



## Development of Local Wisdom-Based "Sandal Wayang" Game Tools to Improve Physical Motor Ability of Children with Special Needs in Early Childhood Education Inclusion

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### ABSTRACT

Childhood is an important period for development and an opportunity to learn and develop motor skills and physical fitness through Movement-based play. This research will develop a play tool, "sandal wayang" (*sayang*), based on wayang characters, namely the "punakawan" family, to improve the physical motor skills of children with special needs in Inclusive ECE. The development method used in this study is the ADDIE (Analyze, Development, Design, Implementation, Evaluation) model, with data collection through observation, surveys, and interviews. The targets of this development research trial were teachers and students at the Kharisma Sidoarjo Kindergarten institution. The product of this research is a "sayang" game with wayang characters from the Pandawa family (*Semar, Petrok, Gareng, Bagong*) and *Gatotkaca*, as well as a guidebook on how to use the "sayang" game. The results of the material and media validation state that the "sayang" game tool that has been developed is suitable for use in learning. The implementation results show that there is an increase in balance and coordination of movements before and after playing "sayang".

## INTRODUCTION

Early Childhood Education (ECE) is a coaching effort aimed at children from birth up to six years, which is carried out through the provision of educational stimulation to help physical and spiritual growth and development. Education is a right for all citizens. The right to education is guaranteed in the 1945 Constitution of the Republic of Indonesia Article 31 Paragraph 1, which states that "Every citizen has the right to receive proper education". This forms the basis that early childhood with special needs has the right to enjoy quality and equal services in inclusive education. Inclusive education has been proclaimed through various declarations and strengthened by Law no. 20 of 2003 concerning the National Education System, which encourages all parties to realize quality education. The implementation of inclusive education must start from an early age, namely from early childhood institutions (Akrim & Harfiani, 2019; Engelbrecht et al., 2017; Karimian Shirejini & Derakhshan, 2020; Mngo & Mngo, 2018; Rasmitadila et al., 2020).

Childhood is an important period for development and opportunities to learn and develop motor skills and physical fitness through movement-based play. The tendency

that occurs in children with special needs is a lack of gross motor skills (Amor et al., 2019; Kaur et al., 2018; Ketcheson et al., 2017; Malboeuf-Hurtubise et al., 2018; Patel et al., 2020). One indicator of the inability of children with special needs in gross motor aspects is shown by their low ability in gross motor activities, especially in activities that require complex gross motor movements and switching movements (Handayani et al., 2018).

Motoric abilities are very closely related to the development of controlling body movements through coordinated activities between the nervous system, muscles, brain, and spinal cord (Hayati & Fatimah, 2019). Gross motor skills include locomotor patterns (movements that cause a change in place) such as walking, running, kicking, going up and down stairs, jumping, etc. (Dwanita et al., 2014). Apart from that, in gross motor skills, there are also non-locomotor movements, namely movements without moving the body to another place, such as pushing, folding, pulling, and bending (Luwes, 2020). Lack of gross motor skills can affect the social aspects of children. In association, they cannot take care of, care for and lead themselves; when they were children, they had to be assisted continuously. Therefore, children's gross motor skills need to be improved through learning through play. By playing, children can carry out activities so that all aspects of development can develop optimally (Hasanah, 2016). Playing is not only fun but also a need that inevitably has to be fulfilled. Motor learning can be interpreted as a process of learning movement skills and fine-tuning motor skills, as well as variables that support or hinder one's abilities through motor skills (Mas'udah & Sujarwanto, 2013).

