

# Development of Mobile-Based Learning Media for Supervision of Physical Education and Sports Training

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**Abstract:** This research aims to develop mobile-based learning media that can support the supervision of physical education and sports training effectively and efficiently. In the context of physical education and sports, effective supervision by supervisors and coaches is very important to ensure that the learning process runs optimally, improve students' motor skills, and promote physical health and mental well-being. With advances in digital technology, mobile applications offer significant potential to improve traditional supervision methods through real-time monitoring, instant feedback, and integrated data management. The Teacher Working Group (KKG) for Physical Education, Sports, and Health (JPOK) in Banjarbaru, consisting of 60 teachers became the participants of this study. This research procedure has seven stages, namely: 1) research design; 2) user needs analysis; 3) application design; 4) application development; 5) trial and evaluation; 6) repairs and adjustments; 7) implementation and dissemination. The application development method used is the Mobile Development Life Cycle (MDLC). The research successfully developed a mobile-based learning medium using the MDLC method. During the development phase, the focus was on creating an intuitive user interface and implementing features that address the needs and challenges identified through user needs analysis. The application was designed with careful consideration of usability and functionality, ensuring that it could effectively support sports supervision and training.

**Keywords:** *Development of Learning Media, Mobile Applications, Supervision of Physical Education, Sports Training*

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## I. INTRODUCTION

Physical education and sports training are essential components in the educational curriculum that contribute significantly to the development of students' physical health, motor skills and mental well-being [1]–[4]. This activity not only aims to improve physical abilities and sports skills, but also forms an attitude of discipline, cooperation and a sense of responsibility. In an educational environment, effective supervision by supervisors and trainers is very important to ensure that the learning and training process runs smoothly, is structured and of high quality [5], [6].

Supervision in physical education and sports requires careful observation, providing timely feedback, and accurate documentation of student progress [7]. However, implementing effective supervision often faces various challenges, such as time constraints, the large number of students, and the complexity of the teaching and training process. Supervisors and trainers must be able to continuously monitor and assess students' physical performance and motor skills to provide appropriate guidance and correct ineffective learning or training methods.

In the current era of digital technology, mobile applications have played an increasingly important role in various aspects of life, including in the fields of education and sports [8]–[12]. Advances in information and communication technology provide new opportunities to overcome several obstacles in the supervision of physical education and sports training. By leveraging popular mobile platforms, supervisors and coaches can integrate technology into the supervision process, enabling them to monitor and record student physical activity in real-time, provide instant feedback, and manage data and documentation more efficiently [13]–[16].

Mobile applications for supervision of physical education and sports training can be designed for a variety of functions, including performance monitoring, recording physical data, managing practice schedules, and analyzing student progress. These features can help supervisors and coaches provide faster and more specific feedback, identify areas that need improvement, and optimize practice and learning programs according to individual student needs. In addition, this application can also facilitate communication between supervisors, coaches and students, as well as enable more in-depth data reporting and analysis.

Although the potential for using mobile technology in physical education supervision and sports training is enormous, the adoption of this technology still faces several challenges [17]. One of the main challenges is the development of learning media that suits the specific characteristics and needs of users in the sports sector. Many mobile applications available today are designed for general purposes and may not be completely suitable for application in the context of physical education and sports training. Therefore, there is a need to develop learning media specifically designed to support the supervision process in this field effectively and efficiently.

This research aims to answer these needs by developing mobile-based learning media that can support the supervision process of physical education and sports training. The proposed learning media was designed taking into account user needs, the characteristics of learning in the field of sports, as well as the integration of features that enable optimal monitoring, feedback and data management. Thus, it is hoped that this research can make a significant contribution in improving the quality of supervision of physical education and sports training through the use of mobile technology.

