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Development of Teacher Modules on Learning Locomotor Movement Materials

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Abstract

This study aims to develop a locomotor movement learning module at grade 4 of SDLB with autism, in terms of content and attractiveness which is equipped with locomotor movement pictures and videos that can be accessed offline or online. Research and development used the ADDIE model (analysis, design, develop, implement, and evaluate) as the model of development research. The research used a questionnaire instrument in collecting data and use descriptive quantitative as an analysis technique data. Research subjects are SLB Autism of Universitas Negeri Malang and SDLB C Autism Tuban. Consist of teachers and students in these schools. The subjects of the small group trial are 3 SLB teachers and the large group trial consisted of 20 SLB teachers. The result in a large group trial is 95%. From this data, the conclusion obtained that the locomotor movement learning module at grade 4 of SDLB with autism for the teacher is very valid to be applied in learning.
***Keywords**: teacher module, autism, locomotor*

INTRODUCTION

Physical education (PE) is an adaptation process between neuromuscular, social, intellectual, emotional, cultural learning resulting from various kinds of physical activities (Menear & Neumeier, 2015). PE has an important role in forming children's characteristics (Yilmaz et al., 2017).

In addition, PE also has an important role in improving students' fitness degrees, developing skills, and implementing a healthy lifestyle (K. Green & Hardman, 2005). Therefore, PE is one of the compulsory subjects in schools (Saitya, 2021). PE has been advised not to be excluded from any group so that all have the same position in physical education (Thorjussen & Sisjord, 2020).

Locomotor movement is one of the critical foundations in performing other movement skills (Oktarifaldi et al., 2019). Locomotor movement is a body movement that causes a displacement from one starting point to another (Heynoek et al., 2020). These movements form the motor basis of the group and involve large muscles (Pangrazi & Beighle, 2009).

These locomotor movements can be in the form of running, horizontal jumping, vertical jumping, sliding, galloping (Kurniawan, 2018). Regarding autistic students, they have several obstacles in their motor skills, especially in moving places and balance (D. Green et al., 2009; Stins & Emck, 2018), remembering to move places is supported by a good level of balance (Bakhtiar et al., 2020).

These obstacles can be overcome by packaging motor learning, especially locomotor in a game. This is in line with the results of research which states that there is an increase in motor skills of autistic students through circuit games by 31% (Indahwati & Krisniawan, 2020).

Autistic Spectrum Disorder (ASD) is defined as a nervous disorder (spectrum trouble) and is classified in the category of children with special needs. Autism is a disorder condition that causes children to think slower than other normal children (Ohara et al., 2020).

The symptoms of autism can be seen early on through certain characteristics. Generally, disorders in people with autism include impaired communication (verbal language), limited social interaction, and limited interests (Ammar et al., 2021).

In accordance with previous research, people with autism have low physical abilities, especially in aspects of cardiovascular endurance, abdominal endurance, and low upper body abilities (Healy et al., 2018)). Despite these limitations, people with autism still need

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movement, although with certain capacities and adjustments (Staples & Reid, 2010).

To meet the movement needs above, it is necessary to have a movement learning process that has been adapted to the abilities of the autistic person. Given that a child with autism has motor skills, fitness performance, participation behavior, and intellectual function below the expected range for a certain age (Zhang & Griffin, 2007).

The criteria for a good Adaptive Physical Education teacher are those who have information and master the material well (Gunawan, 2014). The teacher or assistant has an important role in the learning process of the locomotor movement. This is because autistic students need extra attention and guidance from a companion.

This assumption is in line with an opinion, that states that physical education teachers are indispensable in dealing with children with special needs, because they do not know what they will face in the future (Moe et al., 2020).

The right referred to be applied in the process of learning locomotor movement for 4th-grade SDLB autistic students is through adaptive physical education. Adaptive physical education is a series of physical learning processes that have been prepared and adapted to the abilities and needs of children with special needs.

Specific guidelines for adaptive physical education should reflect integral features of the quality of physical pedagogy development (Penney et al., 2018). So, physical education teachers have an important role in compiling and modifying movement learning materials properly.

In preparing the locomotor exercise model for grade 4 SDLB students with autism, it must be adjusted to the existing core competencies and basic competencies. Previous research has shown that children with autism may be delayed in physical development, lose motor skills, and score poorly on Physical fitness (Lee & Hodge, 2017).

