Konsep Dasar Pendidikan Anak Usia Dini*. Jakarta: Depdiknas, 2005
- [7] Andrian, Y. Robot Penyortir Benda Berdasarkan Warna Menggunakan Sensor Warna TCS3200. *SISFOTENIKA*, 3(2), 2013

Supplementary Material

Supplementary material that may be helpful in the review process should be prepared and provided as a separate electronic file. That file can then be transformed into PDF format and submitted along with the manuscript and graphic files to the appropriate editorial office.