## II. LITERATURE REVIEW

### A. Educational Supervision

Educational supervision is a process that involves guiding, supervising, and assessing the performance of teachers and other educational staff to improve the quality of learning and student learning outcomes [18]–[20]. Educational supervision aims to develop teacher professionalism, increase learning effectiveness, and ensure that set educational standards are achieved. According to Glickman, Gordon, and Ross-Gordon [21], educational supervision is a systematic and continuous effort to improve learning through improving the quality of teacher teaching. It involves various aspects, including classroom observation, performance evaluation, training and professional development, and support and guidance for teachers. Educational supervision is based on several main principles:

- **Collaboration:** Supervision must be carried out in an atmosphere of partnership between the supervisor and teacher.
- **Professional Development:** Focus on continuously improving teacher skills and knowledge.
- **Reflection:** Encourage teachers to reflect on their own teaching practices as part of the professional development process.
- **Data Based:** Decisions and actions in supervision must be based on accurate and relevant data.

The approach to educational supervision can be clinical, where supervision is carried out through a cycle of observation, reflection and discussion. Other approaches include developmental supervision, which focuses on developing teachers' professional capacity through training and support.

### B. Physical Education

Physical education is an integral part of the school curriculum which aims to develop the physical abilities, motor skills, knowledge and attitudes necessary to achieve optimal health and an active lifestyle. Physical education does not only focus on physical aspects but also includes cognitive, affective and social aspects [22], [23]. According to Bucher and Wuest [24], physical education is a process designed to improve students' physical and motor development through structured and planned activities. Physical education also aims to form a positive attitude towards physical activity that is sustainable throughout life. Physical education in schools has several main objectives, including:

- **Motor Skills Development:** Improve basic motor skills such as running, jumping, throwing and catching.
- **Health and Fitness:** Increase students' physical fitness levels through activities designed to strengthen the heart, muscles and endurance.
- **Knowledge of Physical Activity:** Provides knowledge about the importance of physical activity and how to do it safely and effectively.
- **Social and Emotional Development:** Develop social skills such as cooperation, leadership, and sportsmanship.
- **Active Lifestyle:** Establish sustainable physical activity habits for long-term health.

Physical education has many benefits for students, including:

- **Physical Health:** Improve physical fitness, reduce the risk of obesity, and prevent chronic diseases such as diabetes and heart disease.
- **Mental Health:** Improves mental and emotional health by reducing stress, anxiety, and depression.
- **Social Skills:** Develop social skills such as cooperation, communication, and leadership through group activities and games.
- **Academic Achievement:** Research shows that physical activity can improve students' concentration, memory and academic performance.

Physical education is an important component of the school curriculum that has a big role in developing physical health, motor skills, knowledge and a positive attitude towards physical activity. Despite several challenges, physical education provides significant benefits for students' physical and mental health and social development. Effective implementation of physical education programs requires support from all parties, including comprehensive curriculum development, provision of adequate facilities, and ongoing teacher training.

### C. Physical Education Supervision

Supervision in physical education has several specificities that are different from supervision in other subjects. Physical education does not only focus on cognitive aspects, but also involves students' physical and affective aspects. Therefore, physical education supervision must consider the following aspects:

- **Security and Safety:** Supervisors must ensure that the physical activities carried out are safe for students and comply with safety standards.
- **Facilities and Equipment:** Evaluation of the condition of sports facilities and equipment is very important in physical education supervision.
- **Variety of Learning Methods:** Supervision must pay attention to the use of various creative and effective learning methods in physical education.
- **Health and Wellness:** Supervision should include assessment of programs aimed at improving student health and wellness.

Supervision in physical education necessitates a comprehensive and integrative approach. This includes evaluating teacher performance, developing the curriculum, and assessing student learning outcomes in both physical and psychomotor aspects [25], [26]. Furthermore, physical education supervision must also involve psychosocial aspects, such as student motivation, attitudes towards physical activity, and character development. Supervisors must have a deep understanding of physical education pedagogy and be able to provide constructive feedback that helps teachers develop effective teaching strategies.

In practice, physical education supervisors need to conduct regular classroom observations, provide specific and targeted feedback, and provide opportunities for teachers to undertake relevant training and professional development. This aims to ensure that the physical education program implemented is able to achieve the expected learning objectives, namely improving students' physical fitness, motor skills and character development.

