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Inclusive physical literacy model based on video modeling to facilitate movement skills and physical activity in children ADHD

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Abstract

Research Problems: Children with Attention Deficit Hyperactive Disorder are one of the developmental disorders that have low concentration, are active in moving but still do not have direction, goals and tend to be impulsive. ADHD children have limitations in the development of motor activities so that increased activity is not directed and tends to lose control. The importance of physical activity and motor skills for children with ADHD is currently experiencing quite serious problems. **Methods:** this study was adopted from ADDIE research and development which is divided into the stages of analyze, design, develop, implementation and evaluation. The sampling technique in this study used proportional random sampling, with subjects consisting of attention deficit hyperactivity disorder inclusion students, who are in the Malang City area, Indonesia, the subjects in the study were 30 students. A product testing questionnaire with a Likert scale was employed as the study's tool. The study's data analysis involved reducing the model's expert evaluation results, which were subsequently examined using quantitative descriptive percentage analysis. **Results:** of the study on a limited scale group trial showed an average gain of 84% with a very good category, while the large scale trial showed a score gain of 85% with a very good category. **Conclusion:** findings support the literature that suggests that physical activity-based interventions provide significant benefits in inclusive education.

Keywords: Physical Activity; Motor Skills; ADHD; Physical Literacy

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INTRODUCTION

Lifestyle changes in the 5.0 era are increasingly changing, this is triggered by changes in globalization and traditional lifestyles from life style to sedentary life style, this lifestyle is caused by a lack of physical activity followed by excessive dietary intake, such as high intake of carbohydrates, protein, fat and low fiber. An irregular diet and not balanced with physical activity will be at risk of obesity (Proverawati, 2010). Children today have physical activity that decreases every year. Physical activity and physical condition are aspects that need to be maintained and improved in every activity of a person to carry out daily activities well. (Sari & Wirjatmadi, 2016). A person can be said to be doing physical activity if he can move his limbs and muscles in the skeleton. (Karim et al., 2018). One example of physical activity is running, walking and cycling. In addition, physical activity is one of the physical activities that

involves a person's efforts in getting various effective and efficient movements with the aim of improving the body's system, physical health, mental health and motor skills (Mashuri et al., 2019; Riyanto & Mudian, 2019).

High levels of physical activity are one of the factors that can influence the quality of good or bad physical health (Dewi, 2018). Physical activity plays the most important role in causing someone to become obese. Age 5-17 years based on recommendations by WHO is, physical activity carried out at medium to high intensity has a duration of 60 minutes each day, high physical activity will involve exercises to strengthen skeletal muscles, aerobic exercise can be done at least 3 times a week (Organization, 2010). ADHD is a developmental disorder in children who have low concentration, are active in moving but still do not have a sense of direction and purpose, and like to run but tend to be impulsive. (Erinta & Budiani, 2006; Jacob & Watini, 2022) explains that ADHD children have limitations in the development of motor activities so that increased activity is not directed and tends to lose control.The importance of physical activity and motor skills for children with ADHD is currently experiencing quite serious problems, it is very necessary in developing healthy motor activities and lifestyles in children, therefore physical education at least has a contribution in carrying out the role of literacy. Physical literacy is a learning concept that integrates health that is acquired and applied in the context of movement and physical activity. It can also be understood as the capacity to move the body during physical activity, choose a healthy lifestyle, and practice various skills.

ADHD is characterized by low concentration but high activity. However, currently, there are no products that can be tailored to a child's abilities. Children with ADHD have more energy and are highly active, so they need to be provided with more activities. INPHYCY learning media is also designed with accessibility and learning differentiation in mind. With this product, teachers can determine which physical activities to choose based on the student's initial abilities and the day's learning objectives.

Physical literacy is a reflection of continuous development that incorporates social, cognitive, psychological, and physical skills. A similar explanation is provided by (Melby et al., 2022) (Dowens et al., 2013; Keegan et al., 2019). The development of pupils' emotive, physical, and cognitive domains is significantly influenced by physical literacy. Additionally, by engaging in a variety of physical activities and enhancing one's motor abilities, physical literacy promotes an active and healthy lifestyle (Castelli et al., 2015). Physical activity behavior, active attitudes and lifestyles, exercise motivation, sports knowledge, and motivation are the five interconnected categories of physical literacy. (Holler et al., 2019).

