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# DEVELOPMENT OF IA TRAINER LEARNING MEDIA BASED ON ANDROID APPLICATION TO IMPROVE GROUNDSTROKE ABILITY OF BEGINNER TENNIS PLAYERS

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Abstract: The tennis lecture process that has been carried out so far is still conventional, so it is less effective in improving the learning outcomes of beginner tennis players. Therefore, a more effective learning media is needed and can trigger an increase in the learning outcomes of beginner tennis players. This study aims to develop learning media that suits the needs of beginner tennis players in tennis lectures. For this reason, researchers developed an android application-based IA trainer learning media to improve the groundstroke ability of beginner tennis players at FIK UNM. The feasibility test of the developed media was carried out by involving expert validators in conducting media validation, learning media validation, and material validation. Based on the average results of product validation, a score of 90.4% was obtained which was categorized as very feasible. So it can be concluded that the learning media IA trainer based on android applications to improve the groundstroke ability of beginner tennis players at FIK UNM is very feasible to use. Meanwhile, based on the results of the paired sample t test, the mean value of the beginner tennis player's groundstroke pre-test data is 13.55 and the mean groundstroke post-test data is 17.67, so that the mean difference is 4.117. So from the test results it is known that the groundstroke ability of beginner tennis players has increased. The results of the effectiveness test on the paired sample t test results above show that the difference in the pre-test and post-test results of beginner tennis player groundstroke skills. Based on the results of the study, it can be concluded that the android-based IA trainer media has an effect on improving the groundstroke skills of beginner tennis players.

**Keywords:** Development, Learning Media, Groundstroke, Tennis.

# Introduction

The advancement of Science and Technology (IPTEK) has given rise to unique problems for education graduates in designing teaching materials that can improve the level of education. (Syafruddin, 2023). Many educational institutions are currently utilizing advances in science and technology to create interactive learning materials that can be accessed via computers or Android smartphones. According to (Abdulrahaman et al., 2020), (Van Den Beemt et al., 2020), And (Manca, 2020), existing research, studies, and literature support the idea that media is an effective instrument to enhance the learning process. Utilizing a variety of teaching resources in an engaging manner can help students overcome learning challenges, allowing them to acquire knowledge more easily, not limited by physical space and time constraints. The implementation of learning includes multimedia components in the form of Android applications to reduce student boredom during learning.

Makassar State University College located in Makassar City, South Sulawesi is an Educational Personnel Education Institution (LPTK) that specifically produces quality graduates in the field of sports education. The Faculty of Sports Science is one part of Makassar State University which aims to produce highly skilled graduates who are able to develop national sports that are ready to face global problems.

Tennis is a sportcompulsory lectures in the study program of Sports Coaching Education, Physical Education, Health and Recreation-Elementary School Education, as well as the program of Physical Education, Health and Recreation of the Faculty of Sport Science, Makassar State University. Students who are classified as beginner tennis players are taught the theory and practice of playing tennis to develop their skills. In teaching groundstroke techniques in tennis, it is better to use effective and innovative learning materials. These materials must allow beginner

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tennis players to learn independently, without being limited by time and location. Mastering groundstroke techniques is very important for beginner tennis players, because the technique is complicated but basic(Ngatman et al., 2022). By providing the opportunity to learn repeatedly, novice tennis players can better understand these techniques, considering the very limited duration of learning sessions on campus.

The main role of media in the learning process is as a tool that facilitates the creation of learning scenarios, thereby facilitating the teaching and learning process and helping students understand the messages conveyed. (Kustyarini et al., 2020). Likewise, in a learning process carried out at the Faculty of Sports Science, Makassar State University, it is still conventional with the use of textbooks, whiteboards and also power point slides that cannot be utilized by beginner tennis players efficiently and effectively independently.

Based on the author's observations as a lecturer in the tennis course in the Physical Education, Health, and Recreation Study Program, there are various obstacles faced in the lecture process such as, only a small number of students have experience playing tennis before starting college, the majority of students lack knowledge about the rules of the game and basic tennis strokes, most new students are seen holding tennis rackets and balls and based on measurements of students' tennis groundstroke abilities, only a small number show proficiency in these skills.

Needs analysis was also conducted in the form of distributing questionnaires via Google Form to beginner tennis players who had taken a tennis course program which received 79 responses indicating: (1). 1.3% very easy, 25.3% easy, 50.6% difficult, 22.8% very difficult to understand and practice forehand groundstrokes. (3) 0% very easy, 13.9% easy, 53.2% difficult, 32.9% very difficult to understand and practice backhand groundstrokes. (4) 0% very unnecessary, 3% unnecessary, 41.8% necessary, 54% very necessary for an IA trainer learning media based on an Android application that can be used independently without space and time limitations to improve forehand and backhand groundstroke skills.