#### *D. Mobile-Based Learning Media*

Mobile-based learning media refers to the use of mobile devices such as smartphones and tablets as tools to deliver learning material and support the teaching and learning process [27], [28]. With the increasing penetration of mobile technology, this medium is becoming increasingly relevant and widely used in various educational contexts. Mobile-based learning media allow flexible, personalized and contextual learning access. It supports learning anywhere and anytime, facilitating more interactive and collaborative learning [29]. The use of mobile-based learning media has several main advantages:

- **Mobility:** Learning can be done anywhere and at any time without being tied to a specific location.
- **Interactivity:** Mobile applications often have interactive features that allow students to actively participate in the learning process.
- **Personalization:** This medium allows learning that can be tailored to the needs and learning speed of each student.
- **Accessibility:** Learning materials can be easily accessed by students via their mobile devices.

Even though it has many advantages, the use of mobile-based learning media also faces several challenges, including:

- **Limited Access:** Not all students have access to mobile devices or adequate internet.
- **Self-Discipline:** Mobile-based learning requires a high level of self-discipline from students to stay focused and not be distracted by applications or other content on their devices.
- **Content Quality:** Poor quality or irrelevant content can reduce learning effectiveness.
- **Technical Problems:** Technical problems such as bugs in the application or connectivity problems can hinder the learning process.

Mobile-based learning media offers great potential to improve the quality and accessibility of education [30], [31]. With advantages in terms of mobility, interactivity, personalization and accessibility, this medium can support more effective and enjoyable learning. However, to maximize the benefits, efforts are needed to overcome existing challenges and ensure that the content and platforms used truly support the learning process.

### **III. METHOD**

This research procedure has 7 stages, namely, 1) Research Design; 2) User Needs Analysis; 3) Application Design; 4) Application Development; 5) Trial and Evaluation; 6) Repairs and Adjustments; 7) Implementation and Dissemination. The research method for developing mobile-based learning media for supervision of physical education and sports training involved a series of structured steps. First, an analysis of user needs was carried out through interviews, surveys, or focus group discussions with teachers from the Teacher Working Group (KKG) for Physical Education, Sports and Health (PJOK) in Banjarbaru to understand the needs, preferences, and challenges they face in the supervision process and sports training. Based on the results of the user needs analysis, the application was designed by designing an intuitive user interface and features that suit user needs. Mockup was created to plan the layout and navigation of the application. Furthermore, the application was developed using the Java programming language, with a focus on implementing sports supervision and training features such as tracking physical activity, preparing training programs, and creating documentation of student athlete progress. This application was tested by two media experts to determine the feasibility of the learning media being developed. In this trial, a media feasibility test was carried out using the System Usability Scale (SUS) to assess the system usability of a product or service. The scale used is a Likert scale. The results of this trial were used to make improvements and adjustments to the application, including debugging, adding new features, and improving the user interface. Once the application is deemed ready to use, it was implemented and disseminated to 60 teachers in the Physical Education, Sports and Health (PJOK) Teacher Working Group (KKG) in Banjarbaru. At this stage, teachers were given two types of tests, namely pre-test and post-test. The pre-test is given to determine their initial competency in studying the material before using mobile learning media. The post-test was given after the teachers used mobile learning media. These two tests were carried out to determine the effectiveness of the learning media that had been developed. Apart from that, teachers are

also given a questionnaire after using the application. This aims to find out how teachers respond to the mobile learning media that has been developed. This questionnaire also uses the System Usability Scale (SUS) and Likert scale. The following are the provisions for determining the assessment of the SUS score percentile rank [32].

Table 1 SUS Score Percentile Rank

Grade	Description
A	score $\geq 80,3$
B	score $\geq 74$ and $< 80,3$
C	score $\geq 68$ and $< 74$
D	score $\geq 51$ and $< 68$
E	score $< 51$

Thus, through this method, it is hoped that the application developed can meet the needs and expectations of users and make a positive contribution to the sports supervision and training process.