The right stimulation in developing the physical and motoric abilities of normal children and children with special needs is through games. In contrast to playing, games have regular behavior and are usually carried out for the common good. Especially for children with special needs, educators need to provide games that can facilitate children's needs. Traditional games are a form of play that can be taught to children with special needs, but it is necessary to refer to adaptive physical education. Adaptive physical education is a comprehensive service delivery system designed to identify and solve problems in the psychomotor domain (Sukoco, 2019). Learning about traditional games for children with disabilities specifically helps those with disabilities in physical, mental, emotional, and social growth and development. Traditional games developed for children with special needs need to consider gross motor development needs according to their needs and also the advantages possessed by children with special needs themselves. Modifications in games for children with special needs are divided into four types, namely: a) Instruction: related to rules, lesson plans, and strategies, which can be modified or combined to make children able to participate in gross motor learning, b) Regulations: rules can be adjusted or changed if they can make children with special needs succeed in playing games, c) Equipment: game tools can be replaced with other objects that have different shapes, colors, sizes, etc., d) Environment: if necessary, the teacher can change the size of the playground as needed.

In this study, the researcher wanted to develop a modification of the traditional game tool. The game that will be developed by the research team is the *Sandal Wayang* game tool or what can be called "*Sayang*" This game tool is an innovation from the traditional

clog stilts game, which was developed specifically for children with special needs by fulfilling ergonomic elements including physiological, aesthetic and economic elements.

Ergonomics is one of the requirements to achieve a good design, quality, certified, guaranteed, and according to user needs. This knowledge becomes a simultaneous unit starting from design planning, design, or production process to the final product produced. Ergonomics is needed for product evaluation, and in addition to functional design, it must also be able to provide safety, health, security, and comfort for humans, especially for children with special needs, when using and operating the design product results (Dianat et al., 2018; Hartanti & Hendrassukma, 2021; Kuber & Rashedi, 2020; Robielos et al., 2019). To assess a final product as a good design value category, there are three elements, namely functional, aesthetic and economic. These three elements must be present in the game product developed in this study, namely the "*Sayang*" game tool.

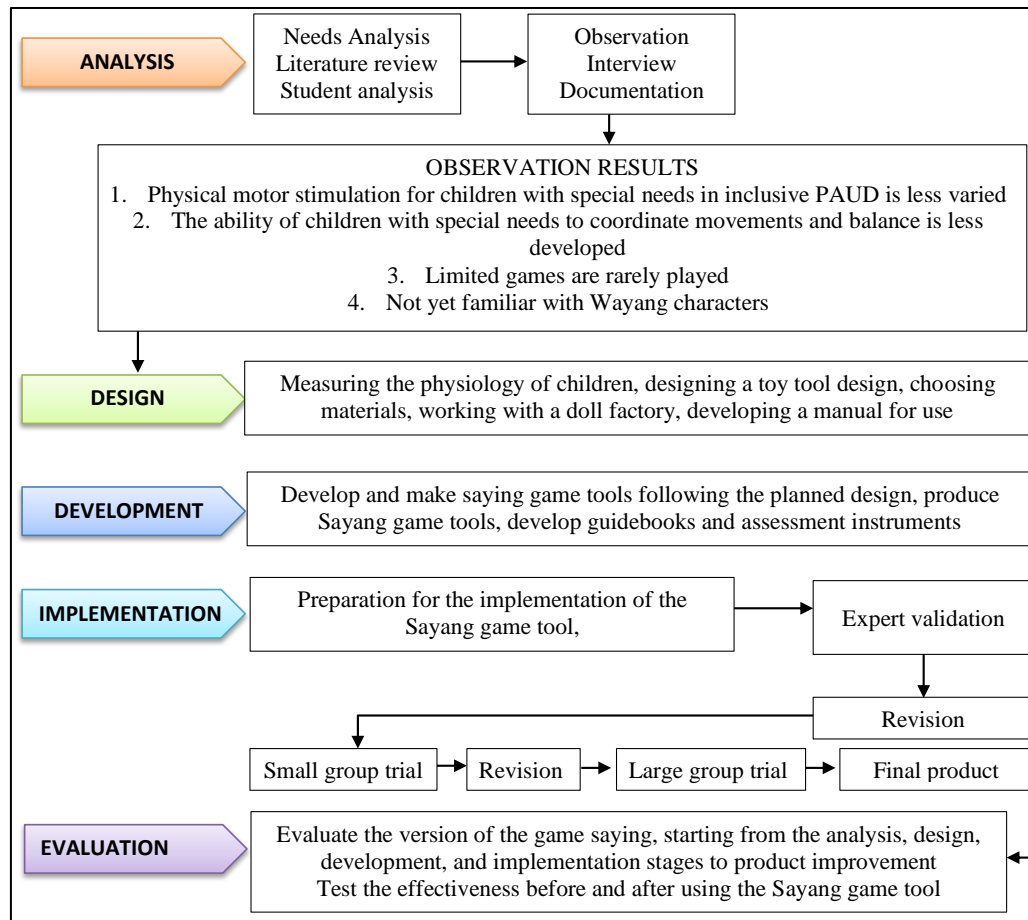
The coordination of body movements involves muscles, joints, and nerves. When a child plays "*Sayang*", the cerebellum determines the position of the movements of the various muscles involved. The cerebellum, whose role is to coordinate the movements of the thigh muscles, calf muscles, soles of the feet, hand muscles, arm muscles, and the right body position to the field being traversed. In addition, the function of coordination is also related to one's intelligence. The level of gross motor skills is positively related to cognitive development (Veldman et al., 2019). The benefits of the "*Sayang*" game tool are also to train the body's balance. Children are expected to be able to maintain their body position in a state of rest, move and walk. "*Sayang*" is a type of game that trains manipulative movements. Elements that can be developed in the "*Sayang*" game are the balance of walking movements, coordination of eye, hand, and foot movements, and fine motor skills when the child holds and squeezes the handle of this "*Sayang*" game tool while walking consistently.

