



Belangkas Robot As An Effort To Improve Calistung Ability In Early Children

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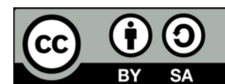
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ABSTRACT

Education in the 4.0 era requires the education sector to be able to compete and utilize computer technology, which is currently developing rapidly as an interesting and interactive learning tool or media for children and to increase children's interest in learning. The first problem that came to the attention of the implementing team was that it was difficult for children to concentrate while studying, and children who entered elementary school without attending kindergarten still had difficulties in the processes of reading, writing, and arithmetic (Calistung), which of course would have an impact on children's delays in understanding learning material. The second problem is that the online teaching and learning process that was carried out previously was not effective in encouraging children's understanding of a lesson because it was difficult for children to focus on the learning being given. The third problem is that children are often exposed to gadgets that will have a negative impact on their gross and fine motor development. The duration of long and frequent use will lead to addiction to gadgets, the child's development will become less than optimal, and the child's emotions will be out of control and trigger early stress. The fourth problem is the absence of interactive learning media in partner schools that can increase children's interest in learning. The output target to overcome the existing problems will be interactive learning media in the form of a robot named BELANGKAS Robot (Concise Learning). The purpose of this research is to develop an alternative learning medium for children using robots by inviting children to collaborate and compiling a series of instructions for the robot to carry out a learning activity (an introduction to numbers, letters, and pictures) that leads to sharpening children's logical thinking and attracting children's interest in learning, reading, writing, and arithmetic. From the results of the research that has been done, the BELANGKAS robot is proven to be able to attract children's learning interest, and of course this interest will improve children's learning abilities, especially CALISTUNG.

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1. Introduction

Learning media is a tool that is able to bridge children in the teaching and learning process. Learning media can use anything including learning robots [1]. The ability that children must have to prepare

themselves to enter school is the basic ability to read, write and count (calistung) which of course must be learned from an early age of 4-6 years [2]. Currently countries around the world are feeling the negative impact of the Covid-19 Pandemic. The thing that is most felt is the limited activities outside the home including learning activities. Early childhood, which includes PAUD and Kindergarten, generally cannot read, write and count. Meanwhile, Grade 1 Elementary School Children who do not attend Kindergarten have the same problem so that Online learning is not the right thing for early childhood. Online learning without interactive learning media will make it difficult for children to understand lessons without assistance from teachers and fun learning media to attract children's learning interest and focus [3]. From the description of the background, it can be drawn that the problems to be examined include:

1. For young children and children who enter elementary school without attending kindergarten, they still have difficulties in the process of reading, writing and arithmetic (calistung), which of course will have an impact on children's delay in understanding learning material.
2. The online teaching and learning process that was carried out previously was less effective in encouraging children's understanding of a lesson because it was difficult for children to focus on the learning being given.
3. Children are often exposed to gadgets that will have a negative impact on their gross and fine motor development. The duration of long and frequent use will lead to addiction to gadgets, the child's development becomes less than optimal and the child's emotions are out of control and trigger early stress.
4. There is no interactive learning media in partner schools that can increase children's interest in learning. The specific objective of this research is to improve reading, writing and arithmetic skills in early childhood using the BELANGKAS Robot as an interactive learning medium and to increase research interest in students who are invited to participate in research. Research Urgency, the increasing number of Covid-19 cases requires children to study online and there is no interactive learning media, of course this makes the teaching and learning process ineffective. The ability to read, write and count children is still low, where this calistung ability is a basic ability that must be possessed to take the next level of education.

Based on the description above, it can be seen that the contribution of this product to science can be said to be quite large. If the BELANGKAS Robot is used routinely and applied in early childhood learning, especially in CALISTUNG learning, of course it will have a positive impact on children.

2. Research Method

This research was conducted by first building a prototype and then implementing it to related parties. The prototype model can be used to connect customer incomprehension to application makers [12]. The steps of the prototyping mode are:

1. The Research Team will collect the data needed in the process of making the Robot, and this stage is also the first step to finding the formulation of the problem related to how to design the BEANGKAS Robot which will be used as an interactive learning medium for early childhood.
2. The Research Team created a prototype program to provide an overview to customers. The prototype to be provided is as follows:

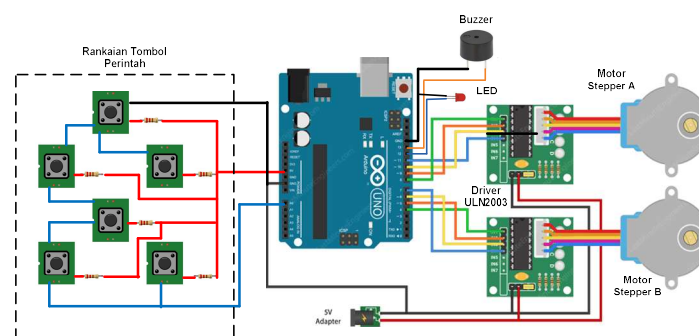


Figure 1. BELANGKAS Robot Series

Description :

1. The robot circuit consists of a microcontroller circuit, a series of command buttons, and a series of actuators. To use the robot, the user must first enter commands via the available button interface.
2. To interact with this robot, the user can do it through the five available instruction buttons. The instruction starts by pressing the "=" button then the robot will beep 3 times which means the robot is ready to receive commands.
3. All instructions will be stored in the EEPROM memory found on Arduino.
4. When the user presses the command execution button, the robot will move according to the sequence of commands that have been input into the EEPROM memory.
5. The function of the stepper motor in driving this robot is to keep the distance of each step carried out by the robot consistent.