Therefore, it is necessary to adjust Core Competency and Basic Competency, so that learning becomes more focused. The basic competence of locomotor movement for grade 4 SDLB autistic students is to recognize and practice the use of variations in basic locomotor movement patterns, manipulatives according to the rhythm without/with music in simple rhythmic movement activities (Permendikbud, 2016).

Student with autism can perform various locomotor movements. For example, such as walking, running, jumping, jumping, and so on. The difference is that autistic students need more time to understand and practice these movements (Astuti et al., 2021).

This is because autistic students have slow thinking skills, which are caused by disorders of brain neurodevelopment (Hillier et al., 2020). Therefore, it is necessary to have interesting and not boring variations of locomotor movement exercises, which will then be packaged into teaching materials in the form of teacher learning modules.

This serves to make it easier for teachers or assistants for autistic students to carry out locomotor movement learning, considering that teachers have an important role in the success of autistic students in doing movement learning (Komarudin, 2016).

This research is supported by an initial needs analysis conducted by researchers regarding the need to develop locomotor movement modules for 4th-grade students of SDLB with autism. The needs analysis was distributed to 40 respondents who work as SDLB teachers in East Java, with 10 questions.

From the results of the initial needs analysis questionnaire, it was obtained data that: (1) 36 out of 40 teachers experienced problems when providing learning material locomotor movements by 90%, (2) 19 of 40 teachers stated that they used a module book for learning locomotor movement material by 47.5%, (3) 37 of 40 teachers (92.5%) stated that it was necessary to develop PJOK learning books/modules in schools by 92.5%.

Based on the above conditions, it can be concluded that it is necessary to develop a teacher module in learning locomotor movements for 4th-grade autistic SDLB students.

In addition, 4th graders of SDLB with autism have characteristics that they prefer to play on something that attracts their attention and have the characteristics of being a little difficult to learn movement without teacher guidance (Fittipaldi-Wert & Mowling, 2009).

Based on some of the results of the data above, researchers need to develop a locomotor

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movement learning module for grade 4 students of SDLB with autism in terms of content. Given that the materials used as teaching materials must be under the capacities and needs of students (Wijiningsih et al., 2017).

The development of locomotor movements for the student with autism has been developed but only at the high school level (Kurniawan, Aji Pradana, et al., 2022; Kurniawan, Paulina Heynoek, et al., 2022). The development of movement activities at the elementary school level is limited to Non-Locomotor (Kurniawan, Pambudi, et al., 2022) and Dynamic Balance materials (Kurniawan, Mu'arifin, et al., 2022) .

Then, it is necessary to develop teaching guidance for locomotor activity in elementary schools. This study aimed to develop a teacher module on locomotor movement learning for 4th graders of SDLB with autism in terms of content and module quality specifically.

The contents of the material include introductions, learning activities, variations of locomotor movement exercises (completed with pictures and videos), practice questions, and evaluations.

METHODS

The research method used was research and development methods. While the research model used was ADDIE (analyze, design, develop, implement, and evaluate) (Branch, 2009). The ADDIE model is a systematic learning design that can help the process of making development modules for some complex problems (Razak et al., 2020).

The subjects of this research were SDLB Autism State University of Malang (UM) and SDLB C Autism Tuban. The technique of taking research subjects from each school was purposive sampling, where data is taken based on certain criteria (Surahman et al., 2021). The sample criteria in this study were PJOK teachers in SDLB with autism and SDLB students with autism in grade 4.

The initial analysis used a needs analysis regarding the importance of developing a teacher module in learning locomotor movement for grade 4 in SDLB with autism. As for product validation, it involves learning media experts, physical learning material experts, and characteristics of autistic children.

Research Model

By the ADDIE model, five main stages are starting from analysis, design, development, implementation, and evaluation. The flow of the research model that is carried out must be sequentially according to the stages that have been determined according to the ADDIE model.

The first stage of this research was analysis, carried out by analyzing the teacher's needs for the development of locomotor learning modules for teachers of grade 4 SDLB autistic students. Then proceed with taking data through interview techniques, surveys, and initial observations.

