

The Development of Volleyball Teaching Media based on Android Applications for Students of Physical Education, Health and Recreation Department in State University of Medan

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ABSTRACT

The purpose of this study is to develop teaching media, assist and facilitate the learning process of volleyball refereeing material by implementing this android-based volleyball refereeing teaching media, for students majoring in Physical Education, Health, And Recreation Department (PJKR), State University of Medan (Unimed). In this study using the R & D Model according to (Borg and Gall). This research method is development, data collection techniques with research instrument questionnaire sheets, data analysis techniques with percentages. The population of the study were students majoring in PJKR Unimed Batch 2022. The product was designed and then validated by 4 experts. Material experts, media experts, linguists and learning experts. Initial field trials totaled 10 students, main field trials numbered 70 students for small trials and large trials. This teaching media has been previously validated by 1 material expert 1 volleyball expert who has a background in sports education. The validation results of the expert questionnaire assessment are declared valid and can be used with the total percentage is 85% and 72% material expert, the percentage is 72.5%, 70% and 80% media expert, the percentage is 72% and 72% linguist and the percentage is 86.67% and 76.36% learning expert. The results of the student subject questionnaire assessment sheets with percentages of 93.33% and 95.55% (very valid or very feasible) by stating the level of understanding, use, clarity, attractiveness, usability, design are good so that the category is declared feasible or valid. Through the research stage and validation assessment by experts, the product is suitable and suitable for use by students, so it can be concluded that the Android-based volleyball refereeing teaching media for students majoring in PJKR Unimed is valid or appropriate and can be used for the learning process of volleyball refereeing material.

KEYWORDS

teaching media; volleyball; volleyball refereeing; students

INTRODUCTION

The progress of sports science and technology has had a positive impact on various sports fields such as training, refereeing and competitions (Adiska, 2016). With the support of science and technology, it will help and improve the quality of all components involved in a match or competition. The technology that is now widely used is the smartphone. Smartphones now have several multifunctional advantages that can help human work and

facilitate desired activities in one hand (Putro et al., 2018). According to (Gustian, 2017). Smartphones are the development of cellular phones which are then added features and other facilities so that they become smart phones and are called smartphones. Meanwhile (Ginting, 2019). Between cell phones and smartphones indicates that there is a development of science and technology. The development of science and technology changed various sectors of world life that were present to facilitate human work in carrying out their daily tasks.

Seeing directly for PJKR Unimed students with reference to the existing curriculum for learning volleyball in lectures includes six materials, the first is overpassing, underpassing, serve, smash, block and lastly refereeing material, of which these six materials summarized into sixteen meetings. Especially here, one of them is for volleyball refereeing material, which if counted only about two or three meetings for refereeing material, where with about two or three meetings this has the impact that students don't really know and understand about the refereeing material in volleyball. due to lack of time in the given meeting.

When looking at the learning process for volleyball refereeing material, students still use books which we know that if you only use books you can only see them visually and certainly not very effective and efficient in learning and understanding them because not all students will learn the material arbitration (Kasih et al., 2020). Volleyball with books wherever they are. If you only use books, the impact is that students do not understand and understand better about the Volleyball refereeing material, especially with a relatively short time in the learning process (Kasih, 2022). And also the impact if only using books students feel bored when studying volleyball refereeing materials. In fact, the real purpose of learning volleyball refereeing material is that when students enter the field, they will be able to lead a simple match that will be held around them. The aim is not only to jump into the field, but the simplest goal is to be able to lead a volleyball match that occurs among classmates during volleyball lessons (Nurhayati, 2019).

With the above problems, a solution is offered to overcome them by developing an android-based volleyball teaching media, where the purpose of this android is to help students learn volleyball refereeing materials. Where in the past the teaching materials for refereeing volleyball were only in the form of books, but now there will be updates or developments in the form of teaching materials for volleyball refereeing based on android.

