Development of Android Physics Learning Tools Based on Local Wisdom Traditional Game Bola Boy as a Learning Source

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Abstract—Teachers must develop learning tools that can assist students in making it easier to follow the course of learning and improve students' abilities. Teachers can integrate local wisdom into learning tools that will increase student competence. This research aims to produce learning tools based on local wisdom suitable for use. The learning tools developed to consist of the lesson plan, student worksheets, and Android media. Based on the results of the feasibility assessment by several validators consisting of two experts, two physics teachers, and three colleagues, the learning tools developed are in a good category and are suitable for use with an average score between 3.80 to 4.40. Furthermore, 30 students tested the product to determine the readability, namely android media as a learning media. Based on the results of the product trial analysis, it is known that the android media product is in the excellent category and is suitable for use in learning physics with an average score of 4.10. This learning tool can be an alternative to contextual physics learning guidelines. There needs to be creative innovation in physics learning by integrating technology and local wisdom that develops so that students' abilities and learning outcomes increase.

Keywords—Android, learning tools, local wisdom, physics learning, traditional game

1 Introduction

Learning is a process carried out to increase understanding and knowledge. Learning is an independent activity carried out with a sense of responsibility to master competencies and skills from experience [1]. Meanwhile, the teacher's role affects the education system's success [2]. Furthermore, professional teachers must be able to carry out their duties professionally. In addition to prioritizing aspects of professionalism, teachers need to highlight social, pedagogic, and personality aspects in learning. This is intended to make learning more comfortable, and students easily understand the material [3].

Nevertheless, sometimes the teacher overrides this aspect which only focuses on delivering the material. During teaching, teachers seem to be burdened by demands that they must complete the discussion of a particular material [4]. Moreover, many physics teachers only refer to textbooks without combining them with phenomena around students [5].

The essence of learning is to understand material concepts and apply them in real life. Sometimes teachers also prepare to learn guidelines before carrying out learning, which is often referred to as learning tools and content scenarios [6]. Learning tools are used to help students learn more effectively and efficiently. Moreover, learning devices in physics subjects can make it easier for teachers and students to understand physics concepts [7]. The use of learning tools in physics education significantly impacts students' abilities, and thus, learning tools need to be encouraged in every lesson. Furthermore, the learning tools used by teachers, it is known that the use of physics learning tools has not been able to support the achievement of student competencies [8]. Moreover, learning tools are like two different sides of a coin.

Learning tools make it easier for teachers and students to implement learning [9]. However, the existence of learning tools makes teachers have an excessive administrative burden. Teachers also mostly prepare learning tools not associated with contextual events [10]. This, of course, has an impact on the difficulty of understanding the material taught by the teacher to students. Thus, teachers need to develop learning tools by student characteristics, students' daily circumstances, and student needs [11]. Teachers must develop learning tools to improve students' ability to build knowledge. In addition, learning tools based on a contextual learning approach are better able to facilitate students in understanding physics material [12].

When students are taught new things, they do not yet have the knowledge capital, so students are still guessing. However, if learning is related to students' everyday world, then students are much easier to understand the material. Moreover, with the proliferation of technological products, learning is also carried out online or blended learning [13]. Learning carried out using blended learning certainly requires a different strategy from face-to-face learning. Blended learning requires learning tools that can explain the stages of learning using internet technology facilities, meeting media, laptops, or smartphones [14]. The application of blended learning needs to be done with various variations. This is so that students do not feel bored in learning. If students are bored and uncomfortable in learning, the material presented by the teacher will be difficult for students to understand [15].

The implementation of formal learning needs to be adjusted to student needs, learning materials, and trends. This can also be done by incorporating contextual phenomena such as traditional games into learning [16]. However, in incorporating traditional games into learning, it is also necessary to integrate them into applications or games on smartphones [17]. Furthermore, learning based on local wisdom is the regeneration of knowledge of local wisdom values in students. So that local wisdom-based learning becomes the culture and attitudes of students. However, it is rare for teachers to integrate their learning into traditional games [18]. This is primarily due to teachers who do not understand the application of learning materials into traditional games. Teachers also often complain about the limited time to integrate learning into traditional games.