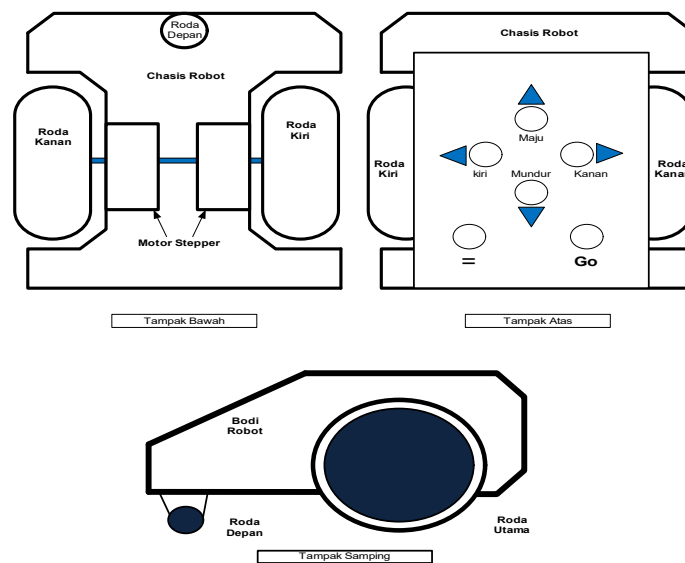


Figure 2. Robot Prototype Design

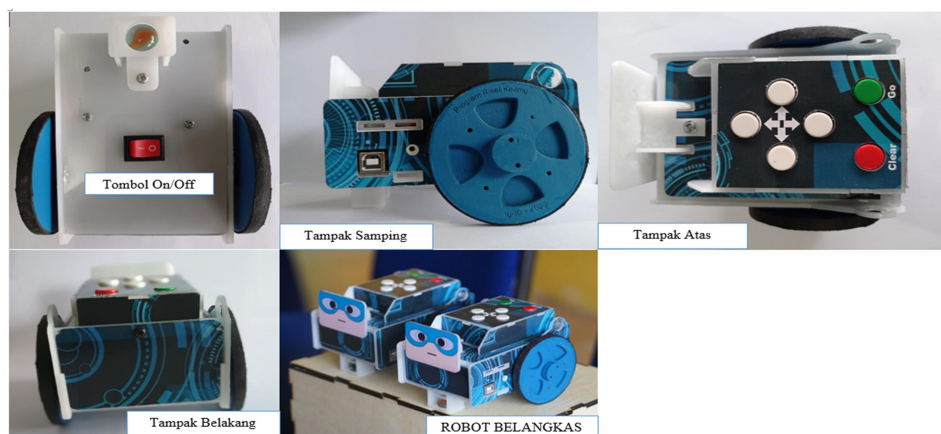


Figure 3. BELANGKAS Robot Physical Form

The mattresses made in this study have been adapted to the needs of Partners, including:

- a. Letter Recognition Mat
- b. Number Recognition Mat
- c. Hijaiyah Letter Recognition Mat
- d. Arabic Numeral Mat

The mattress to be made can be adjusted according to needs.

For how to use the BEANGKAS Robot, a tool demonstration was previously carried out with partners and a video was made of using the robot which can be seen on the following YouTube link <https://youtu.be/nMadJ6yZgwY>.

- The final step is to perform the BEANGKAS Robot demonstration and testing to ensure the BELANGKAS Robot runs according to its function.

3. Result and Discussion

At this stage, data analysis will be carried out on the research conducted. Before conducting data analysis, the research team will provide training on the use of the BELANGKAS Robot to children and teachers. Then the research team will conduct tests on samples of early childhood that are taken randomly in the process of reading, writing and arithmetic to be used as a reference for comparison with the results of the final evaluation later.



Figure 4. Phase 2 Testing Activities

The data analysis carried out was to make a guided questionnaire to be asked of the children and a questionnaire to be filled out by the teacher with a Likert scale to assess and evaluate the understanding of children and teachers in using the BELANGKAS Robot. Then, the data will be processed using SPSS to see comparisons before and after the child learns to read, write and count (CALISTUNG) using the BELANGKAS Robot.

3.1. Research Achievement Indicators

The achievement indicator of this research is the improvement of reading, writing and arithmetic processes using the BEANGKAS Robot which includes the following aspects. For the results of stage 2 testing that was carried out on children, the results were obtained based on observations from the distribution of questionnaires carried out on children as follows:

Table 1. Research Achievement Indicators

Achievement Indicator	Achievement Targets	How to measure	achievement results
Learning activities include: Recognizing Letters	80%	It was observed during the process of providing training and counting children who fulfilled aspects of knowing letters.	85%
Recognizing Numbers	80%	It was observed during the process of providing training and counting children who fulfilled the aspect of knowing numbers.	85%
Reading	80%	It was observed during the process of providing training and counting children	80%

		who fulfilled the reading aspect.	
Writing	80%	Observed during the process of providing training and counted children who fulfilled the writing aspect.	80%

The achievement indicators to be achieved in this study were determined that at least 80% of children scored > 70. Based on the results of the questionnaire conducted, the desired value has been achieved in the study.

4. Conclusion

The conclusions of this study are:

1. The resulting BELANGKAS Robot product is 100% running according to its function.
2. The results obtained from the testing and outreach that have been carried out for teachers have been achieved, and based on the results of questionnaire observations on children, 80% are in accordance with the expected results, which are located at a value of > 70%.
3. To support MBKM activities, this can be said to have been achieved because the proposal exam and the thesis results exam were carried out on 5 students from this scientific research team.

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