Where is the offer of developing Android-based teaching media where previously in Volleyball courses the refereeing material still used books manually. The aim of the Volleyball subject in refereeing material to be achieved is one of them is to pass the course and after graduation it is hoped that students can lead simple matches in their surroundings (can become referees). Therefore, in order to achieve this goal, an Android-based teaching media is developed which contains refereeing materials and rules regarding volleyball.

Based on the problems and concepts described above, it is the reason and background for researchers to conduct research and development in order to increase the knowledge of PJKR Unimed students and make it easier for students to learn refereeing material in volleyball. The development of volleyball teaching media is through an Android-based application, the reason researchers use Android-based is because now almost everyone has an Android-based smartphone. So, students can download the application via their smartphone and can use it anywhere and anytime.

Based on this background, it underlies the researchers to conduct research with the title "Development of Android-Based Volleyball Teaching Media for Students of the PJKR Department in Unimed".

RESEARCH METHODS

This type of research is development (research and development). Research Development to develop aspects of science. In research on the development of android-based volleyball refereeing teaching media. Borg & Gall proposed a series of steps that must be taken in this approach including 10 general steps, in this study the authors carried out 9 research steps. The steps of this research are as follows according to Borg and Gall (2007):

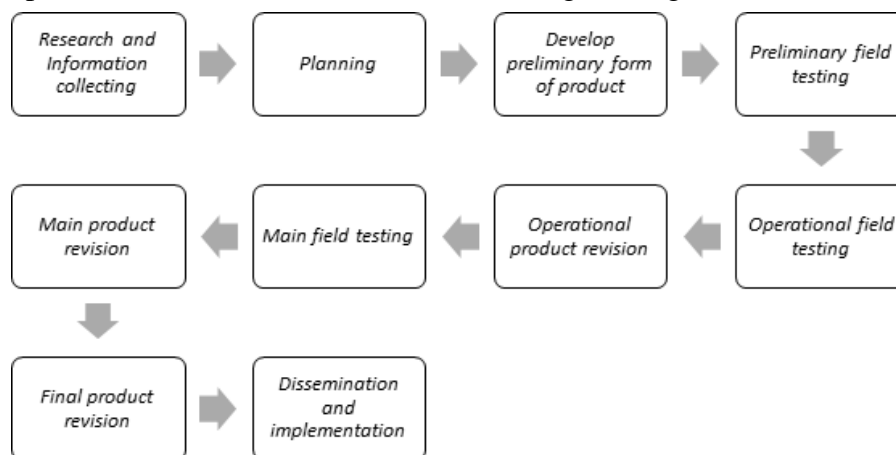


Figure 1. The research steps according to Borg and Gall

RESULTS AND DISCUSSION

Research and Information Collecting. This stage is the stage of searching and collecting data. According to Borg & Gall (2002), at this stage are collecting data or information, literature studies and field studies related to the problem being studied as well as preparation for formulating a research framework. In this study, researchers carried out the data or information collection stage to determine learning needs. The steps taken at this stage are literature and field studies. Literature study

1. A literature study is carried out with the aim of obtaining various important information related to the material or characteristics to be developed, such as theories related to the source and learning of volleyball refereeing materials previously used by students.
2. Field Study Field studies were carried out with the aim of seeking information about the development needs of volleyball refereeing material learning. This field study is also intended to look for the same media products that have been developed in order to see the appearance and contents.

The analysis of the needs of searching and collecting data is a basis for research on a problem where researchers make observations in this study and look for references to obtain data, so researchers conduct research or surveys through referrals by looking at the volleyball refereeing learning process that was carried out previously. The researcher also found that there were already those who made teaching media based on Android but the content was not about volleyball refereeing material, so the researcher could conclude that there was no Android-based design which resembled the design that the researcher wanted to develop. So that this idea will emerge a new work that can increase knowledge and facilitate the learning process for the intended subject.

Regarding this matter, there is an important note related to the survey conducted by the researcher, which did not find the characteristics of Android-based teaching media regarding volleyball refereeing material that is the same as the researcher's idea.

