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DESIGN OF MOTOR LEARNING INSTRUMENTS BASED ON TRADITIONAL ENGKLEK GAMES

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Abstract

Motion is a basic element of human life. With human motion can do any activity without difficulty. Motion is an activity that is closely related to motor skills, many children experience sluggish motor development due to lack of movement training or because of the lack of fun movement learning facilities. In several cities in Indonesia, there are many data on the lack of movement activity that causes various diseases such as obesity and so on. In the city of Padang, it was found that 18.98% of children's basic movement skills were in the low category. This data shows that there are still many young children experiencing difficulties in mastering movement, the absence of instrument technology for learning basic movement skills is one of the dominant factors influencing this situation. This is due to the delay in identifying the development of movement skills in children. The purpose of this study was to produce learning instruments for basic movement skills based on the traditional Englek game which is equipped with complex technology in assessing motion in children, especially in locomotor, non-locomotor and manipulative movements such as running, jumping, walking, kicking a ball, throwing a ball and so on in order to overcome motion problems that occur in the city of Padang, West Sumatra. This research is expected to produce learning instruments for basic movement skills that can be used effectively, easily and practically by related parties such as Early Childhood Education and Kindergarten.

Keywords: *Motion; Instruments; Learning; Ankle*

INTRODUCTION

Early age is a golden age in which the stimulation of all aspects of development plays an important role in further developmental tasks. Early age is also a critical period that will determine the outcome of the next child's growth and development process (Bahtiar, 2015). Based on the results of research on basic movements in the city of Padang, it was found that 36.07% were in the low category. This data is reinforced by research findings from Bakhtiar (2015) which

states that boys and girls in rural and urban areas in West Sumatra are very delayed in locomotor skills and their control objects. This data shows that there are still many young children who have basic movement skills that are in the low category. Movement delays in children if left unchecked will cause several pathological threats to children, including: 1) Asymmetrical or unbalanced movements between the left and right limbs, 2) Persistence of primitive reflexes, 3) Hyper/hypotonia or impaired muscle tone, 4) Hyper/hyporeflexia or impaired body reflexes, 5) The presence of uncontrolled movements. (Bernie, 2013). Furthermore, the low basic movement skills of children will cause impaired sensory function, cause body defects, obesity (obesity), imitation movement disorders (stereotypic), malnutrition (lack of nutrition), have difficulty in regulating body balance, slow reactions and poor coordination.

Based on further studies, this problem occurs influenced by various factors, including the lack of motor development infrastructure, the absence of learning instruments for children's basic movement skills based on the traditional engklek game, so that evaluations are rarely carried out by teachers or parents regarding basic movements, limits of range of motion. which is very narrow, the emergence of electronic devices that can produce games such as play stations, online games, smartphones, which causes children to be lazy to move in active games, the demands of parents on early childhood to be able to read, write and count, in addition to the rapidly growing With digital technology like today, traditional games that are very beneficial for children's motoric growth will be increasingly eroded, such as one of them is the traditional engklek game, engklek is a traditional game played on a flat surface that has several squares that are g is jumped and is shaped like a human who has one leg, where there are two boxes lined up at the base, two boxes facing each other, one box above it, two boxes facing each other, and a round part that resembles a head which forms a free area for players.

The dominant factor influencing the low basic movement skills of children is the absence of basic movement learning instruments based on the traditional

engklek game. One of the motor learning models for children is conventional learning in the form of teachers demonstrating movements for children and without any supporting instruments that make children more interested in the learning process, so it is very necessary to redevelop motor learning instruments in the form of locomotor, non-locomotor and manipulative movements. Based on this situation, it is necessary to develop learning instruments for basic movement skills that are able to attract children's attention as well as become a fun learning medium for a child (Donie et al., 2021). One of them is by developing tools that are able to shift the learning system from conventional ones to using technology and preserving traditional games. One of them is the use of sensors and today's technology (Okilanda et al., 2021). Sensors used in the development of learning instruments for basic movement skills are motion sensors, cameras, and speakers.

The research scheme used is the design of motor learning media which refers to the decentralized policy of managing the UNP Research Program and PKM. One of the objectives of UNP's research is to improve the quality of research results towards the acquisition of HKI/Patents.