This shows that the shortcomings or limitations of current tennis lectures lie in the need to introduce new teaching methods so that students can optimize the development of their groundstroke techniques. Researchers are motivated to produce tennis learning media based on Android applications to improve the groundstroke skills of beginner tennis players at FIK UNM. IA Trainer learning media based on Android applications is an educational product that offers the benefits of presenting factual scenarios through audio visuals accompanied by text, Slowmotion Groundstroke Movements, and evaluations practical learning in Android applications. This makes it easier for novice tennis players to understand and absorb information through visual, auditory, and textual means.

## Метнор

This research focuses on Research and Development (R&D) research. Borg & Gall (1983: 624) defines educational research and development (R&D) as a systematic procedure used to create and authenticate educational instruments. (Rasminto & Purwantini, 2024). According to Sugiyono (2013:407), Research and Development is a research approach used to create certain items and evaluate their efficacy. (Purwono et al., 2023). The purpose of this project is to create and evaluate Android-based IA coach learning materials that focus on improving the groundstroke skills of novice tennis players at the Faculty of Sport Science, Makassar State University.

## Research Procedures

The stages in this research consist of searching and collecting data (Research and Information Collecting), planning (Planning), developing the initial product form (Develop Preliminary From of Product), initial field testing (Preliminary Field Testing), revision of the initial field test results (Main Product Revision), main field testing (Main Field Testing), revision of the operational product (Operational Product Revision), operational field testing (Operational Field Testing), refinement of the final product (Final Product Revision), dissemination and implementation (Dissemination and Implementation).(Rahma, 2024).

The research design applied is the development of IA trainer learning media based on an Android application to improve the groundstroke abilities of beginner tennis players with the following steps: 1)Determining the research subjects that will be used as data sources; 2) Conducting a pre-test; 3) Testing the learning media model that has been developed; 4) Conducting a post-test; 5) Comparing the average values of the post-test and pre-test of the groundstroke ability of beginner tennis players; (6) Conducting a t-test analysis aimed at determining whether or not there is an influence of the learning media developed to improve the groundstroke ability of beginner tennis players. The sub-

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jects of this study were 60 beginner tennis players from the Faculty of Sport Science, Makassar State University. The sampling technique was carried out using purposive sampling by considering several criteria such as 1) the sample had programmed a tennis course, 2) was in good health, 3) was willing to take part in the research process, 4) was aged 18 to 21 years, 5) was present when the research was carried out. Purposive sampling is a sampling technique with certain criteria. (Campbell et al., 2020).

# Data collection technique

Data collection method for needs analysis using survey technique to beginner tennis players. Data collection technique in the form of questionnaire, instrument used is Likert Scale: (1) very inappropriate, (2) inappropriate, (3) quite appropriate, (4) appropriate, (5) very appropriate. Meanwhile, to determine the effectiveness of learning media, the Dyer Tennis Test instrument is used. Dyer tennis test revision is a test of shot accuracy skills with beginner tennis players as subjects at college level. Equipment and supplies needed in carrying out this test include: (1) wall or board with a flat or smooth surface with a height of 20 ft (6.096 m) and a width of 20 ft (6.096 m); (2) Meter to measure the target used in the test; (3) tape or chalk to mark the target (height: 20ft, width: 20ft, and distance between target height and floor: 3 ft (0.914 m)) and the distance between the ball hitting place and the target is 20 ft (6.096 m); (4) ball basket and tennis ball; (5) tennis racket, (6) stopwatch, and (7) score sheet and pencil/ballpoint to record test results.

The Dyer Tennis Test Revision procedure begins with a warm-up. Before performing the test, the research subjects began with a 15-minute dynamic warm-up followed by a 5-minute warm-up of rallying techniques with a partner. After completing the warm-up, the research subjects took turns performing the test. The research subjects began the test by placing themselves on the hitting boundary line, which was 20 ft from the target (wall/board). A spare ball was placed behind the research subjects. The test began by serving from behind the hitting boundary line (all types of serves were allowed). When the ball touched the target, the stopwatch started. If the research subjects lost the ball during the first rally, they could continue using another ball. Each time they started hitting, they were required to serve from behind the boundary line. The research subjects rallied with the target for 30 seconds.

The test was conducted twice during the lecture. The scoring of the Dyer Tennis Test Revision was carried out with the following provisions: 1) one point was counted each time the ball was hit and entered the target (above the 3 ft net line); 2) a ball that touched the target line still got a point; 3) a rally that did not start with a serve would not be counted; 4) a ball that was hit by the research subject in front of the boundary line did not get a point; 5) a ball that did not enter the target or outside the target line did not get a point(Alim & Nurfadhila, 2021).