## RESEARCH METHOD

This development research uses the ADDIE development model. The development plan will be carried out for eight months; the development team focuses on developing designs and testing the feasibility of local wisdom-based "*Sayang*" game tools. This model was chosen because it has simple but systematic characteristics. The ADDIE model is a development model consisting of 5 stages, namely: 1) Analysis, 2) Design, 3) Develop, 4) Implement, and 5) Evaluate. The procedural design of the *Sayang* game tool is as follows in Figure 1.

To obtain the required data, 3 data collection methods are used, namely: Observations were made to obtain data during the trial implementation of the use of local wisdom-based "*Sayang*" game tools. Observation targets are teachers and students/parents (Riatin, 2020). The instruments used in the observation are observation sheets of teacher and student/parent activities using the "*sayang*" game tool.

1. Interviews are used to obtain the data needed for needs and content analysis. The targets in this interview were academics and ECE practitioners.
2. The survey, used to test the reliability of the product being developed. The survey was carried out directly.



**Figure 1.** Procedural design of "sayang" game tool.

The targets of this development research trial were teachers and students at Kindergarten Kharisma Sidoarjo as partners in this study which is one of the ECE service institutions that also accepts children with special needs at the school whose learning process is shared with children who do not have special needs (inclusion school) in the Sidoarjo Park area.

## RESULTS AND DISCUSSION

### Analysis Stage

The analysis phase consisted of two activities, namely needs analysis and game equipment components, conducting Focus Group Discussions (FGD) between the development team and colleagues, ECE practitioners, and stakeholders in Inclusion ECE. The needs analysis stage was carried out at Kharisma Kindergarten by using observation and interview techniques. The observation results stated that the gross motor development achievements of children with special needs and normal children at Kharisma Kindergarten were different, especially in terms of coordinating body movements and balance (Srikantaiah et al., 2018; Subur, 2017). Children with special needs require more time and consistent habituation in coordinating movement activities

and training balance. The variations in gross motoric activities in children with special needs are still less diverse.