Teachers need to learn the basic concepts of the material to be presented to students. Therefore, teachers rarely integrate traditional games due to time constraints [19]. Furthermore, if learning is associated with traditional games, students can optimize their cognitive, affective, and psychomotor abilities [20]. This is because traditional games prioritize optimizing the selection of the right strategy, respect, and agile body movements. Students can also develop their knowledge and personality traits [21]. At the same time, local wisdom is the idea of local communities containing wisdom values passed down from one generation to the following [22]. Local wisdom was taught by the first generation in the form of knowledge, how to understand and act in a situation [23]. In addition, local wisdom can also be seen as a form of presentation of various religious, social, and ritual traditions [24].

If traditional games can be promoted massively through education, it will provide value to the style of Indonesian education. In addition, traditional games can also be used as a learning tool beneficial for all levels of society. Physics learning is related to everyday life, including community traditions known as local wisdom. It is essential to introduce local cultural heritage to students. The integration of cultural content in physics learning can create a longer duration of contextual learning [25]. Learning physics is meaningful for students because it is related to everyday life. Learning by integrating local wisdom is a set of plans regarding objectives and learning materials that are prepared according to the potential of each region and the method used as a guide [26]. Growing sensitivity to the environment means raising the values of local wisdom. Local wisdom can be used as a source of material that is the basis for acting and behaving in everyday life [27].

Based on an explanation of the background of the problem and several theoretical studies described in the previous section, this research aims to produce learning tools based on local wisdom suitable for use. Meanwhile, the research questions are as follows.

1. What are the results of the analysis of physics learning tools in senior high school?
2. What do the traditional game-based physics learning tools look like?
3. What are the feasibility test results for the traditional game-based physics learning tools Bola Boy?

2 Literature review

2.1 Physics online learning

Physics online learning is physics learning that is carried out indirectly by requiring an intermediary device such as a laptop or smartphone connected to the internet network [28]. Online physics learning can also be interpreted as implementing physics learning experiences through strategies that are carried out synchronously and asynchronously using smartphones and laptops that have online learning applications and are connected to the internet network [29]. Through online physics learning, students can learn anywhere and anytime. This means that online physics learning does not require classrooms anymore and flexible implementation time.

Students can study from home or anywhere and anytime with a stable internet network [30]. Furthermore, students can easily and quickly interact with friends, teachers, and physics learning materials in online physics learning. Students can also use various physics learning resources and material formats available on the internet [31]. Learning physics online has a variety of programs that use the internet simultaneously inside and outside the classroom. The availability of a stable internet will affect the efficiency, effectiveness, and success of the implementation of online physics learning [32]. This is due to stable internet access, so teachers and students can easily access all kinds of physics teaching materials and materials, and their interactions can run effectively [33]. Given the current conditions still affected by the COVID-19 pandemic, every teacher and student must quickly adapt to technological products that support online physics learning. Therefore, after the COVID-19 pandemic ends, it is possible that online physics learning will still be implemented again but combined with face-to-face learning so that this learning is often referred to as hybrid learning [34].

2.2 Bola Boy traditional game

The multimedia learning module based on local wisdom also incorporates local wisdom in physics learning. One of the local wisdom from Indonesia, especially from Maluku Province, is the traditional game of Bola Boy [35]. The Bola Boy game is a traditional game of the type of bowling ball game but uses simple equipment. This game is played in teams consisting of two or more teams. In the game Bola Boy, one person is determined to keep the pile of stones, while the other takes turn to throw the ball at the pile of stones until it collapses [36]. When the pile falls, the keeper must pick up the ball and throw it to his playmate. When the ball hits a player, the players take turns guarding the pile of stones [37]. In this game, physics concepts can be learned: impulse and momentum. Impulse momentum material is one of the physics materials that is quite difficult for students to understand [38]. Many students think that momentum and impulse are challenging to apply in everyday problems [39].

Integrating traditional games in physics requires technological products, which makes a big step in adapting students to technology and traditional games [40]. This pattern of learning physics is often referred to as the learning gamification of physics. This is because the focus of understanding physics material for each student focuses on traditional games as a medium for learning physics [41]. Moreover, the COVID-19 pandemic is not over yet, so learning physics gamification remains a new pattern in strengthening students' understanding of complex physics material. Students can learn physics concepts through physics games, play games, and preserve existing traditional games [42]. Like the proverb, two to three islands are exceeded while diving to drinking water or a rare paddle. This has become a practical step in strengthening students' understanding of physics and inculcating noble local wisdom values [43].