The second stage designs were carried out by compiling an initial product design (prototype) in the form of a locomotor movement learning module for teachers of grade 4 SDLB autistic students before being tested. The third stage was development, in which there was a product assessment from the validator of characteristics of autistic children, physical education learning experts, and learning media experts.

After getting ratings and suggestions from the validator, the product can be refined again before being tested. And the next stage was implementation, which was done by testing the product in small and large groups. A small group trial was conducted at SDLB Autism UM, with the research object being 6 autistic students and 3 teachers at SDLB Autism Laboratory UM.

While the large group trial was carried out at SDLB C Autism Tuban, with the object of research being 18 autistic students and 20 teachers at SDLB C Autism Tuban. The assessment questionnaire instrument was in the form of a statement containing a score rate of 1-5 and using Likert scale.

The last stage was evaluation, which was done by evaluating the product based on the assessments made by several teachers in the research trial.

Data collection

The instrument of data collection was through the distribution of a teacher's initial needs analysis questionnaire regarding the development of a teacher module in learning locomotor movement for grade 4 SDLB with autism. Then supported by interviews and preliminary studies. This serves in the preparation of the initial product which will later be tested on the research subject..

Data analysis

Based on the results of the analysis and testing of the teacher module in locomotor movement learning for grade 4 SDLB with

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autism, the data technique used was descriptive quantitative. Where the test results are expressed in numbers and described through certain information based on the scores obtained.

RESULTS AND DISCUSSIONS

Research Result

Analyze

Curriculum analysis

At this stage, there is a needs analysis regarding the development of teacher module products in learning locomotor movement material for grade 4 SDLB with autism.

The analysis developed was based on the PJOK curriculum in SDLB with autism, and based on the core competencies and basic competencies of locomotor movement material for 4th graders of SDLB with autism. Based on the results of the study, it was obtained a curriculum review consisting of KD following the object under study

Table 1. Curriculum Analysis

Basic Competency	
3.3 Recognize the use of variations in basic locomotor movement patterns, manipulatives according to the rhythm without/with music in rhythmic movement activities	4.3 Doing the use of variations in basic locomotor movement patterns, manipulatives according to the rhythm without/with music in rhythmic movement activities.

Concept analysis

At this stage, there is a process of analyzing the concepts that will be presented in the teacher module in learning locomotor movement material for grade 4 SDLB with autism.

The first stage is compiling the concept of material in the module. This concept is used as a reference for the locomotor exercise model that is compiled.

Table 2. Concept Analysis

Concept	Movement Element
Fundamental Motor Skills	- Doing the movement of walking - Doing the movement of running - Doing the movement of jumping - Doing several variations of the locomotor movement model practicing

Analysis of learning resources

After the concept analysis, it is continued by analyzing the reference of learning resources that are used as the basis for implementing the module. After analyzing the learning resources, the next step is to collect various relevant learning resource references.

Table 3. Analysis of Learning Resources

Learning Resources	Description
Curriculum Guidelines	• Curriculum 2013 Regarding Core Competencies and Basic Competencies
Autism	• Teacher's Modules of Autism A to F
Fundamental Motor Skill	• Understanding Physical Education Book, (K. Green, 2008) • (Whyatt & Craig, 2012). Motor Skills in Children Aged 7-10 years, Diagnosed with Autism Spectrum Disorder. Journal of Autism and Developmental Disorders, 42(9), 1799–1809.

Design

At this stage, an important element that must be done is to design the module as a product to be developed. The following are several components that include the stage of designing the teacher module in locomotor learning for grade 4 SDLB with autism:

Table 4. Components of Teacher Module

Components of Teacher Module	
Concept Map	Contains explanations or definitions of important terms contained in the module
Introduction	The concept map contains an overview of the module as a whole
Exercise	Locomotor movement
Duration	40-60 minutes
Mentor	Teacher
Ability Target	Able to practice variations of locomotor movement training models, such as walking, running, and jumping
Age Group	9-10 years old
Equipment	Cones, colored paper dan balloon
Preparation Stage	Warming up steps supported with pictures
Main Stage	Main activity (variation of locomotor movement exercises) are equipped with pictures and youtube video barcodes
Cooling Down	Cooling down are supported by the pictures
Question Practice	Questions in the form of questions related to locomotor movement material

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Components of Teacher Module	
Evaluation	Answer keys and discussion of practice questions
Self-Assessment	Contains student learning assessments according to the locomotor movement material
Bibliography	References in the preparation of the module

After designing the module, the next step is to design learning resource media. The media developed in this study was based on print media in the form of a teacher module on locomotor motion learning materials for grade 4 SDLB autistic students. The module can be accessed offline or online (e-book).