Based on the various explanations above, it can be concluded that physical literacy is a program that has a mutually binding relationship with the aim of improving or facilitating health, developing affective, physical and cognitive by developing motor skills and planned physical activities. The development of physical literacy is one of the active and healthy lifestyle programs that has benefits in maintaining health in children, adolescents and adults.

Importance of controlling the more focused movement activity in ADHD children, therefore, a model is needed that can facilitate the movement skills and physical activity of ADHD children. Facilitating movement activities, and physical activities in children and a healthy lifestyle at this time, is an urgency that needs to be considered, therefore by developing an Inclusive Physical Literacy Model Based on Video Modeling, it will help to facilitate movement activities, physical activities and a healthy lifestyle in children with attention deficit hyperactive disorder. Video modeling is a video that involves a demonstration of behavior played by someone through video representation so that children who observe can learn about behavior (Bellini & Akullian, 2007), Through modeling, children can learn about how to carry out good behavior by observing other people who understand more about behavior (Albert, 2008)

Video modeling appears in the theory of social learning, namely observational learning, in observational learning it says that if a child does not have a model, then he will not be able to imitate the behavior of the model. The act of observing can provide space for humans to learn without doing, because through modeling someone can learn without having to go through direct experience (Sashkin & others, 1977).

METHOD

Method in this study was adopted from ADDIE research and development which is divided into analyze, design, develop, implementation and evaluation stages. In the analyze stage, the researcher conducted a needs analysis by identifying indicators of an inclusive physical literacy model based on video modeling to facilitate movement skills and physical activity of children with attention deficit hyperactivity disorder. The needs assessment phase included interviews with physical education teachers, which revealed a need for a product in the form of media as teaching materials in the classroom. Furthermore, researchers observed the behavior of children with ADHD. Expert validation was conducted with physical education teachers and lecturers to ensure the instrument met the qualifications before being used for

trials. The product was declared feasible after passing group trials with a feasibility score above 70%.

Design stage, researchers compile product trial questionnaire instruments and create INPHCY model designs based on video modeling that are in accordance with children's characteristics. Develop stage, researchers develop INPHCY models based on video modeling, conduct validation tests on the developed models, and make product improvements based on suggestions and input from experts. Implementation stage, researchers conduct product trials on a limited and large scale. Evaluation stage, researchers make improvements to the products that have been developed based on assessments given by experts and observers.

The study's sampling strategy was proportional random sampling, and its participants were 30 inclusive kids with attention deficit hyperactivity disorder who live in the Malang City region of Indonesia. A product trial questionnaire with a Likert scale was the instrument used in this study. Experts and observers evaluated it using the inclusive physical literacy model, which is based on video modeling. This study used quantitative descriptive percentage analysis to analyze the findings of the experts' evaluation of the model or product.

RESULT

Children with ADHD are known to be restless and very active, so video modeling plays a crucial role in helping these children. The following is an image of the product being developed.

Picture 1. Product Video Modelling

A limited-scale group trial and a large-scale group trial were the two phases of the product trial. Researchers conducted a limited-scale group trial with ten elementary school

students who fell into the category of children with attention deficit hyperactivity disorder. Twenty pupils who met the same criteria were included in the large-scale group trial. The process for both large-scale and limited-scale group trials was conducted in one location at different times. The limited-scale group trial was implemented using video modeling, and experts and observers who were physical education teachers watched and evaluated the product during both the large-scale and limited-scale group trials.

Table 1. Results of Limited Scale Group Trial of Model Suitability Indicators

Compliance	Expert 1	Expert 2	Observer 1	Observer 2
Suitability, images and animations with learning materials	4	3	3	3
Suitability of media with learning materials	4	4	3	2
Suitability of media with student characteristics	4	4	2	3
Accuracy of media selection for physical activity and movement activities	3	3	4	4
Language used according to student characteristics	3	4	4	3
Ability of media to develop students' imagination and fantasy	3	4	3	3
Ability of media to increase physical activity and movement activities	4	4	4	4
Appropriateness of media used as a medium for individual learning	3	3	4	4
Score	28	29	27	26
Percentage	87	90	84	81

Table 2. Results of Limited Scale Group Trial of Model Attractiveness Indicators

Model Attraction	Expert 1	Expert 2	Observer 1	Observer 2
The media display is attractive and in accordance with the characteristics of students	3	3	3	3
The attractiveness of physical activities and movement activities packaged in the media	4	3	4	4
The ability of the media to attract students' attention	4	3	3	3
The ability of the media to create a sense of pleasure in students in physical activities and movement activities	3	4	4	3
Score	14	13	14	13
Percentage	87	81	87	81