The results of interviews with teachers stated that various traditional games could be used to stimulate gross motor skills. The classic game that is usually used is the clog game made from coconut shells. However, in its use, normal children and children with special needs have difficulty walking or swinging clogs from coconut shells. The form of a small spilled media is complex for children to walk in balance, and when used on the floor, it is very slippery and dangerous (Joshi et al., 2021). Figure 2 and Figure 3 illustrates in graphical form the data from the results of the needs analysis activity, which shows the level of body coordination and balance of children with special needs and normal children in Kharisma Kindergarten.

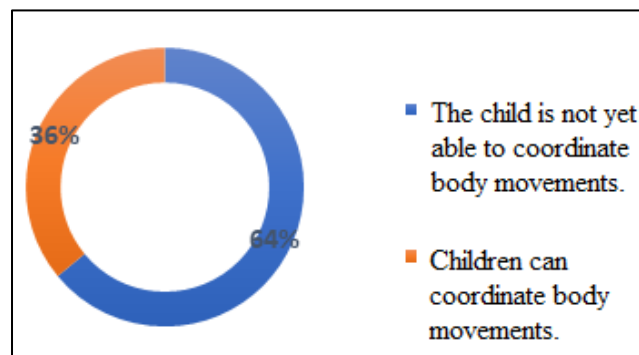


Figure 2. Coordination of body movements.

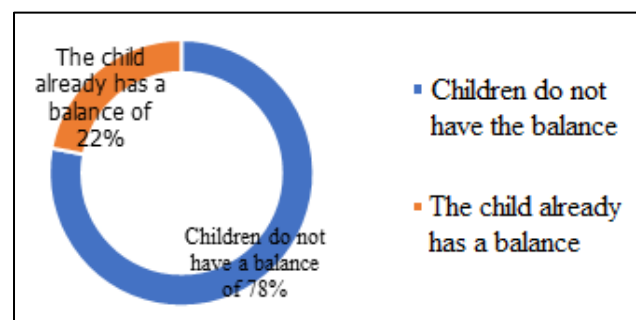


Figure 3. Body balance.

It can be concluded that based on the results of the analysis of existing problems, children with special needs and normal children both need stimulation to maintain movement coordination and balance through a game. The "saying" game tools that will be developed will not only train children to coordinate movements and balance but can be an alternative for children with special needs to train concentration and introduce Javanese culture through the character Semar.

### Stage Design

The design stage starts with determining the learning objectives, developing the idea of a game tool "sayang" based on Javanese local wisdom, and writing a draft of a dear game



guidebook. To get an idea for the design of the Semar puppet sandals game, the researchers observed the existing variety of clogs, then used the Semar character as the character in the sandals. The following is the process of designing the wayang sandals in Figure 4.