3 Methodology

3.1 General background

This research is research and development. Research and development are a research model carried out with the main stages of researching problems in the field and then

developing a solution such as a product to overcome the problems in the field [44]. Research and development are widely used in education, and this is done by developing various media, learning models, or learning evaluations to improve learning outcomes [45]. Research and development in this study were carried out considering that physics learning has not been able to improve learning outcomes and is rarely integrated into traditional games. Therefore, this study develops a physics learning tool that helps the learning of physics by combining the traditional game from the province of Maluku, namely the Bola Boy game.

Meanwhile, this study's research and development model is 4D. The 4D development model defines, designs, develops, and disseminates [46]. The details of physics learning products developed include lesson plans, student worksheets, and android media.

3.2 Participants

Participants involved in research and development are divided into two types. The first participant is the participant who tests the feasibility of the physics learning product developed. The first participant can also be called a validator. The validators who participated in this research and development consisted of seven validators: a physics learning media expert validator, a physics learning material validator, three physics teachers, and two colleagues. The selection of this validator uses a purposive random sampling technique. The criteria for the validators involved to test the feasibility of this physics learning tool include the experience of validator media experts and physics material experts in validating physics learning tools for approximately five years, physics teachers have taught in high schools for more than five years, and colleagues who have researched physics learning that integrates traditional games.

Meanwhile, the second participant in this research and development is a participant who is involved in the stage of testing the appropriate learning tools according to the results of the validators' research. The participants involved in this trial stage were 11th-grade students of MIA 3 from one of the public madrasahs aliyah in Central Maluku. Public madrasah aliyah is an Islamic-based high school whose responsibility is under the Ministry of Religion of the Republic of Indonesia [47].

Furthermore, there were 30 students involved in the testing phase of this physics learning tool. The selection of participants involved in the testing phase of this learning tool was carried out using a purposive random sampling technique. The criteria used in selecting participants are that students have been taught material about momentum and impulses, the learning experienced by students uses a variety of learning models, and students have received physics learning integrated with local wisdom, one of which is traditional games.

3.3 Instrument and procedures

Data collection in this research and development was carried out using an instrument that included a questionnaire. The questionnaire used in this study included a feasibility test questionnaire for the traditional game-based physics learning tool Bola Boy which was given to the validators. The second questionnaire is a response questionnaire given to students to know the impressions and suggestions given directly

by users, namely students. The indicators used in compiling these two questionnaires include the suitability of the material with the media, the continuity of the learning flow developed, the clarity of the material in the media, the ease of use of the media, and the interactivity of the physics learning media. Furthermore, the stage of data collection in this study was initiated by developing a physics learning tool based on the traditional game of Bola Boy. Then test the feasibility of the learning product to the validators. It was furthermore testing the learning product to students as direct users. The last stage is to analyze the results of the feasibility test and student responses to obtain a physics learning tool based on the traditional game of Bola Boy, which is suitable for use in learning physics in high school.

3.4 Data analysis

The physics learning tool based on the traditional game of Bola Boy has been tested for feasibility through validators and used by students. After that, the data obtained from the feasibility test results and the use test are ready to be analyzed to find out how big the feasibility of the physics learning tool based on the traditional Bola Boy game developed. According to the purpose of this study, the stages of data analysis are to determine the feasibility level of physics learning based on the traditional game of Bola Boy, which is carried out in several stages. The stages of data analysis are carried out by tabulating all the data from the feasibility test results for each component. Calculate the average score of each component and interpret the average score with the reference criteria. The reference criteria used in determining the percentage of eligibility for each component of the physics learning tool based on the traditional game of Bola Boy can be shown in Table 1.

Table 1. Product feasibility criteria

No.	Score Range	Category
1.	$X > \bar{X}_i + 1,8 \times sb_i$	Very good
2.	$\bar{X}_i + 0,6 \times sb_i < X \leq \bar{X}_i + 1,8 \times sb_i$	Good
3.	$\bar{X}_i - 0,6 \times sb_i < X \leq \bar{X}_i + 0,6 \times sb_i$	Enough
4.	$\bar{X}_i - 1,8 \times sb_i < X \leq \bar{X}_i - 0,6 \times sb_i$	Less
5.	$X \leq \bar{X}_i - 1,8 \times sb_i$	Very Less

Based on the data presented in Table 1, it can be seen that $\bar{X}_i$ is the ideal mean. The magnitude of $\bar{X}_i$ or ideal mean can be determined by calculating $\frac{1}{2}$ (ideal maximum score + ideal minimum score). Furthermore, sb_i is the ideal standard deviation. The magnitude of sb_i or ideal standard deviation can be determined by calculating $\frac{1}{6}$ (ideal

maximum score—ideal minimum score) [48]. Furthermore, the physics learning tool based on the traditional game Bola Boy can be said to be feasible if the results of the feasibility test of the learning product are in a suitable category. Using the physics learning tool based on the traditional game Bola Boy by students also resulted in a score in the excellent category. The physics learning tool based on the traditional game Bola Boy can be feasible if the feasibility and usage test results are suitable.