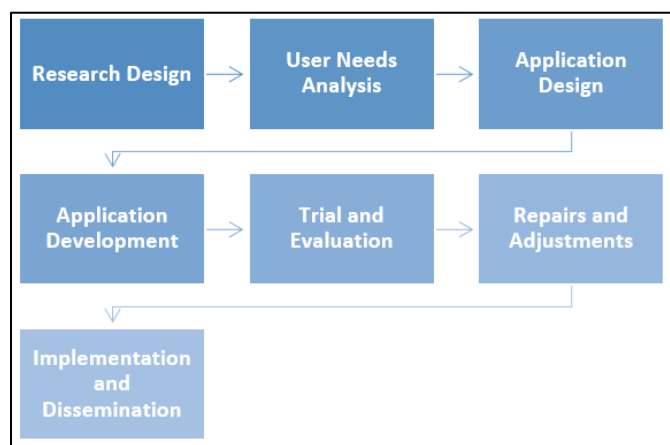


Fig 1 Research Procedure

#### A. Research Design

At the research design stage, research approaches and methods are selected that are appropriate to the research objectives and characteristics. The approach used is the research and development method. This stage includes planning the entire research process, including setting schedules, dividing tasks, and preparing research instruments such as questionnaires and interview guides. Apart from that, the population and sample that were involved in this research were also determined.

#### B. User Needs Analysis

The user needs analysis stage aims to identify the needs, problems and expectations of users who used this application. Data was collected through survey methods, in-depth interviews, and focus group discussions (FGD) with teachers from the Teacher Working Group (KKG) for Physical Education, Sports and Health (PJOK) in Banjarbaru. The information obtained from this stage is used as a basis for designing application features and functions, so that the application developed can meet the real needs of users.

#### C. Application Design

The application design stage uses the ADDIE model, which includes five phases: Analysis, Design, Development, Implementation, and Evaluation. In the design phase, the structure and appearance of the application is designed based on the results of the user needs analysis. This process involves creating a mockup to depict how the application looks and function. The user interface (UI) design is created to be intuitive and user-friendly, ensuring that all user needs and problems identified in the previous stage can be properly accommodated.

#### D. Application Development

The application development stage also uses the ADDIE model, especially in the development phase. This process involves the technical implementation of the design that has been created, including application coding, feature integration, and database creation. Developers use appropriate programming languages and platforms to build mobile applications. Internal testing is carried out during the development process to ensure that each application component functions properly and meets design specifications. In addition, debugging is carried out to identify and correct errors found.

#### E. Trial and Evaluation

After the application has been developed, a testing and evaluation phase is carried out to assess the performance and effectiveness of the application in a real context. The trial involved two media experts who provided input regarding the suitability of the media before being implemented at the next stage. Data was collected through questionnaires to evaluate aspects such as ease of use, functionality and user satisfaction. The evaluation results are used to identify deficiencies and areas that require improvement.

#### F. Repairs and Adjustments

Based on the evaluation results from the trial phase, improvements and adjustments are made to the application to overcome the deficiencies found. This process includes recoding or adjusting certain features so that the application can function better and meet user expectations. After repairs are made, a retest is carried out to ensure that the repairs have been effective and the application is ready to be implemented.

#### G. Implementation and Dissemination

The final stage is implementation and socialization of the application. The implementation is carried out by applying the application to the actual physical education and sports training environment. End users such as teachers are given two tests, namely pre-test and post-test to determine the effectiveness of the mobile learning media that has been developed. Teachers are also given a questionnaire after using mobile learning media. Apart from that, teachers are also given training to use the application effectively. Dissemination of research results is carried out through journal publications, seminars, workshops and other media to disseminate information about applications and increase their adoption. Socialization also aims to obtain wider input and support future application development.

#### IV. RESULTS AND DISCUSSION

##### A. User Needs Analysis

The results of the user needs analysis show that there is a significant need for mobile-based learning media that can facilitate supervision of physical education and sports training. Users want features like performance logging, providing real-time feedback, and easy access to learning materials. Surveys and in-depth interviews revealed that the desired application must be intuitive, easy to use, and able to support supervision activities effectively.

##### B. Application Design

At the application design stage, a blueprint, wireframe and application mockup have been created. User interface (UI) design is focused on ease of use and clarity of navigation. Key features identified from the user needs analysis, such as recording performance and providing feedback, were integrated into the design. The resulting design includes a user-friendly color scheme, easy-to-understand icons, and an intuitive layout.

##### C. Application Development

In the initial stages of developing this mobile-based learning media, the main focus has been given to conceptual design and application prototype design. The development team has put together a basic framework that includes user interface design, navigation structure, and core features that support physical education supervision as well as sports training. This prototype aims to provide an interactive platform, where teachers can access learning modules, provide instruction, and track student progress more effectively.