Furthermore, the researcher conducts research or surveys through references to journals accessed from the internet, referring to what the researcher has done related to reading journals with keywords that become reference reinforcements in following up on procedures of thinking "development of volleyball teaching media" from the search results that researchers do, the researchers obtained some information from the journal as follows:

Table 1. The Researchers and Information

No	Name	Title	Media
1	Netto Rizki Aprilianto (2021)	Development of "Smart Volly" Android-Based Learning Media for Volleyball Learning for Class VII Students of Ulujami 1 Public Middle School	Android
2	Gian Dwi Oktiana (2015)	Development of Android-Based Learning Media in the Form of Digital Pocket Books for Basic Competency Accounting Subjects Making an Overview of Service Company Accounting Cycles in Class XI MAN 1 Yogyakarta Academic Year 2014/2015	Android
3	Tri Gustoro Adi (2019)	Development of Android-Based Volleyball Learning Media in Physical Education at Semarang City State Vocational High Schools	Android

Based on the data above, by combining the sources between observations of physical education facilities and reviews from the internet, the researcher can conclude that there is no design that the researcher wants to develop, so that this idea will create a new work that can increase knowledge and facilitate the learning process for the intended subject.

1. Planning, at this stage, the writer formulates skills and expertise related to the problem, determines the goals to be achieved at each stage, and if possible/necessary carries out a limited feasibility study.
2. Develop a preliminary form of product, at this stage, the authors develop an initial form of the product to be produced, prepare supporting components, prepare guidelines and manuals.
3. Preliminary Field Testing, at this stage the author does a product trial without any samples and then takes it to an expert. The expert will test the feasibility of the Android-based volleyball refereeing teaching media product whether it can be tested or not.
4. After validating with the validator without research subjects, the authors validated the instrument with experts
5. Operational Field Testing, at this stage, the authors conducted initial field trials on a limited scale. by involving as many as 10 subjects. The following are the results of group trials on 10 subjects: The first testing phase in this development model is conducting initial field trials in a limited scope involving subjects or try out as many as 10 students. It requires a complex understanding in the abstract in understanding each stage of development research and requires intelligent analogy to be able to compile the contents of a research report so that readers can read and understand it. The steps taken by the researcher basically required the results for data collection and analysis to be carried out by means of interviews, documentation of the provision of research questionnaire instruments Through the results of initial field trials after the product validation evaluation stage designed by researchers. This trial was carried out with a total of 10 students by obtaining results for the first aspect of 81% and for the second aspect a value of 78.86% was obtained. The initial student trial justified the

operation and use of teaching media to facilitate the learning process and facilitate students in learning material regarding refereeing material volleyball.

6. Operational Product Revision, at this stage the author performs expert validation on material experts, media experts, linguists and learning experts. Following are the results of validation and expert revision as follows:

- 1) Material Expert

The researcher provides a product design concept in the form of materials, images and forms of using volleyball refereeing teaching media which are developed regarding mechanisms and benefits as volleyball refereeing learning media. Based on the results of the discussion and the expert's initial assessment of the product, there are two aspects that are assessed, namely the aspect of the content indicator and the depth of the material, for the aspect of the content indicator, the score is 34 out of 40 questions and the average value obtained is 85% which is at an interval of 80% - 100% in valid categories.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{34}{40} \times 100\%$$

$$\text{Score} = 85\% \text{ (valid or feasible)}$$

Furthermore, for the depth aspect of the material, a value of 18 out of 25 questions was obtained and the average value obtained was 72% which was in the 60% - 79% interval in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{18}{25} \times 100\%$$

Score = 72% (valid enough or decent enough) and which will be explained through the diagram:

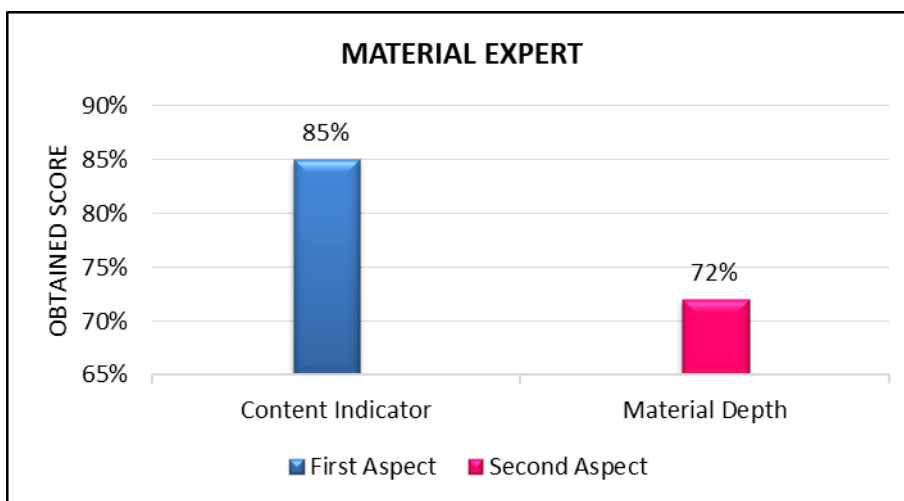


Figure 2. Initial Field Test Revision Result Diagram

- 2) Media Expert

The researcher provides product design concepts in the form of material, images and forms of using volleyball refereeing teaching media which will be developed regarding materials that have been made into teaching media. Based on the results of the expert's initial discussion and assessment of the product,

there are three aspects that are assessed, namely aspects of the application page display, application installation and application use, for the application page display aspect, a score of 29 out of 40 questions is obtained and an average value is obtained of 72.5 % which is in the 60% -79% interval in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{29}{40} \times 100\%$$

Score = 72.5% (valid enough or decent enough)

For the aspect of application installation, a score of 14 out of 20 questions was obtained and an average value obtained was 70% which was at an interval of 60% -79% in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{14}{20} \times 100\%$$

Score = 70% (valid enough or decent enough)

For the aspect of using the application, a score of 20 is obtained out of 25 questions and an average value obtained is 80% which is at an interval of 80% - 100% in the valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{20}{25} \times 100\%$$

Score = 80% (valid or appropriate) and which will be explained through the diagram:

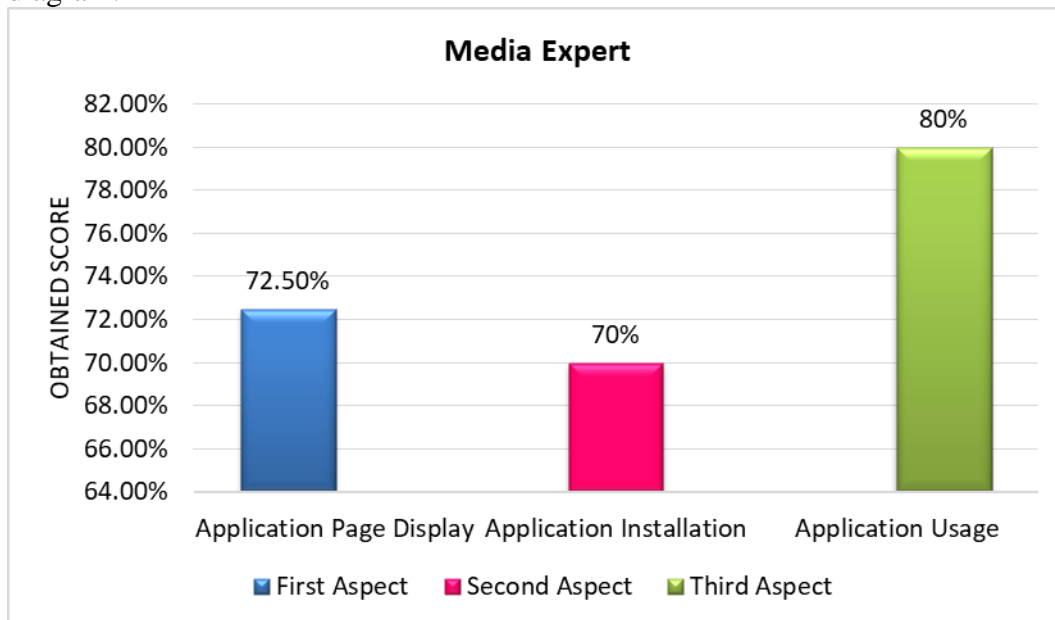


Figure 3. Initial Field Test Revision Result Diagram

3) Grammar Expert

The products that have been made are then shown to grammar experts to discuss the product in order to provide suggestions and input as well as obtain an evaluation of the product of Android-based volleyball refereeing teaching media whether it is feasible or not. Based on the results of the expert's initial discussion

and assessment of the product, there were two aspects that were assessed, namely the aspect of using language effectively and efficiently and conformity with Indonesian language rules EYD, for the aspect of using language effectively, a score of 18 was obtained from 5 questions and an average score obtained is 72% which is in the interval 60% -79% in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{18}{25} \times 100\%$$

Score = 72% (valid or appropriate)

For the aspect of conformity with the rules of the Indonesian language, a score of 18 out of 5 questions was obtained and the average value obtained was 72% which was in the 60% -79% interval in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{18}{25} \times 100\%$$

Score = 72% (valid or appropriate) and which will be explained through the diagram:

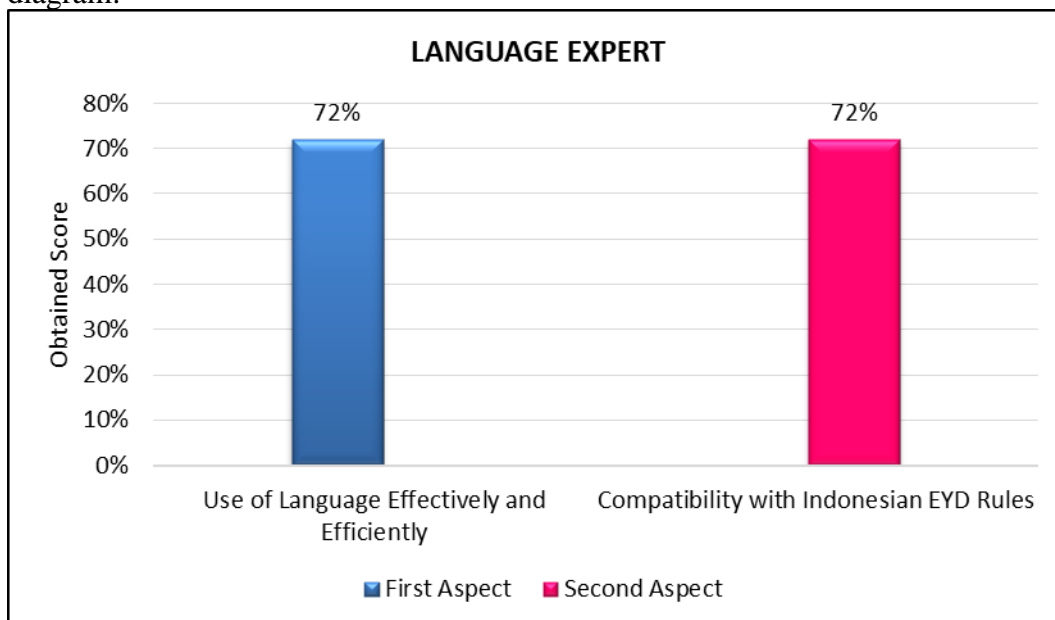


Figure 4. Initial Field Test Revision Result Diagram

4) Learning Expert

The products that have been made are then shown to learning experts to discuss the product in order to provide suggestions and input and obtain an assessment of the Android-based volleyball refereeing teaching media product whether it is feasible or not. Based on the results of the discussion and the initial expert assessment of the product, there are two aspects that are assessed, namely the suitability of ICK and objectives with KD and the presentation of learning. For the aspect of conformity of ICK and goals with KD, a score of 26 was obtained out of 6 questions, the average value obtained was 86.67% which was at intervals of 80% -100% in the valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{26}{30} \times 100\%$$

Score = 86.67 % (Valid or Eligible)

For the presentation aspect of learning, a score of 42 was obtained from 11 questions, the average value obtained was 76.36% which was at an interval of 60% -79% in the quite valid category.