4 Results

4.1 Needs analysis on physics learning in senior high school

Preliminary research needs to be done to initiate any research and development. This is done to know the problems that occur in the field. After knowing the problems in the field, the next step is to develop learning products to overcome these problems [49]. This preliminary research stage is carried out by examining urgent needs in the field so that the preliminary research stage can also be called a needs analysis [50]. Furthermore, this preliminary research was conducted in one state, madrasahs aliyah, in Central Maluku. This preliminary study activity is carried out by checking what needs to be provided in physics. The implementation of this preliminary study was carried out by interviewing physics teachers and students. The findings during this preliminary study can be stated as follows. One of the physics teachers named AA stated that "*In guiding the course of learning, I always explain the learning material to students and also repeat the material I teach so that students understand the physics material that I teach more quickly*". Another physics teacher named AB said that "*When I was delivering physics material, both simple and complex physics such as mechanics and quantum physics, I always asked students to stay focused on listening to my explanation. Students will be able to accommodate the mastery of the material by 60% rather than taking notes*". Meanwhile, a physics teacher named AC put forward his argument that, "*To be honest in physics learning, I have never combined the physics learning process with local wisdom in Central Maluku, be it traditional dances or traditional games. The time is not enough if it has to be combined with traditional games*".

Furthermore, to strengthen the statement made by the physics teacher, interviews were conducted with the students. The BC student presented his argument that "*The physics teacher delivers physics material through the PowerPoint, but I am still confused. I can understand physics easier if the teacher systematically writes down physics equations on the blackboard*". A student named BD also said something that was not much different, "*I sometimes feel bored with the delivery of learning materials carried out by physics teachers. Physics teachers only deliver physics material according to what is in the textbook, and there is never any application in everyday life Even though I am interested in applying the concepts of physics in my daily activities*". Meanwhile, a student named EB stated that, "*Physics teachers only teach textual and rarely contextual physics material. This sometimes makes the atmosphere of learning physics too tense and uncomfortable*". Based on the preliminary study results, it can be concluded that the physics learning that has been carried out in Central Maluku is not comfortable. The atmosphere is tense, only textual, and rarely combined with traditional games.

Meanwhile, by filling out a questionnaire conducted by the students, the results showed that most of the students knew about local wisdom in the traditional game Bola Boy. Most students also use Android-based smartphones in physics learning. However, smartphone use has not been used to support physics learning. Most students have difficulty understanding Newtonian mechanics, especially Impulse and Momentum. Furthermore, it is necessary to develop physics learning tools based on the local wisdom of the traditional ball game Bola Boy to improve the physics learning process that is more fun and optimize students' abilities. One of the physics materials integrated into the Bola Boy game is impulse and momentum material. This is in line with filling out a questionnaire conducted by high school students in Central Maluku who still have difficulty understanding and interpreting the material of momentum and impulse.

4.2 Physics learning tools based on Bola Boy's traditional game

The lesson plan in physics learning is designed based on the 2013 revised 2016 curriculum applicable in Indonesia. The implementation of physics learning uses an active learning model emphasizing impulse and momentum material. This physics lesson plan is designed for two meetings. The time allocation for the first meeting is 3×45 minutes, and this means that physics learning at the first meeting was carried out for three hours of learning, with each hour for 45 minutes.

Meanwhile, the implementation of physics learning at the second meeting was carried out for 2×45 minutes. This means that physics learning at the second meeting was carried out for two hours of learning, each hour for 45 minutes. These physics learning implementation plan consists of core competencies, essential competencies, competency achievement indicators, learning objectives, learning methods and media, learning resources, learning steps, and assessments. Furthermore, a snippet of the physics lesson plan used in this study can be presented in Table 2.