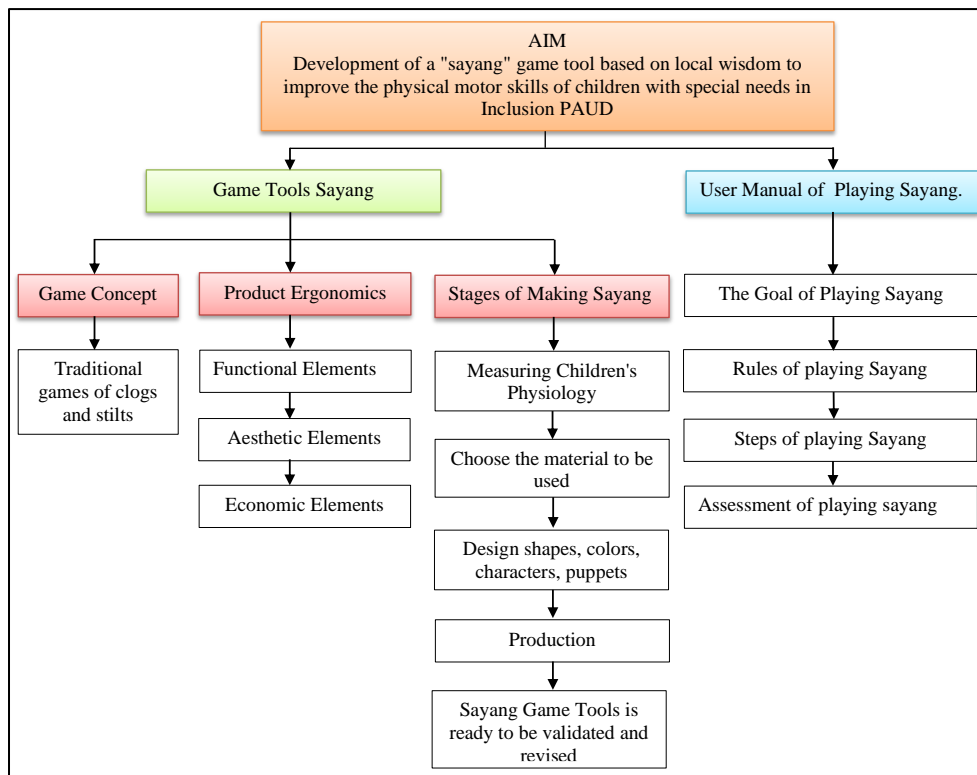


Figure 4. Conceptual design of *sayang*.

### Stage Development

The development stage develops "sayang" game tools based on Javanese local wisdom and creates a guidebook by validating experts whether the game tools developed are in accordance with the development of children with special needs in inclusive ECE and meet the elements of ergonomics and local wisdom, with the following details:

#### 1. *Sayang* Game Tool

This wayang sandal game tool was developed through the following stages:

##### a. Develop Competency Map

The basic competence of child development achievements in the development of playful play models focuses on the development of game tools that stimulate physical motor skills, including balance and coordination of movements of children with special needs in Inclusive ECE by considering ergonomic elements.

##### b. Development of "sayang" game tools through Ergonomics stages

###### 1) Functional Elements


The functional element is a measurement of the child's physiological form and relates to anthropometry. Anthropometry is a study related to measuring body dimensions. In making this baby game tool, the resulting child's physiological size

data is used in the development of the baby game design. This is intended so that the baby game tool product is in accordance with the child's body dimensions and is suitable for use. The first thing to do is measure the length of the child's feet, the child's height, weight, and the diameter of the hands of the special needs child in Inclusion ECE. The puppet sandals ("Sayang") game tool that has been developed have a handle length up to the child's chest limit, so the sizes used are 60, 70 cm, 80 cm, 90, and 100 cm to adjust the height of each child, which is different.

## 2) Aesthetic Elements

This wayang sandal game has an interesting design by integrating local wisdom, namely the character Semar. The design describes the figure of Semar as follows in Table 1.

**Table 1.** Design of *Sayang* game tools.

| Design   | Description   |
|--|---|
|  | The wayang sandals game tool with the character of Semar, the raw materials used are lighter made of Eva sponge and polyfoam. |

The process of making a "Sayang" game tool starts with 1) measuring the raw material according to the length of the child's foot, 2) cutting the EVA sponge pattern according to the size, the next step is 3) making the size pattern from cardboard, starting from the base, handle, wayang character which is in the "honey" handle, after that 4) draw the pattern on the velboa fabric and 5) cut according to the pattern. The next process is 6) sewing the cloth into the shape of Semar's handle and figure, then 7) filling it with polyfoam material on the "Sayang" handle and Eva foam on the "Sayang" base. The base and handle blend with the shape of the body, which is above the child's toes. The process of making "darling" has been improved several times in collaboration with the doll home industry so that the form is suitable for children. The physical form of the "darling" game tool is as in Figure 5.