Table 3. Results of Limited Scale Group Trial of Model Display Indicators

Appearance	Expert 1	Expert 2	Observer 1	Observer 2
Neatness of appearance	4	4	4	4
Color and background combinations do not interfere with the material	3	4	3	3
Suitability of type, size and color of letters on the media	3	4	3	3
Use of font variations is not excessive	3	3	3	4
Placement of illustrations and image captions does not interfere with understanding	3	4	3	3
Use of illustrations/images in accordance with the material	4	3	4	3
Clarity of instructions in delivering learning materials	3	3	4	3
Score	23	25	24	23
Percentage	82	89	85	82

Table 4. Results of Limited Scale Group Trial of Ease of Use Model Indicators

Ease of Use	Expert 1	Expert 2	Observer 1	Observer 2
Ease of media operation	3	4	4	3
Media capability provides convenience to students	3	3	3	3
Application usage is easy to use	3	4	3	4
Students' flexibility in using media	4	4	3	3
Instructions for using media are easy to understand	3	3	4	3
Score	16	18	17	16
Percentage	80	90	85	80

Table 5. Results of Large-Scale Group Trial of Model Suitability Indicators

Compliance	Expert 1	Expert 2	Observer 1	Observer 2
Suitability, images and animations with learning materials	3	3	3	3
Suitability of media with learning materials	3	3	4	3
Suitability of media with student characteristics	4	4	2	3
Accuracy of media selection for physical activity and movement activities	3	3	4	4
Language used according to student characteristics	3	4	3	3
Ability of media to develop students' imagination and fantasy	3	3	3	3
Ability of media to increase physical activity and movement activities	4	4	4	3

Appropriateness of media used as a medium for individual learning	3	3	4	4
Score	26	27	27	26
Percentage	87	90	84	81

Table 6. Results of Large-Scale Group Trial of Model Attractiveness Indicators

Model Attraction	Expert 1	Expert 2	Observer 1	Observer 2
The media display is attractive and in accordance with the characteristics of students	4	4	3	3
The attractiveness of physical activities and movement activities packaged in the media	3	3	4	4
The ability of the media to attract students' attention	3	4	3	3
The ability of the media to create a sense of pleasure in students in physical activities and movement activities	3	4	4	3
Score	13	15	14	13
Percentage	81	93	87	81

Table 7. Results of the Large Scale Group Trial of Model Display Indicators

Appearance	Expert 1	Expert 2	Observer 1	Observer 2
Neatness of appearance	3	3	4	4
Color and background combinations do not interfere with the material	4	3	3	3
Suitability of type, size and color of letters on the media	3	3	3	3
Use of font variations is not excessive	3	4	4	3
Placement of illustrations and image captions does not interfere with understanding	4	4	3	4
Use of illustrations/images in accordance with the material	4	3	4	3
Clarity of instructions in delivering learning materials	3	3	4	3
Score	24	23	25	23
Percentage	85	82	89	82

Table 8. Results of Large-Scale Group Trial of Ease of Use Model Indicators

Ease of Use	Expert 1	Expert 2	Observer 1	Observer 2
Ease of media operation	3	3	3	4
Media capability provides convenience to students	3	3	2	4
Application usage is easy to use	4	4	4	4
Students' flexibility in using media	4	3	3	4
Instructions for using media are easy to understand	3	3	4	3

Score	17	16	16	19
Percentage	85	80	80	95

Table 9. Average Value of Limited Scale Group Trial

Indicator	Expert 1	Expert 2	Observer 1	Observer 2
Suitability	87	90	84	81
Model Appeal	87	81	87	81
Appearance	82	89	85	82
User Ease	80	90	85	80
Average Percentage			84	

Table 10. Average Value of Large-Scale Group Trials

Indicator	Expert 1	Expert 2	Observer 1	Observer 2
Suitability	87	90	84	81
Model Appeal	81	93	87	81
Appearance	85	82	89	82
User Ease	85	80	80	95
Average Percentage			85	

Results of the limited-scale group trial showed an average gain from experts and observers of 84% with a very good category. The assessment explained that the product could be used well, but with improvements, after getting assessments and suggestions from experts and observers, the researcher made improvements to the inclusive physical literacy model based on video modeling, improvements consisting of animation and physical fitness programs in the media. The researcher conducted a large-scale group trial once the product was improved. The large-scale group trial's results revealed an average gain of 85% with a very good categorization from experts and observers. So based on the conclusions of the experts and observers, the product was declared to be usable in a real environment.