Table 2. The learning physics lesson plan is based on the Bola Boy traditional game

First Meeting (3 × 45 minutes)	
Teacher Activities	**Student Activities**
Introductory Activity (30 minutes)	
Phase 1. Problem Orientation	
1. The teacher starts the lesson by greeting, praying, and checking the students' attendance. 2. The teacher gave the pretest and questions orally to the students. 3. The teacher asks students to install the "Boyfis" application. 4. The teacher explains how to use the "Boyfis" application. 5. The teacher guides the students to open the "Boyfis" application. 6. The teacher invites students to read the initial display instructions menu. 7. The teacher conveys the theme to be studied at this first meeting and the learning objectives.	1. Students answer greetings and start learning activities by praying. 2. Students do the pretest and answer questions from the teacher by triggering many answers and problem-solving. 3. Students install the "Boyfis" application on their android smartphones. 4. Students listen to the teacher's explanation of using the "Boyfis" application. 5. Students open the "Boyfis" application. 6. Students read the instructions for using the "Boyfis" application in the instructions menu. 7. Students listen to the delivery of learning objectives by the teacher.

(Continued)

Table 2. The learning physics lesson plan is based on the Bola Boy traditional game *(Continued)*

First Meeting (3 × 45 minutes)	
Teacher Activities	**Student Activities**
Core Activities (60 minutes)	
Phase 2. Organizing students to learn	**Communicating**
1. The teacher divides the students into five groups (A, B, C, D, and E). 2. The teacher distributes the first student worksheets to each group. 3. The teacher gives each group directions to fill out the first student worksheet. 4. The teacher briefly explains the traditional "Bola Boy" game and the "Boyfis" application.	1. Students sit in their groups. 2. Each group receives the first student worksheet. 3. Students listen to the teacher explaining filling out the first student worksheet. 4. Students listen to the teacher's explanation about the traditional game "Bola Boy" and the "Boyfis" application.

Based on Table 2, the implementation of physics learning in this study was carried out in groups. The learning model used in this study is problem-based. Meanwhile, physics learning emphasized in this study uses the help of android media based on the traditional Bola Boy game to understand the momentum and impulse material. The android media used in this physics lesson is called Boyfis. Meanwhile, the learning tools other than the learning plan developed in this study are student worksheets. The student worksheets developed in this study were designed to be used in two meetings. The distribution of physics subject matter in the development of this student worksheet is for the first student worksheet; momentum material is used. The first student worksheet was used in the first meeting.

Meanwhile, the second student worksheet used impulse material at the second meeting. The components used in developing the two worksheets in this study include group identity, essential competencies, physics learning objectives, work instructions, and momentum and impulse materials integrated into the traditional game Bola Boy. These two student worksheets were developed by combining the traditional game Bola Boy with a problem-based learning model that focuses on student activity. The snippet of the display of student worksheets integrated into the traditional Bola Boy game is as follows.

5 Student worksheet based on bola boy traditional game

5.1 Problem orientation

Every afternoon Raka and his friends play in the village field. The game that Raka and his friends play is Bola Boy. Bola Boy is a game that focuses on the speed of movement and the accuracy of the focus of the attack on the target. Techniques in the game are shown to produce running speed or the ball and the accuracy of throwing opposing players or bricks. The throws produced by each Bola Boy player are different. The throw produced by a player reaches a speed of 6 meters per second. At the same time, another player can throw at a speed of 14 meters per second. The speed of throwing the ball is critical in the game Bola Boy. To get a quick and right throw, several things need to be considered by Bola Boy players, which include the force given and the speed of releasing the ball.

5.2 Problem orientation

Write down the hypothesis of the statement!
1.....
.....
2.....
.....
3.....
.....

5.3 Organizing

1. Open the "Boyfis" application on your android smartphone!
2. Take simulation data 1 on the momentum and impulse material scan!
3. Record the data from your observations!

Another component of the physics learning tool based on the traditional Bola Boy game is the android learning media combined with the traditional Bola Boy game. The android physics learning media based on the traditional Bola Boy game was developed by compiling a flowchart and storyboard to develop the android media. The indicators used in developing android physics learning media based on the traditional Bola Boy game include material and examples of momentum and impulse questions associated with the traditional Bola Boy game, pictures, and videos of the traditional Bola Boy game, as well as animation and simulation of the traditional Bola Boy game. The screenshot of the android physics learning media based on the traditional game Bola Boy can be presented in Figure 1.