**Figure 5.** The results of the development of the "*sayang*" game tool.

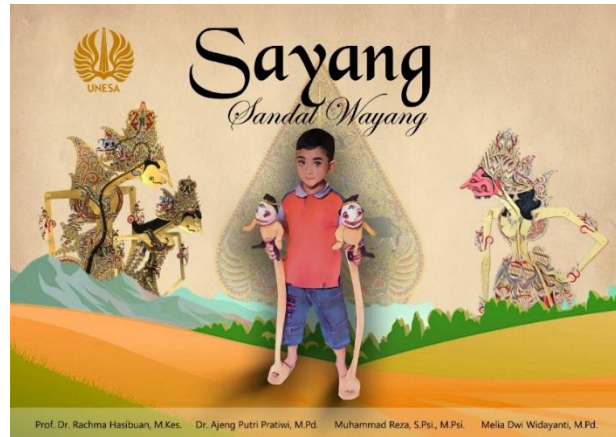
### 3) Economic Elements

This "*Sayang*" game tool was developed with an attractive design and had a sale value to the community, besides that it's flexible; its flexible shape has practical value, can be used indoors or outdoors, and can be stored in a box or bag so that it can be taken anywhere.

## 2. Teacher's Handbook

This "*sayang*" game tool is structured through the following stages: (1) creating a competency map, compiled based on the needs found in the field regarding children's physical motoric abilities. The competency map in the initial draft consists of activity material content, namely (1) coordinating limbs and limb balance. (2) develop special learning objectives that are adjusted to the expected competency maps; (3) making storyboards, namely sketches of pictures arranged sequentially according to specific learning objectives, with storyboards, the activity material can be conveyed easily, (4) making pictures for a guide on how to play "*honey*" game tools for early childhood, (5) compiling media with Flip PDF. The images that have been made are arranged and combined with the original photos to add a lively impression to this game tool, (6) export the overall result in Flip PDF form. The guidebook was developed using the 5W 1H method, namely what, where, when, who, why, and how. It is hoped that these six elements will make it easy for teachers/parents/readers to understand and use how to play the "*Sayang*" game for children with special needs in Inclusive ECE.





**Figure 6.** Results of the development of the “sayang” game tool & the “sayang” game tool guidebook as Draft-1.

## Implementation Stage

### 1. Results of the Evaluation and Revision of the “Sayang” Game Tool

After the game tool is developed, the next step is to evaluate the product being developed in order to revise the product being developed. There are also stages in the evaluation, namely expert review by a team of material experts, sports experts, and learning media. The results of the expert team's review are called the results of the feasibility of the product developed as draft 2, while the results of the one-to-one test are called the results of the product draft 3, the results of the small group test are called the results of the product draft 4, and the results of field tests with prospective users are called the effectiveness of the product being developed called the final product.

#### a. Product Feasibility Test Results Developed

The results of the expert review were carried out by expert judgment, which consisted of material experts, sports experts, and learning media experts on product development, namely "darling" game tools and guidebooks.

#### 1) Results of the Material Expert's Assessment of the game tools developed

Validation was carried out on the initial media product to obtain data on the quality of the product components. The number of items in the material expert's assessment questionnaire on media quality is 12 items. Some of the suggestions given by material experts as input in improving the product being developed can be seen in Table 2.

**Table 2.** Revision of material expert review results.

| Assessment Aspects  | Development Advice  | Product Revision/Follow Up   |
|---|---|--|
| 1. Appropriateness of motor-physical stimulation in children with special needs in coordinating movements based on sayang games | In several aspects of competence, it must be divided according to the theory that basic movements and advanced movements. | The media has been adapted to material expert advice for children with special needs in Inclusion ECE. |

| Assessment Aspects  | Development Advice                                   | Product Revision/Follow Up   |
|---|--|--|
| 2. Appropriateness of motor-physical stimulation in children with special needs in sayang-based play balance            | Reduce content, use simple language and clear images | The media has been adapted to material expert advice for children with special needs in Inclusion ECE. |
| 3. Appropriateness of stimulation of sayang games that contain local wisdom (introduction to wayang in early childhood) | A short narrative is given.                          | The media has been adapted to material expert advice for children with special needs in Inclusion ECE. |

The results of suggestions from material experts as input to improve the product being developed. Furthermore, the results of the assessment by experts were analyzed using a percentage descriptive technique to determine the feasibility level of the product being evaluated, with the following categories: presentation range 90.10% - 100% (very feasible/very valid); range 80.10% -90% (feasible/valid); the range of 70.10% -80% (quite decent/quite valid); and the range of 60.10% -70% (less feasible/not valid); and 01.00% -60% (not feasible/invalid).