Develop

After the step of design, a module is developed by compiling several variations of locomotor movement training models for 4th-grade students of SDLB with autism.

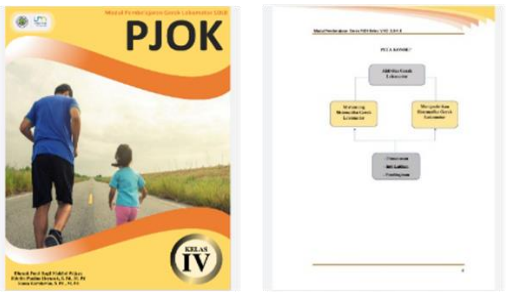

Figure 1. Prototype of Modules

The next stage is to carry out a validation test, which is assessed by learning media experts, physical education material experts, and characteristics of autistic children. The assessment is carried out by giving a questionnaire to the learning media expert to assess the feasibility of the developed module product, giving a questionnaire to the physical education material expert to assess the feasibility and suitability of the material in the developed module product, and giving a questionnaire to the autistic child characteristics expert to assess the suitability of the material and the feasibility module product developed. The following is a graph of the results of the assessment of the validator experts above:

Expert Validation Results of Learning Media

From the two categories, the results are consistent with 100% percentage (very valid), although with a few suggestions to clarify who the module is for and an introduction to the page before the table of contents and glossary.

Table 5. Descriptive Statistic of Learning Media Expert

Aspects	Total	Mean	SD
Presentation	35	5	0
Grafiti	65	5	0

The following is the result of the value data obtained from the expert validation of learning media packaged through graphs or diagrams:

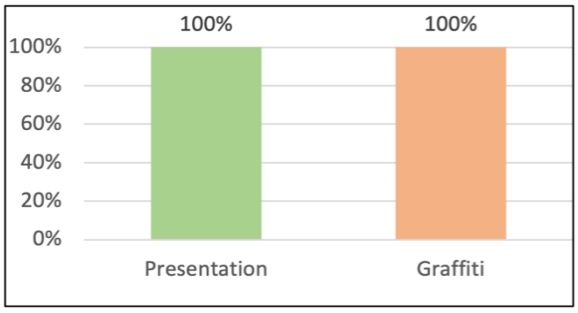

Figure 2. Percentage of Validation Results of Learning Media Experts

Expert Validation Results of PE Materials

Both categories produce high percentages, which are above 90%, with a note to clarify the explanation of the distance between the cones in the model of jumping and inflating balloon exercises.

Table 6. Descriptive Statistic of PE Materials Expert

Aspects	Total	Mean	SD
Language	50	5	0
Content	53	4,64	0,4

So it can be concluded that the developed module is feasible in terms of the language and content of the module. The following is the result of the value data obtained from the validation of material experts packaged through graphs or diagrams.

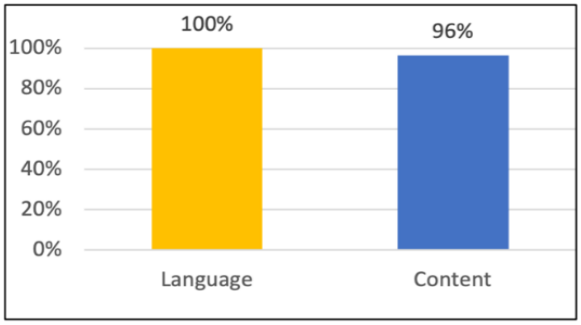

Figure 3. Percentage of Results of Physical Education Learning Expert Analysis

Expert Validation Results of Characteristics of Autistic Children

From the three categories, an average percentage of 91.79% was obtained, with some notes such as the need to adjust the instructions

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for using the module and who it is intended for, a marker for the barcode is needed so that it can be easily seen by the reader, and the display of images (material) needs to be spaced. So it can be concluded that the module that has been developed is very feasible in terms of language, content, and presentation.