Fig. 1. Display of android physics learning media based on the Bola Boy traditional game

Figure 1 displays the android physics learning media based on the traditional game Bola Boy. The android physics learning media was developed in Indonesian. This is because using and implementing it is carried out for high school students in Indonesia. In addition, the use of Indonesian is also carried out so that students are not confused in understanding and interpreting the concepts of momentum and impulse, which are combined with the traditional game of Bola Boy. The android physics learning media was more interactive because there was a choice of media operations carried out by inputting the physics quantities carried out by students. Therefore, through the use of android physics learning media based on the traditional game of Bola Boy, it is hoped that students' critical thinking and analytical skills can develop optimally.

5.4 Feasibility test results of physics learning tools based on the Bola Boy traditional game

A physics learning tool based on the traditional game of Bola Boy has been developed in this research. However, before physics learning tools are used in research or widely distributed, it is necessary to do a feasibility test first. The feasibility test of this physics learning tool was carried out by validators and supported by direct student use tests. The feasibility test results for the traditional game-based physics learning tool Bola Boy components, which includes lesson plans, student worksheets, and android physics learning media, can be presented in Table 3.

Table 3. Feasibility test results of physics learning tools

Component	Aspect	Score	Category
Lesson plan	Clarity of identity	4.18	Good
	Indicator formulation or learning objectives	4.00	Good
	Material selection	4.00	Good
	Selection of approaches and learning methods	3.93	Good
	Learning activities with a discovery learning	3.64	Good
	Selection of learning resources	4.21	Good
	Assessment of learning outcomes	4.05	Good
	Average Score	**4.00**	**Good**
Student Worksheet	Contents served	3.43	Good
	Language	4.18	Good
	Average Score	**3.80**	**Good**
Physics Learning Media Based Android Bola Boy	Theory	3.93	Good
	Language	4.14	Good
	Audiovisual display	4.18	Good
	Software engineering	4.14	Good
	Average Score	**4.10**	**Good**

The feasibility test results for one of the components of the physics learning tool based on the traditional game of Bola Boy, namely the lesson plan, obtained an average

value of 4.00. Based on the feasibility criteria for the development product presented in Table 3, it can be stated that the lesson plan based on the traditional Bola Boy game developed is in a suitable category. The lesson plan based on the traditional game Bola Boy is suitable for physics learning activities. Aspects of the feasibility assessment of the traditional game-based lesson plan Bola Boy obtained the most miniature score, namely the aspect of learning activities with a discovery learning model of 3.64. At the same time, the aspect of the feasibility assessment that obtained the most significant score was the selection of learning resources aspect of 4.21.

Meanwhile, the results of the student worksheet based on the traditional game Bola Boy obtained a score of 3.80. The feasibility test results on the student worksheets are included in the good category. Student worksheets based on the traditional game Bola Boy are suitable for physics learning activities.

Furthermore, the aspect of feasibility assessment on student worksheets based on the traditional game of Bola Boy, which obtained the smallest score, namely the contents served aspect, was 3.43, and the aspect of feasibility assessment which obtained the largest score was the linguistic aspect of 4.18. In addition, the feasibility test results of the traditional game-based Android learning media Bola Boy from the material aspect obtained a score of 4.04. The feasibility test results for the traditional game-based android learning media Bola Boy are good. This means that the traditional game-based android learning media Bola Boy is suitable for physics learning in terms of physics learning materials. Furthermore, the feasibility test results of the traditional game-based Android learning media Bola Boy from the media aspect obtained a score of 4.16. The feasibility test results for traditional game-based android learning media Bola Boy are good.

This means that in terms of physics learning media, the traditional game-based Android learning media Bola Boy is feasible in physics learning. Meanwhile, the overall results of the feasibility test for the traditional game-based android learning media Bola Boy obtained a score of 4.10. The traditional game-based android learning media Bola Boy is in a good category and suitable for physics learning. Based on the feasibility test results of the android learning media based on the traditional Bola Boy game, the smallest score on the anchovy, momentum, and impulse aspects that were combined into the traditional Bola Boy game was 3.93. Meanwhile, the feasibility test results of the traditional game-based android learning media Bola Boy obtained the largest score on the audiovisual display aspect of 4.18. Furthermore, the feasibility test results for each android physics learning tool component based on the traditional game Bola Boy, which includes lesson plans, student worksheets, and android physics learning media, can be represented in a graph. The graphical representation of feasibility test results of android physics learning tool-based traditional game Bola Boy can be shown in Figure 2.