The results of the media assessment are as follows in Table 3. Overall, the average percentage of media feasibility analysis of questionnaire data for the assessment of material experts is  $(100\% + 100\% + 87.5\%)/3 = 95.83\%$ . It can be concluded as a whole, based on the results of the material expert's assessment, that the game model is very feasible to use to improve children's gross motor skills.

**Table 3.** Results of material expert assessment.

| Component              | Score         |
|------------------------|---------------|
| 1. Learning objectives | 4 (100%)      |
| 2. Theory              | 4 (100%)      |
| 3. Learning process    | 3,5 (87,6%)   |
| Average Score          | 11,5 (95,83%) |

## 2) Learning Media Expert Assessment Results

The learning media expert who conducts a review of the initial product developed is a person in charge of Media Technology. Evaluation is carried out on the initial media product to obtain data on the quality of the product components. The number of items in the questionnaire for the assessment of learning media experts on the quality of the media is 12 items. Each questionnaire item used consists of a range 1-4 with score interpretations, namely: score 4 (very appropriate/very good/very appropriate), score 3 (appropriate/good/accurate), score 2 (poorly appropriate/poor/poor right), and a score of 1 (not appropriate/not good/not right). Some of the suggestions given by

material experts as input in improving the product being developed can be seen in Table 4.

**Table 4.** Revision of media expert review results.

| Assessment Aspects             | Development Advice  | Product Revision   |
|--------------------------------|---|--|
| 1. Learning objectives         | Create general learning goals and translate them into specific learning goals   | The media has been adapted to material expert advice for children with special needs in Inclusion ECE. |
| 2. Material suitability        | Tailor material to specific learning objectives   | The media has been adapted to material expert advice for children with special needs in Inclusion ECE. |
| 3. 'Sayang' play tool design.  | The wayang head character design is less attractive if it is placed on a love mat. Wayang character characters are not visible when used. | Changed the design of dear game tools by placing the character on the handle                           |
| 4. Sayang game guidebook cover | The cover of the guidebook is not only a picture of girls, so there is no gender bias.  | Replace pictures with photos of boys and girls playing sayang  |
| 5. Aspects of the manual image | The design is too stacked for good  | Separate multiple images so they don't overlap on one page   |



**Figure 7.** Results of the revised study by media experts on the "sayang" game tool (draft-2).

The results of suggestions from media experts as input to improve the product being developed. Furthermore, the results of the assessment by media experts were analyzed using a percentage descriptive technique to determine the feasibility level of the product being evaluated, with the following categories: presentation range of 90.10% -100% (very feasible/very valid); range 80.10% -90% (feasible/valid); the range of 70.10% -80% (quite decent/quite valid); and a range of 60.10% -70% (less feasible/less valid); and 01.00% -60% (not feasible/invalid). Assessment in the media is grouped into four components, namely: instructional objectives, materials, design, and learning processes.

The results of the media expert's assessment of the feasibility of the developed media are as follows in Table 5. Overall, the average percentage of eligibility media based on the analysis of media expert assessment questionnaire data is 70.62%. It can be concluded as a whole, based on the results of the media expert's assessment, that the media is quite feasible to use to improve the gross motor skills of early childhood.