Based on the results of the data analysis that has been done, the r value is 0.975. The reliability coefficient ranges from 0 to 1, with 0.7 as the standard threshold for adequate reliability for group comparisons and a stricter minimum threshold for individuals of 0.90.

# Data Analysis Techniques

The effectiveness test used was an experiment with a one group pre-test and post-test design. Hypothesis testing used the Paired Sample T Test which had previously undergone prerequisite testing (normality test). The data collected were analyzed using the SPSS version 29 application.

#### RESULTS

The data presented in this study is groundstroke ability.beginner tennis players obtained through pre-test and post-test data aimed at determining the increase in groundstroke ability of beginner tennis players after being given IA trainer learning media based on android applications. To test the hypothesis, a T-Test was used which first went through a data normality test.

#### Descriptive Analysis

This descriptive analysis aims to provide an overview of the results of the groundstroke abilities of novice tennis players before and after being given treatment in the form of IA trainer learning media based on an Android application.

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**Table 1.** Descriptive test results

	Mean	Median	Std. Deviation	Range	Max.	Min.	Sum
Pre-Test Groundstroke	13.55	14	2,190	10	18	8	813
Post-Test Groundstroke	17.67	18	2,176	9	22	13	1060

Based on the results of the descriptive test of the pre-test groundstroke and post-test groundstroke data, the results are as follows:following:

- a. The results of the descriptive test of the pre-test groundstroke data showed a mean value of 13.55; median of 14; standard deviation of 2.190; range of 10; lowest value of 8; highest value of 18; and sum value of 813.
- b. The results of the descriptive test of the post-test groundstroke data showed a mean value of 17.67; median of 18; standard deviation of 2.176; range value of 9; lowest value of 13; highest value of 22; and sum value of 1060.

## Normality Test

Table 2. Data normality test results

	N	Sig.	Information
Pre-Test Groundstroke	60	0.225	Normal
Post-test Groundstroke	60	0.158	Normal

The results of the normality test of the pre-test groundstroke and post-test groundstroke data show that the Sig. value for the pre-test groundstroke data is 0.225. While the results of the normality test of the post-test groundstroke data show that the Sig. value is 0.158. Because the Sig. value of each data is > 0.05, it can be concluded that the pre-test and post-test groundstroke data are normally distributed.

## Hypothesis Testing

After the prerequisite test is fulfilled, the hypothesis test can be carried out. The hypothesis test is carried out using the Paired Sample T Test which aims to determine the effect of IA trainer learning media in improving the groundstroke ability of beginner tennis players.

Table 3. Results of the paired sample t-test

	N	Mean	Mean Difference	Sig.
Pre-Test Groundstroke	60	13.55	4 117	0.001
Post-Test Groundstroke	60	17.67	— 4,117	

Based on the results of the paired sample t-test, the mean value of the pre-test groundstroke data is known.beginner tennis players of 13.55 and the mean post-test groundstroke data of 17.67 so that the mean difference is 4.117. So from the test results it is known that the groundstroke ability of beginner tennis players has increased. The results of the effectiveness test on the results of the paired sample t test above show that the difference in the pre-test and post-test results of the groundstroke ability of beginner tennis players. So it can be concluded that the android-based IA trainer media has an effect on improving the groundstroke ability of beginner tennis players.

## DISCUSSION

This research is a research on the development of learning media in tennis lectures. This tool aims to improve the groundstroke skills of beginner tennis players at FIK UNM. The development of this learning media was initiated to answer the challenges faced by beginner tennis players at the Faculty of Sports Science, Makassar State University. These players have difficulty in improving their groundstroke skills due to the lack of appropriate learning resources. The creation of IA trainer learning media based on Android applications through a systematic research and develop-

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ment process, which involves various stages. Borg and Gall define educational research and development (R&D) as a systematic procedure used to create and authenticate teaching materials(Rahardjanto & Husamah, 2022). Based on this understanding, a series of research and development procedures are carried out in a continuous cycle. In each phase, the results of the previous process are consulted and utilized consistently, which ultimately results in the creation of new educational products.

The results of the analysis show that the IA trainer learning mediabased on android application is very feasible to be used to improve the groundstroke skills of beginner tennis players FIK UNM. This product shows very good quality and is very acceptable for use. Based on the validation and feasibility tests, it is clear that this learning media was developed specifically to improve the learning process of beginner tennis players in the physical education, health, and recreation study program. Students can use this educational media as a learning aid, so that they can increase motivation, foster interest in learning, understand the material offered easily, and practice it directly easily. Facilitate the process for teachers to disseminate information with maximum effectiveness and efficiency. The use of video media has been proven to increase the motivation of beginner tennis players to take lectures or courses, as shown by research conducted by (Barut Tugtekin & Dursun, 2022), (Noetel et al., 2021), And (Galatsopoulou et al., 2022).