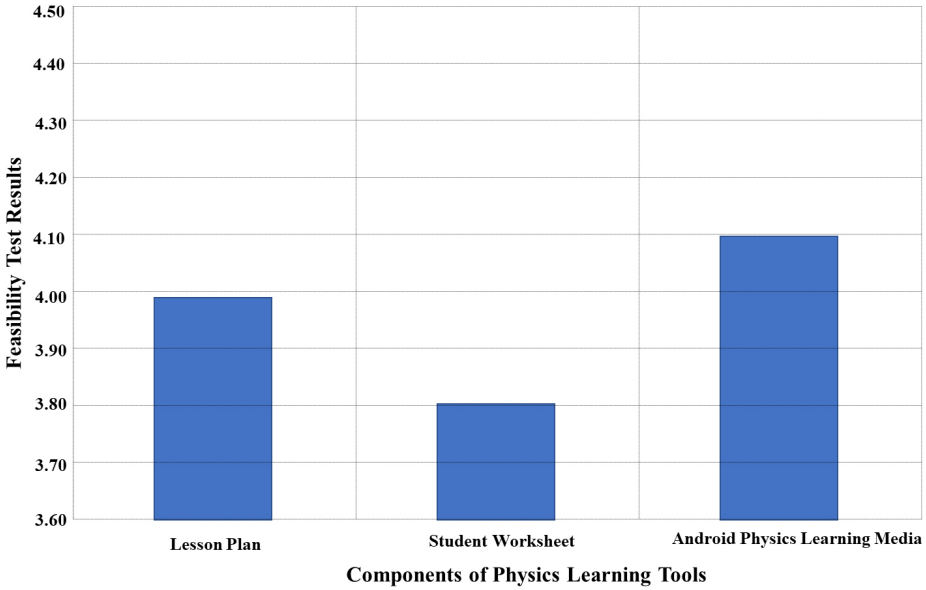

Fig. 2. Feasibility test results of physics learning tools

Based on the feasibility test results on the three components of the learning tool shown in Figure 2, the feasibility level of the android physics learning tool based on the traditional game Bola Boy obtained a score of 3.97. This means that the android physics learning tool based on the traditional game Bola Boy is in a good category and is suitable for use in physics learning about momentum and impulse. However, if each component is examined, then the Android physics learning tool component based on the traditional game Bola Boy which gets the smallest score is the student worksheet of 3.80. While the components of the android physics learning tool based on the traditional game Bola Boy, which obtained the largest score, the physics learning media based android Bola Boy was 4.10.

After obtaining the feasibility test results from the validators of the physics learning tool, the next step is to analyze students' use of test results. The use test or the readability test of the components of the physics learning tool based on the traditional game Bola Boy, especially the android physics learning media, was carried out by 11th-grade students of MIA 3 from one of the public madrasah aliyah in Central Maluku. Students involved in this legibility test phase have studied momentum and impulse material in grade 10. Furthermore, the results of the readability test of android physics learning media based on the traditional game Bola Boy performed by students can be shown in Table 4.

Table 4. Readability test results of android physics learning media

Aspect	Score	Category
Learning or material	3.36	Very Good
Audiovisual display	3.41	Very Good
software engineering	3.87	Very Good
Average Score	**3.83**	**Very Good**

Based on Table 4, it can be seen that the results of the readability test of android physics learning media obtained a score of 3.83. The android physics learning media is included in the very good category and is suitable for use as a variation of interactive physics learning media. The results of the readability test of the android physics learning media conducted by these students strengthen the feasibility of the developed product as one of the choices of physics learning media. If the results of the readability test and the android physics learning media feasibility test are combined, a score of 3.97 is obtained. The android physics learning media from the assessments carried out by the validators and students proved to be one of the perfect and feasible physics learning media to be applied in physics learning on momentum and impulse material.

6 Discussion

This research and development are carried out by developing learning products used to overcome physics learning problems in high schools. The problem in high school is that teachers rarely teach physics material that is integrated with students' daily lives [51]. Moreover, physics learning that is integrated into traditional games is still rarely done by teachers [52]. Many teachers think that just understanding physics material takes a long time, especially if you have to integrate it into traditional games; it will take much longer [53]. In addition, physics material tends to be abstract also takes a long time to understand. Thus, this research and development try to develop physics learning products that are technological and regional contextual. This has become one of the novelties of this research and development and overcoming or as an alternative solution in learning physics. The learning products developed in this research are physics learning tools consisting of lesson plans, student worksheets, and android physics learning media based on the traditional game Bola Boy.