**Table 5.** Results of media expert assessment.

| Number | Component           | Score         |
|--------|---------------------|---------------|
| 1.     | Learning objectives | 1 (25%)       |
| 2.     | Theory              | 4 (100%)      |
| 3.     | Design              | 2,5 (62,5%)   |
| 4.     | Learning process    | 3,8 (95%)     |
|        | Average Score       | 11,3 (70,62%) |

#### b. Small Group Trial

Small group evaluation aims to obtain information used in improving the product in the next revision. The trial phase was carried out on three children with special needs at Kharisma Kindergarten. From the results of the small group evaluation, data were obtained using the questionnaire assessment criteria for motor-physical abilities. The assessment criteria with four value scales, 4 (very capable), 3 (able), 2 (poor), and 1 (not able), are as in Table 6.

**Table 6.** Small group trial results.

| Number | Observation Points   | 4    | 3   | 2 | 1 |
|--------|--|------|-----|---|---|
| 1.     | Children can stand on "sayang"   | 100% | 0   |   |   |
| 2.     | Children can hold the handles of the stilt clogs                             | 67%  | 33% |   |   |
| 3.     | Children can step on the right and left legs alternately.                    | 67%  | 33% |   |   |
| 4.     | Children can step right and left by holding the stilt clogs without falling. | 67%  | 33% |   |   |
| 5.     | Children can walk using clogs on stilts until the specified finish line.     | 67%  | 33% |   |   |

c. Large Group Trial

**Table 7.** Pre-test results.

| Number | Observation Points  | 4 | 3    | 2   | 1   |
|--------|---|---|------|-----|-----|
| 1.     | Children can stand on the stilt clogs.                                      |   | 100% |     |     |
| 2.     | Children can hold the handles of the stilt clogs                            |   | 17%  | 17% | 66% |
| 3.     | Children can step on the right and left legs alternately                    |   |      | 34% | 66% |
| 4.     | Children can step right and left by holding the stilt clogs without falling |   |      | 34% | 66% |
| 5.     | Children can walk using clogs on stilts until the specified finish line     |   |      | 34% | 66% |

**Table 8.** Post-test results.

| Number | Observation Points  | 4    | 3   | 2 | 1 |
|--------|---|------|-----|---|---|
| 1.     | Children can stand on "sayang"  | 100% | 0   |   |   |
| 2.     | The child can hold the handle dear  | 67%  | 33% |   |   |
| 3.     | Children can step on the right and left legs alternately with             | 67%  | 33% |   |   |
| 4.     | The child can step right and left by holding the baby toy without falling | 67%  | 33% |   |   |
| 5.     | Children can walk using "saying" until the finish line is determined      | 67%  | 33% |   |   |

In addition, the criteria for field trials before the intervention was carried out, a pre-test was carried out first to see the child's initial ability to coordinate movements, balance, and speed through playing with wooden stilt clogs and at the end of the learning process a post-test was given to measure the level of gross motor skills through the "love" game. The assessment criteria with four value scales are 4 (very capable), 3 (able), 2 (poor), and 1 (not able), as follows. The results of the pre-test results of this field trial can be seen in the Table 7. The results of the post-test results of field trials using the "sayang" game tool can be seen in Table 8. Field trials were carried out with six children, which were adjusted to the number of children with special needs in Inclusion ECE, namely Kharisma Kindergarten. The main trial process is carried out like a small group trial. Only the population or number of children is greater than the small group trial. Children are given a "love" game tool and are given an intervention with learning for five meetings. This is done because it is to identify deficiencies or weaknesses in the game model, both material and instructional objectives, and the results of motor skills which are expected to improve gross motor skills.



## CONCLUSION

Based on the data that has been collected, the conclusions of this study are (1) Product results from the development of local wisdom-based "Sayang" game tools and manuals for use to improve the physical motoric abilities of children with special needs in Inclusive ECE; (2) The "Sayang" game tool based on local wisdom has been validated by a team of experts or experts and revised for use in field trials to obtain a final product that is suitable for use; (3) The effectiveness of this "sayang" game tool can be seen in the results of field trials, namely an increase in balance and coordination of movements before and after playing "sayang".

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