The results of the analysis also show that the IA trainer learning media based on the Android application has an effect on improving groundstroke skills.beginner tennis players. This can be seen from the average post-test value of groundstroke ability which is better than the pre-test value of groundstroke ability. This is because the content of the learning media developed is able to present the implementation of groundstroke techniques in audio-visual and slow-motion movements. In addition to presenting audiovisual media, this application also provides evaluation materials to measure the progress of beginner tennis players in performing groundstroke techniques.

This android-based IA trainer learning media has an important role in improving the groundstroke ability of tennis players because it can provide a better understanding of game techniques and strategies. By using media such as instructional videos or match analysis, players can see examples of proper movements, correct body positions, and how to set the timing of the strokes directly. This allows them to visualize how effective groundstroke techniques are performed by professional players or coaches. In addition, audio-visual media allows players to replay the footage repeatedly, so they can analyze mistakes or deficiencies in their own techniques, and learn how to fix them in more detail and focus. (Tuma, 2020).

Furthermore, this audio-visual media can also be used as a feedback tool for players. Coaches can record training sessions and use it to show players areas for improvement in their groundstrokes. By seeing their own performance on video, players can more clearly understand suboptimal movements and correct inappropriate posture, footwork, or racket swing. The combination of visual and audio elements in this media provides a more comprehensive learning experience, which in turn accelerates the process of improving groundstroke ability and overall tennis skills.

In addition to assisting in visualization and feedback, this learning media is also effective for strengthening the cognitive aspects of players in learning strategies and game patterns related to groundstroke. For example, players can learn how groundstroke patterns are practiced in various game situations, such as long rallies or when facing opponents with different playing styles. Game strategy videos can help players understand when the time is right to hit a forehand or backhand groundstroke with the right placement on the court. The ability to anticipate an opponent's shot and respond with an effective groundstroke is essential in tennis, and audio-visual media can make it easier for players to hone this skill more systematically. The anticipatory attitude of the opponent's strategy needs to be analyzed so that later it can be used as a lesson for an athlete (Susanto et al., 2024), (Susanto et al., 2021).

In addition, audio-visual media allows simultaneous integration of theory and practice. Players not only learn groundstroke theory through the coach's explanation, but can also see first-hand how the theory is applied on the court. They can learn technical elements such as body rotation, weight transfer, and correct racket angle through detailed, slow-moving displays. As such, it helps create a stronger link between the understanding of theory and its application on the court, ultimately encouraging players to master effective and consistent groundstroke technique more quickly. In addition, the right media can help a player quickly master techniques and strategies (Susanto et al., 2022).

When taking practical lessons, Beginner tennis players will generally feel more comfortable copying the actions demonstrated in a video rather than relying solely on the information provided in a book or illustration. (Cojean & Jamet, 2022). Being involved in these activities will facilitate the teaching and learning process for both students and teachers. Video media improves students' understanding of educational materials by providing learning videos

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that are played. In creating learning media, it is important to meet certain needs. Among them are creating basic, easy-to-understand, and interesting media in order to motivate students in learning. (Hardiansyah & others, 2022) And (Andriyani & Suniasih, 2021). Students consider digital learning materials in the form of videos to be more interesting than conventional media. (Harrison, 2020), (Lange & Costley, 2020), And (Queiroz et al., 2022). This media uses effective visuals to communicate the subject matter, which aims to increase student engagement and focus during the learning process. The implication of this study is that the resulting media can be further expanded until its effectiveness can be accurately assessed through data analysis, thus facilitating students' understanding of the teaching material. This will have a positive impact on improving student learning outcomes.

# **CONCLUSION**

After going through a validation process of 5 (five) expert validators, consisting of media validation, learning media validation, material validation, tennis course lecturers, and FIK UNM beginner tennis players showed that the IA trainer learning media based on the android application to improve the groundstroke ability of FIK UNM beginner tennis players is very feasible to be used in the lecture process. Meanwhile, based on the results of the hypothesis test, it is known that the IA trainer learning media based on the android application has an effect on improving the groundstroke ability of beginner tennis players. Based on the results of the paired sample t test, the mean value of the pre-test groundstroke data for beginner tennis players is 13.55 and the mean value of the post-test groundstroke data is 17.67, so the mean difference is 4.117. So from the results of the test, it is known that the groundstroke ability of beginner tennis players has increased. The results of the effectiveness test on the results of the paired sample t test above show that the difference in the pre-test and post-test results of the groundstroke ability of beginner tennis players.

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