At this stage, the development team has succeeded in compiling the basic structure of the application, which includes learning modules for various aspects of physical education and sports training. Development focused on features such as training schedule management, video guidance, and a criteria-based evaluation system. These features are designed to support the supervision and training process by providing tools that make it easier to organize and monitor student activities.

The application framework has been designed with user needs in mind, with an intuitive and responsive interface. In addition, the designed navigation scheme makes it easier to access various learning modules, task tracking, and performance assessment. Apart from technical development, the team has also compiled learning content that was integrated into the application.

The development of mobile-based learning media is on the right track to fulfill the proposal's objectives, namely creating an effective and efficient tool for supervision of physical education and sports training. With a strong basis from this initial design, the application is expected to make a significant contribution to improving the quality and effectiveness of supervision and learning processes in physical education and sports training in the future. The following are the results of mobile-based learning media.



Fig 2 Start page



Fig 3 Materials List Page



Fig 4 Material Page

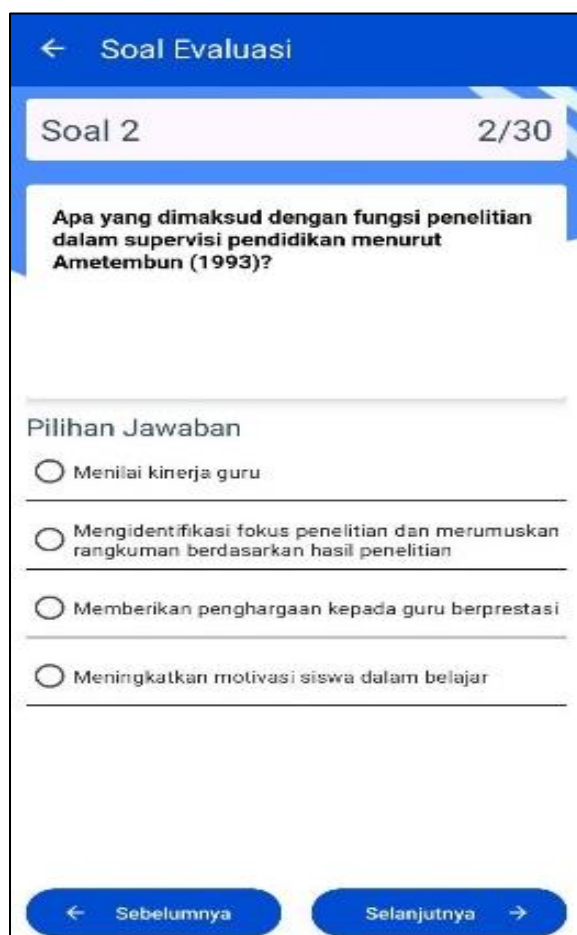


Fig 5 Quiz Page

#### D. Trial and Evaluation

Application trials were carried out involving two media experts. The results of the questionnaire show that the applications are well made. Experts gave positive feedback regarding the ease of use and functionality of the application. Several suggestions for improvements were also received, such as improving application responsiveness and adding certain features. The expert's response can be seen from the questionnaire given after the expert uses the application that has been developed. The response data shows a high level of feasibility and great potential for widespread application. The following is data from the results of the trials that have been carried out.

Table 2 The Results of Material Feasibility Tests by Material Experts

No	1	2	3	4	5	6	7	8	9	10	Total	Total*2.
1	4	4	3	4	3	4	4	4	3	4	37	93
2	3	4	3	4	3	4	4	4	3	3	35	88
Average score												90

#### E. Repairs and Adjustments

Based on the evaluation results, the application is then improved and adjusted to overcome the deficiencies found. Problem identification is carried out to determine areas that require improvement. The improvement process involves recoding or adjusting features based on user feedback. After repairs are made, retesting is carried out to ensure that the repairs have been effective and the application functions as expected.