DISCUSSION

The results of the product trial in two stages, namely limited-scale and large-scale group trials, provide important insights into the feasibility of an inclusive physical literacy model based on video modeling for inclusive ADHD students in elementary schools. The first stage, a limited-scale group trial, involving 10 students showed that the average expert and observer assessment reached 84% which is categorized as very good. This indicates that the product has been effectively used, although it still needs minor improvements, especially related to animation and physical fitness programs in the media. In the second stage trial involving 20 students, the expert and observer assessments increased slightly to 85%, indicating a limited but significant increase in scale after improvements were made.

Consistent assessments across both stages of the trial suggest that the video modeling approach can help ADHD students develop physical literacy in a more inclusive manner. Video modeling can help students with ADHD develop physical literacy because the INPHYCY learning media is designed with accessibility and learning differentiation in mind. Teachers have the freedom to choose which physical activities to choose based on the students' initial abilities and the day's learning objectives. This provides flexibility in implementing Universal Design for Learning (UDL) strategies, which emphasize that learning media must be able to accommodate the diverse needs of each student, including those with attention deficit disorders. Thus, this application provides opportunities for teachers to implement formative assessment during the learning process, as students can be directly observed in their ability to imitate movements and their response times. In addition to accessibility, INPHYCY implements a light gamification approach through the use of engaging animated characters and rhythmic background music, creating a more enjoyable learning environment. This atmosphere is important for children with ADHD, who tend to be more easily distracted when learning situations are monotonous and lack visual-auditory stimulation. Musical rhythm can help maintain focus and increase students' on-task behavior during physical activity. Using instructional audio tailored to the movements also helps reinforce comprehension of instructions through dual stimulation channels (visual and auditory)

These results are relevant to previous research, such as that conducted by (Li et al., 2019) who found that the use of video-based media was effective in improving motor skills in children with special needs. Similarly, research by (Smith, 2016) stated that technology-supported fitness programs can increase the engagement of students with ADHD in physical activity, especially when presented in an interactive and visual manner. The implications of this study for the existing literature suggest that a video modeling-based approach is a strategy that can be implemented effectively in inclusive educational settings, particularly for students with ADHD. Studies over the past 10 years have seen the use of technology in supporting inclusive education increasingly highlighted, particularly in the context of physical literacy (Becker et al., 2014). These findings strengthen the argument that technology-based learning, especially interactive learning, can facilitate the unique needs of students with ADHD. In addition, improvements in animation and physical fitness programs demonstrate the importance of visual elements in increasing engagement in students with ADHD. This is in line with the findings (Maher, 2021) confirmed that children with ADHD are more responsive

to instructions presented in visual form. Thus, the findings of this study provide additional contributions to the literature on the importance of visualization in inclusive education.

Another contribution of this study is empirical evidence that a well-designed video modeling-based program can meet the needs of students with ADHD in the context of physical literacy. These results support the argument (Carter & Kennedy, 2021), which highlights the importance of supporting the physical development of children with special needs. In addition to providing evidence that this model can be used in inclusive educational settings, this study also provides insight into how this approach can be applied in various educational contexts, especially those involving students with ADHD. In this regard, this study contributes to the development of more effective inclusive educational practices.Results of the large-scale group trial that achieved an 85% rating showed an increase in product performance after the improvements were made, indicating that continued development of this model has the potential to further increase effectiveness. This provides a basis for future research to test this model in more diverse settings or with other special needs. This study also emphasizes the importance of involving experts and observers in the educational product development process. This collaborative approach ensures that the product is not only technically functional, but also meets the needs of students with ADHD. Thus, this study makes a significant contribution to the study of inclusive physical literacy and the use of technology in the education of children with special needs, especially ADHD. The findings are relevant to educational practitioners, technology developers, and researchers interested in technology-based educational innovation.

CONCLUSIONS

Contribution of this study is the application of an inclusive physical literacy model that broadens the understanding of the importance of structured physical programs in improving motor skills and physical activity of students with ADHD. These findings support the literature that suggests that physical activity-based interventions provide significant benefits in inclusive education. The results of this study are relevant for educators in designing inclusive programs that not only improve physical skills but also encourage the participation of students with special needs in the general education environment. This study also provides an empirical foundation for future studies on the effects of physical literacy programs in inclusive elementary schools.

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