The Bola Boy game was chosen to overcome physics learning that rarely integrates into traditional games because this game is a game that has similarities to modern games. This game has similarities to the bowling ball game [54]. In addition, the game Bola Boy is rarely played by children in the Central Maluku area, and most children play online games on their smartphones [55]. With such facts, the Bola Boy game is used as a physics learning medium to make it easier for students to understand the momentum and impulse material developed in android smartphones. Furthermore, the feasibility test results of the traditional game-based physics learning tool Bola Boy developed in this study obtained good results. The physics learning tool developed is suitable for physics learning based on the traditional Bola Boy game on momentum and impulse materials. The components tested for feasibility and readability included

lesson plans, student worksheets, and android physics learning media. The feasibility test results on the components of the traditional game-based physics learning tool Bola Boy obtained the highest score on physics learning media than other physics learning tool components.

Android physics learning media based on the traditional game Bola Boy has a higher eligibility score because the physics learning media applies technological advances, namely Android. The use of Android in smartphones today is loved by many children, both for social media or playing online games [56]. Besides that, Android physics learning media that applies the traditional Bola Boy game is still rare. Most of the use of physics learning media used by teachers is through PhET media which can be downloaded on the internet [57]. With the existence of an android physics learning media based on the traditional game of Bola Boy, this is one of the advantages or novelties offered by this development research. Previous research also reveals that physics learning media integrated with technological advances such as Android can optimize learning outcomes [58].

Moreover, learning media in smartphones integrated into students' daily lives will significantly optimize students' abilities. Students do not need to abstract and imagine abstract material in-depth, and students just need to open their daily experiences or memories to apply the physics concepts conveyed by the teacher.

Learning physics using android-based learning media in smartphones also helps teachers deliver physics material. This is because teachers can manage the learning of physics in various ways using various learning models such as blended learning [59]. Teachers direct instruction to students through the lecture method in front of the class, but teachers can do learning remotely. Android-assisted physics learning media can support distance learning [60]. A variety of media and physics learning models will make learning physics more fun. The atmosphere of learning physics that is created will not be surprising and not boring for students anymore. Students increase their curiosity about the concepts of physics and traditional games that surround their lives [61]. In addition to increasing student curiosity, motivation to learn physics is much stronger than before, increasing students' abilities. Although the increase in students' abilities is not immediately significant, it is hoped that the physics learning atmosphere is more easygoing and makes students more reluctant to linger in participating in physics learning. Every learning implementation needs to be emphasized to condition a relaxed and fun learning atmosphere. If learning is relaxed and makes students comfortable, then all the material taught by complex and straightforward teachers is much easier to understand [62].

7 Conclusion

This development research tries to offer a solution to physics learning that has not been implemented contextually so far. The solution offered is to produce a physics learning device based on the traditional Bola Boy game suitable for use in physics learning on momentum and impulse. In addition, the components of the traditional game-based physics learning device developed in this study, including the Android physics learning media, received excellent appreciation from validators and students.

The Android physics learning media combined with the Bola Boy game can be a different added value or a physics learning style in Indonesia. Physics learning media based on the android game Bola Boy is one of the novelty elements in this research that can make it easier for students to understand momentum and impulse material. In addition, students can also help preserve the local wisdom of the area to add to the attraction of education and cultural observers. The results of this research and development can not only be used in the research area but can also be used throughout the area. This is also supported by traditional android-based learning media that were successfully developed in this study to support the implementation of distance learning.

8 Limitations and Recommendations

This research has successfully created a traditional game-based physics learning device, Android physics learning media. However, this study also has some limitations. The limitation of this study is that this research only develops contextual learning products integrated into traditional Android-based games. The product developed is only up to the feasibility test, and readability test stages, and no experiments have been carried out to determine the effect on students' abilities. Therefore, this provides an opportunity for further researchers to determine its effect on physics learning achievement and students' abilities.

Furthermore, the learning products developed in this study are also limited to the traditional Bola Boy game and only for momentum and impulse materials. However, this media can be used in all fields, but teachers need to introduce the traditional game of Bola Boy to students. The results of this study can also be used as a reference for conducting similar research or deepening this research. Android-based traditional physics learning media can be used as a medium used to determine students' abilities about 21st-century abilities. In addition, education and cultural observers can use this research to promote cultural education.

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