#### F. Implementation and Dissemination

The final stage of research is implementation and dissemination of the application. The implementation is carried out by applying the application in the physical education and sports training environment, namely in the Teacher Working Group (KKG) for Physical Education, Sports and Health (PJOK) in Banjarbaru. User training is organized to ensure that teachers can use the application effectively. The dissemination of research results is carried out through journal publications, seminars, workshops and other media to increase application adoption and expand its benefits to the sports education and training community. Following are the results of applying the application to teachers.

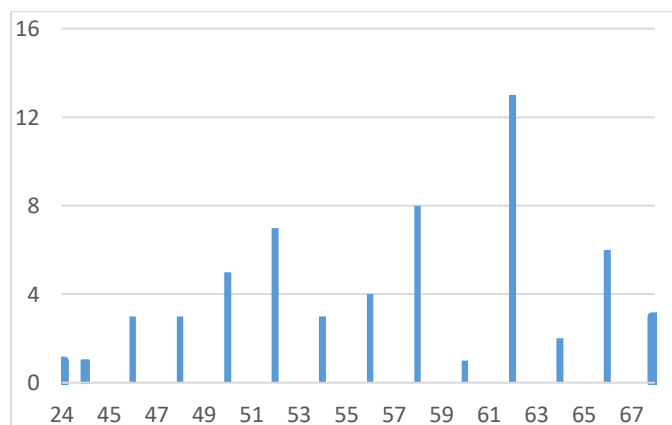


Fig 6 The Results of the Teacher's Pre-Test

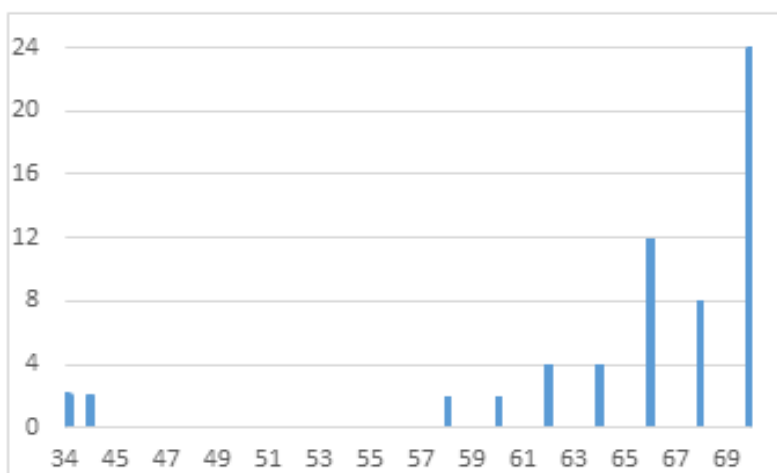


Fig 7 The Results of the Teacher's Post-Test

Apart from that, teachers were also given questionnaires. This questionnaire aims to determine the response of teacher users to the mobile learning media that has been used. The following are the results of teacher user responses to mobile learning media.

Table 3 The Results of SUS

No.	1	2	3	4	5	6	7	8	9	10	Total	Total * 2.5
1	4	4	4	4	4	4	4	4	4	4	40	100
2	4	4	4	4	4	2	4	4	0	4	34	85
3	3	2	3	2	2	2	2	2	2	3	23	58
4	4	3	3	2	2	1	3	2	3	2	25	63
5	4	3	4	1	4	0	4	3	3	3	29	73
6	3	4	4	4	4	4	4	4	4	4	39	98
7	4	4	4	4	4	1	4	4	4	4	37	93
8	3	2	3	3	3	3	3	3	3	3	29	73
9	4	3	3	3	3	3	3	3	3	4	32	80
10	4	4	4	0	4	0	4	4	4	4	32	80
11	3	4	4	2	4	0	4	3	4	4	32	80
12	4	4	4	4	4	0	4	4	0	4	32	80
13	4	4	4	3	4	3	3	3	4	3	35	88
14	3	2	3	0	4	0	3	3	4	3	25	63
15	3	4	3	0	4	1	4	4	4	3	30	75
16	4	4	4	4	4	1	3	3	4	4	35	88
17	2	4	4	4	4	4	2	3	4	4	35	88
18	4	0	4	1	4	0	4	4	3	4	28	70
19	3	1	3	1	3	1	3	3	1	3	22	55
20	3	4	3	3	3	4	3	3	4	3	33	83
21	2	1	2	2	3	2	1	2	2	2	19	48
22	3	2	3	3	3	3	3	4	4	3	31	78
23	2	3	2	3	2	2	3	3	3	3	26	65
24	4	3	4	3	3	2	4	4	4	3	34	85
25	3	3	3	3	3	3	3	3	3	3	30	75
26	4	3	3	2	3	0	4	4	0	4	27	68
27	4	4	4	4	4	4	4	4	4	4	40	100
28	3	3	3	3	3	2	4	4	4	3	32	80
29	3	4	3	3	3	3	3	3	4	2	31	78