Table 7. Descriptive Statistic of Expert of Characteristic of Autistic Children

Aspects	Total	Mean	SD
Language	43	4,3	0,48
Content	51	4,63	0,45
Presentation	31	4,43	0,53

The following is the result of the value data obtained from expert validation of the characteristics of autistic children packaged through graphs or diagrams:

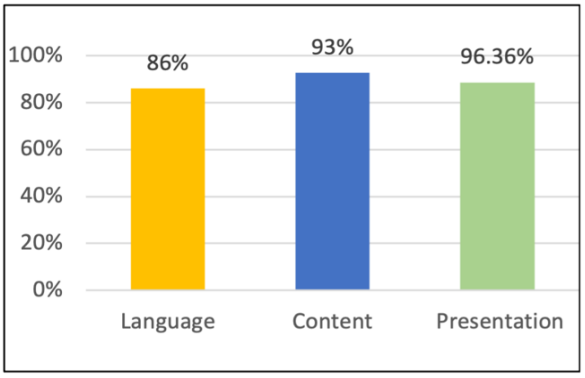

Figure 4. Percentage of Expert Validation Results of Characteristic of Autistic Children

Implementation

The results of the product revisions that have been validated are then tested on 4th-grade students of SDLB with autism to obtain data regarding the feasibility of the teacher module in learning locomotor motion material for class 4 SDLB with autism.

A small group trial was conducted at SDLB Autism Universitas Negeri Malang. Meanwhile, large group trials were conducted at SDLB C Autism Tuban. Then the teacher provides assessments and suggestions through a questionnaire instrument that has been given by the researcher.

Small-Group Trial

Small group trials were conducted at the SLB Autism Laboratory, the State University of Malang with a total of 6 autistic students in grade 4.

Meanwhile, the assessment instrument was given to 3 teachers at the SLB Autism Laboratory, State University of Malang. From these results, the average value percentage is 71.83% with valid information.

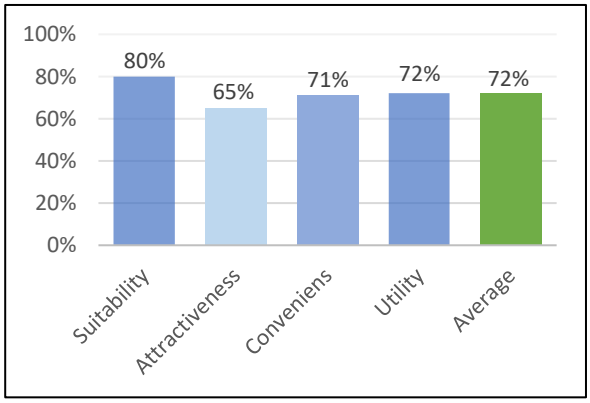

Figure 5. Percentage of Small Group Trial

Large Group Trial

A large group trial was conducted at SDLB C Autism Tuban, with a total of 18 students with autism. While the assessment instrument was given to 20 teachers at SLB C Autism Tuban.

From the results of these trials, the average percentage value is 95.14% with very valid information. It can be seen that there is a significant increase in the percentage, which is 23.31%. The increase in the percentage indicates an improvement and progress from the developed module. The following are the results of small and large group trials presented in graphic form

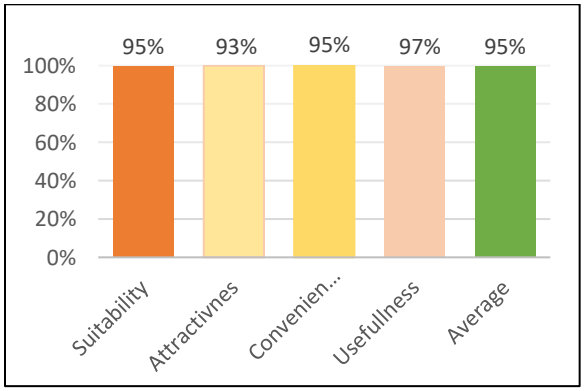

Figure 6. Percentage of Large Group Trial

Evaluation

At the evaluation stage, the results of the trial at the implementation stage were reviewed