METHOD

This research method is research and development (Research and Development). This research method is the method used to produce a particular product, and test the effectiveness of the product. This study aims to develop an instrument for learning basic movement skills for early childhood based on the traditional engklek game. In addition, this study aims to produce a renewable and efficient instrument by utilizing a motion sensor, where the sensor will emit waves, when the wave is disconnected the auto timer will be active as one of the measurement indicators that have good measurement accuracy for measuring early childhood movements, In addition, the sensor will detect the child's movement when the sensor wave is cut off by the child's stomping on the mat that is already available.

This research has the following stages or steps of research and development; 1) potential problems, 2) data collection, 3) product design, 4)

design validation, 5) design revisions, 6) product trials, 7) product revisions, 8) usage trials, 9) product revisions and 10) production mass (Borg and Gall, 2008).

In this study, the researcher has carried out the design revision stage and has designed the tool so that the desired tool has been successfully designed and ready to be operated and tested for use

Tools and Materials

DevelopmentThe design of the instrument for learning basic movement skills for early childhood based on the traditional engklek game requires measuring equipment and electronic components, such as power supplies, infrared sensors, ATmega328 microcontrollers and Arduino Uno Rev 3, interfacing and display circuits (LCD) as reading displays. digital data that will be assembled and connected using a USB 3.0 cable so as to produce measurement data output in the form of the time it takes the child to jump, run or walk and how perfect the child is in carrying out these movements which is indicated by how perfectly a child steps on a mat that has been fitted sensors on each side to detect the footsteps of a child.

In this study, researchers have carried out step by step the research process, namely:

1. Potential Problems

   At this stage it is very clear to find. Based on the results of research on basic movements in the city of Padang, it was found that 36.07% were in the low category. This data is reinforced by research findings (Bakhtiar, 2015) which states that boys and girls in rural and urban areas in West Sumatra are very delayed in locomotor skills and their control objects

2. Data Collection

   At this stage the researchers conducted observations and data collection and it was found that 18.98% of children's basic movement skills were in the low category.

3. Product Design

   The design of early childhood basic movement skills learning instruments is

adjusted to the theory of locomotor motion, namely according to the theory of Lumintuarso (2013) Locomotor motion is the movement of the whole body through a certain room or distance such as walking, running, jumping and so on so that it is based on theory. The design is formed as shown below:
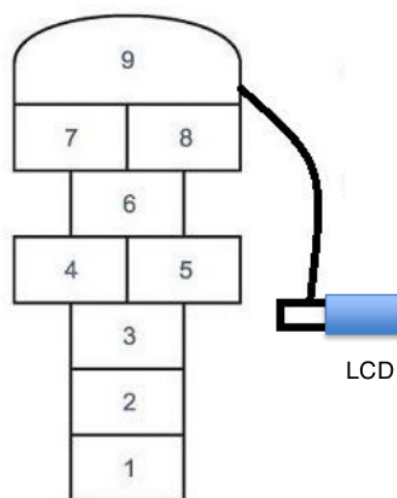

Figure 1. Instrument Design

After passing these stages, the researcher carried out the design validation stage

4. Design Validation

At this stage the researcher got some input from experts so that a new design of the early childhood movement skills learning instrument was obtained, the revision was in the form of improving the length of the running track which was previously only 5 meters, then it was extended to 10 meters, this is based on Nasution in (Suharjana, 2015) playing is important for a child, games can provide opportunities to practice skills repeatedly and can develop ideas according to their own ways and abilities, and the media for playing a child must be wider and wider. are free to develop the child's motor skills, so it can be concluded that the distance required for the child to do the running and

jumping test must be wider and free so that the child can move freely and freely

5. Design Revision

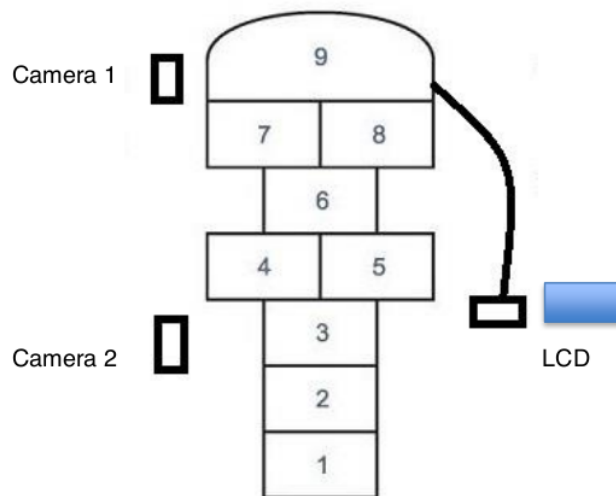Based on the design validation carried out by motorists, the following designs were obtained:

Figure 2. Revision Instrument Design

RESULTS AND DISCUSSION

The process of developing learning instruments for early childhood basic movement skills based on the traditional engklek game was carried out through the first stages, namely finding potential problems, data collection, product design, design validation, design revision and then making a tool where the tool involved several electronic components, namely:

1. Infrared Sensor Adjustable Switch 3 – 80 cm, E18-D80NK Adjustable Infrared Sensor Switch 3-80 cm Is a sensor to detect objects that pass through it and the way it works is that the sensor can reflect infrared rays, and detects a distance from 3 cm – 80 cm according to the settings that will be used so that we can also use the sensor according to the desired distance as a sensor with a certain

distance, this sensor will calculate the number of steps based on the sensor number that has been *set* as desired.

2. The ATmega328 microcontroller belongs to the 8 Bit CMOS family of low-power Microcontrollers based on Risk Architecture, with an instruction execution time of 1 machine cycle. The reception system by the Atmega328 Microcontroller is almost 1MIPS per MHz, this Microcontroller is designed to optimize power consumption against the speed of the process. Atmega328 microcontroller provides: Data and program memory 8 KByte In-System Programable Flash, 512 Bytes EEPROM (Electrically Erasable Programmable Read-Only Memory), 1 Kbyte SRAM, 23 general purpose I/O lines, 32 general purpose working registers, 3 flexible Timer/ Counters, Internal and External Interrupts, serial USART programming, 6-channel ADSC.

3. AnLCD electronicdisplay is an electronic component that functions as a display of data, either characters, letters or graphics. LCD (Liquid Cristal Display) is one type of electronic display made with CMOS logic technology that works by not producing light but reflecting the light around it to the front-lit or transmitting light from the back-lit. LCD (Liquid Cristal Display) functions as a data display in the form of characters, letters, numbers or graphics, so that from these components an instrument is produced that can be used to measure movement skills of early childhood.

How to use :

From these tools, how to use them are:

1. Doing Jump Lessons
   a. The tool consists of two parts, namely the part in the form of a plus sign and the straight part.
   b. Child stands behind box one
   c. The child performs a jumping motion with both feet in succession from cube one which has one sensor to box number nine and back again to the initial cube

d. At the same time the sensor will detect and calculate the time of the child's jump so that theobtained *output* in the form of time isand the sensor will translate the number of movements by displaying the motion detected by the sensor when the child makes a jump, and the results will be displayed on the LCD in the form of the time and number of lights displayed. lights up which indicates the child's movement is correct and detected by the sensor.

2. ConductingRunning Assessment

   a. The child stands behind the number one cube

   b. The child runs towards the ninth cube and after the child arrives at the cube the child makes a turning movement and runs back towards cube one

   c. When the child finishes doing the movement, the sensor will detect the movement and calculate the time since the child made the first running movement until the child returns to sensor one.

   d. The calculation results will be displayed on the LCD in the form of time and motion detection made by the child which is translated into a light that turns on when the sensor detects the child's movement and the light will turn off when the sensor does not detect the child's movement.

3. Carrying out a walk assessment In the walking assessment the test mechanism is exactly the same as the assessment in the running test, starting from the starting point, calculating and detecting sensors, only the tests carried out by the child are carried out by walking instead of running

4. Performing an Assessment of Manipulative

   Movements Manipulative movements are movements using tools , then in this activity the child is in the middle of the semi-circle, at the same time the child kicks the ball 3 times with 3 balls, at that time the camera will record and capture the child's manipulative movements so that the teacher can make an assessment of the movement.

CONCLUSION

The conclusion from the results of this study is the creation of an instrument for learning basic movement skills for early childhood based on the

traditional engklek game which has a role in assessing children's movements, namely jumping, walking, and running movements that are in accordance with motor movement theory and it is hoped that this tool is able to assess motion in children. children, especially in the city of Padang so as to reduce the number of lack of movement skills in early childhood. The next research is the refinement of this instrument for learning basic movement skills for early childhood by conducting expert validity, group trials and usage trials.

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