30	2	3	4	3	4	1	3	3	0	3	26	65
31	4	4	4	4	4	4	4	4	4	4	40	100
32	3	3	4	4	3	4	3	3	4	3	34	85
33	3	3	2	2	3	1	4	4	3	2	27	68
34	2	2	2	3	2	2	2	2	2	2	21	53
35	4	3	3	2	2	1	3	2	3	2	25	63
36	4	3	4	1	4	0	4	3	3	3	29	73
37	3	4	4	4	4	4	4	4	4	4	39	98
38	3	2	3	2	2	2	2	2	2	3	23	58
39	4	4	4	4	4	1	4	4	4	4	37	93
40	3	2	3	3	3	3	3	3	3	3	29	73
41	4	3	3	3	3	3	3	3	3	4	32	80
42	3	2	3	0	4	0	3	3	4	3	25	63
43	3	4	3	0	4	1	4	4	4	3	30	75
44	4	4	4	4	4	1	3	3	4	4	35	88
45	2	4	4	4	4	4	2	3	4	4	35	88
46	3	2	3	3	3	3	3	4	4	3	31	78
47	2	3	2	3	2	2	3	3	3	3	26	65
48	3	4	3	3	3	4	3	3	4	3	33	83
49	2	1	2	2	3	2	1	2	2	2	19	48
50	3	1	3	1	3	1	3	3	1	3	22	55
51	4	4	4	3	4	1	4	4	4	4	36	90
52	4	3	4	3	3	2	4	4	4	3	34	85
53	3	3	3	3	3	3	3	3	3	3	30	75
54	4	0	4	1	4	0	4	4	3	4	28	70
55	4	4	4	4	4	4	4	4	4	4	40	100
56	4	4	4	4	4	2	4	4	0	4	34	85
57	4	4	4	0	4	0	4	4	4	4	32	80
58	3	4	4	2	4	0	4	3	4	4	32	80
59	4	4	4	4	4	0	4	4	0	4	32	80
60	4	4	4	3	4	3	3	3	4	3	35	88
Average Score											77	

Based on the results of filling out the System Usability Scale (SUS) questionnaire by 60 respondents, an average score of 77 was obtained. This score is in the Grade B category, which is a percentage range of values between 74 and 80.3. This score indicates that the system or product being evaluated has a good level of usability and is satisfactory for users. In the Grade B category, the product is considered to have above average usability, with a fairly positive user experience. Users generally feel comfortable and are able to use the system easily, although there are still some small areas that may be improved to achieve a higher level of usability. This score indicates that the system is approaching excellent usability but has not yet reached the highest level of usability, which is usually at Grade A.

## V. CONCLUSION

In the research process, the developed learning medium was initially trialed to assess its feasibility before implementation. The results from this trial show a high level of feasibility. During the implementation phase, two tests were conducted: a pre-test and a post-test. The pre-test was administered to teachers before using the learning media, while the post-test was given after using the learning media. These tests aimed to evaluate the effectiveness of the learning media. The results showed that teachers' post-test scores were higher than their pre-test scores, indicating an improvement in their learning outcomes. Apart from that, teachers are also given the opportunity to find out how teachers respond to mobile learning media. Based on the results of the questionnaire, it is known that teachers respond well to mobile learning media.

The research successfully developed a mobile-based learning medium for the supervision of physical education. The implementation phase, involving pre-test and post-test assessments, demonstrated the effectiveness of the learning media, as evidenced by the significant improvement in teacher scores. This shows that the media developed not only meets user needs but also increases teachers' knowledge of physical education supervision and sports training.

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