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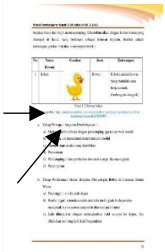
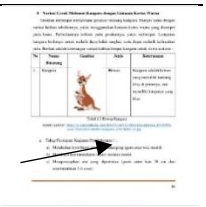
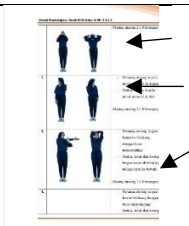
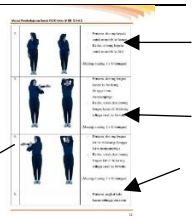
and re-analyzed according to the results of the assessment that had been given by the teacher. It aims to create a final product, the result of the suggestions and inputs that have been given. So at the evaluation stage, the overall product revision is carried out to produce the final product. Some of the improvements include video links, font size, and practice methods.

Table 8. Product Evaluation

Evaluation	Before Revision	After Revision
Small Group Trial		
Give a preface before the table of content and glossary -Need a clarify who the module purposed	-	
The spacing in writing video link, needs to be closed, so it doesn't take up space -Minimize the font on writing table captions and image sources		
Clarify the explanation of the distance the cones on the model of jumping and inflating balloon exercises		
Large Group Trial		
Need a marker for the barcode, for easy the reader to see		
Required distance between images and change the count frequency to "1x8".		

Discussion

The results of the research on the development of the teacher module in motion learning for grade 4 SDLB with autism, obtained results with a very valid category. These results are supported by the advantages contained in the developed module.

For example, there is a barcode video on an example of the process of implementing variations in locomotor movement exercises, there is a glossary or explanation of some foreign words, there are practice questions, evaluations, and so on.

This research process requires patience and patience because it involves adaptive physical education, where all elements of learning must be adapted to the capacities and abilities of autistic students (Pan et al., 2011).

In addition, an approach to autistic students is also very necessary to support the successful implementation of the locomotor movement variations that are being tested. In addition, 4th-grade autistic students tend to prefer the locomotor movement learning process in the form of simple games.

Besides being intended to provide guidance or teaching materials for teachers of autistic students, this module also aims to provide more varied and adaptive locomotor movement learning. Thus, the locomotor movement needs of grade 4 autistic students can be met properly.

This can be correlated with the assumption that good and regular exercise or motor activity can significantly reduce acute respiratory distress syndrome (Kaur et al., 2020). Indirectly, simple motor activities such as performing various locomotor movements can have a positive effect on the body, especially for autistic students.

The results of this study also support the results of previous studies. The results of the study (Whyatt & Craig, 2012), stated that autistic students had poor motor skills, but were still able to perform the movements ordered according to their IQ class.

The locomotor movements of autistic students have no significant difference from the locomotor activities of normal children in general (Kawa & Pisula, 2010). Thus, autistic students can still carry out instructions to perform locomotor movements, accompanied by their teachers.

This study gives an interesting impression because there is a comparison between locomotor activity between children

with autism, Down syndrome, and normal children.

In addition, games can improve the gross motor skills (locomotor and non-locomotor) of autistic students (Handayani & Sudarsini, 2014).

Reinforced by the results of research showing that the locomotor movement abilities of autistic students have an increase if applied through simple games (Niswah, 2016).

This research provides innovations for teachers, to carry out the learning process of locomotor movement through games. Another study (Takahashi et al., 2018), showed that locomotor activity throughout the day for children with autism can encourage the quantitative behavior index to tend to be negative.

Therefore, it is necessary to adjust the capacity of energy and time made by the teacher. These adjustments can be made in a teaching module in the form of a module.

Previous relevant research assumes that the development of modules for special children is very necessary to support the physical learning process (Astuti et al., 2021)

From several research results in national studies, despite the limitations of autistic students, they can still perform fundamental movement skill movements (Kurniawan, Mu'arifin, et al., 2022).

Barriers that often occur are in communication, where the teacher or assistant must provide communication and instructions repeatedly so that students can understand and practice the locomotor movements.

Therefore, teacher assistance is very important for the success of autistic students in carrying out locomotor movement activities.

CONCLUSIONS

The conclusion of this study, states that the teacher module on locomotor motion learning for grade 4 SDLB with autism is very feasible to be used in the learning process.

However, the limitation of this module lies in the coverage of less complex material, which only discusses locomotor movements for class IV SDLB.

It is hoped that in the future, other researchers can develop teacher learning modules for learning physical fitness as a whole.

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