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{42}{55} \times 100\%$$

Score = 76.36 % (Valid or Eligible) and which will be explained through the diagram:

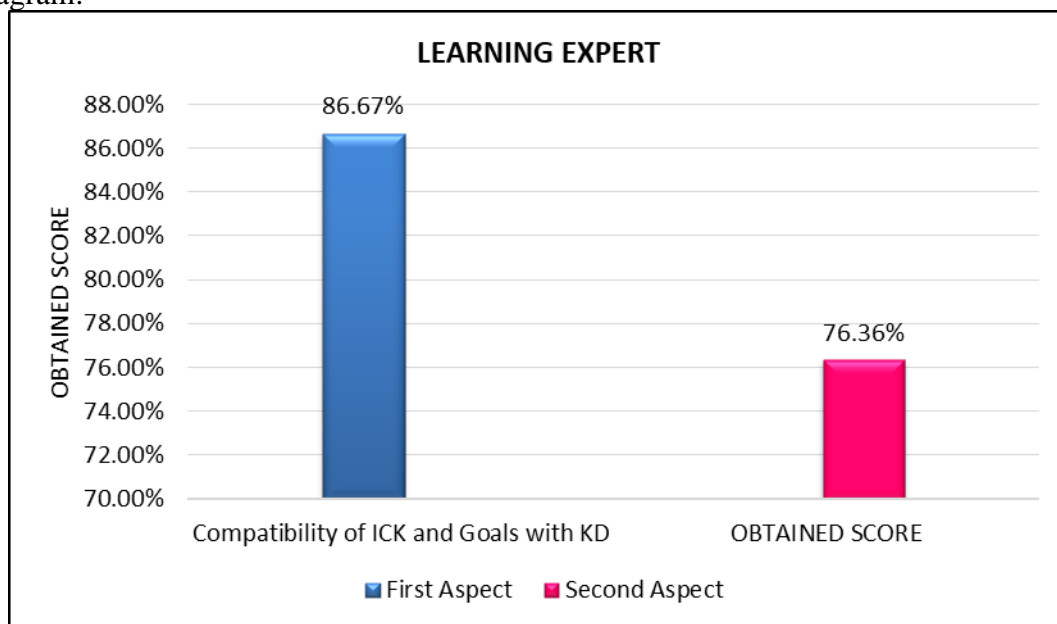


Figure 5. Initial Field Test Revision Result Diagram

From the results of the revision of the experts above, that the three experts provided input and the writer had to improve it before being tested on a large group.

7. Main Field Testing, in the main trial involving athletes as many as 20 subjects for small group trials and 50 subjects for large group trials. The following are the results of large group trials:

small group product trials with aspects of the two materials in the application with 7 questions:

$$\text{Score} = \frac{\text{Total Score Obtained}}{\text{Total Ideal Score of All Items}} \times 100\%$$

$$\text{Score} = \frac{562}{700} \times 100\%$$

Score = 80.29 % (valid or proper)

After the researchers finished conducting small group trials, the researchers concluded that in the section on the suitability of the presentation of the material, it was found that a score of 83.17% was obtained and for the material aspects in the application, a score of 80.29% was obtained which was at intervals of 71% -85%. in the valid category or feasible category, so that through small group trials it can be stated that the android-based volleyball teaching media product for PJKR Unimed students is suitable for use as a medium for learning volleyball refereeing courses.

In the large group trial, the score for the first aspect was 95.2% and the second aspect was 92.57% which was at intervals of 86% - 100%, very valid or very feasible,

meaning that this research was sufficient to be known as valid. or its feasibility from the results of student respondents regarding android-based volleyball refereeing teaching media products for PJKR Unimed students. Explained through the diagram below.

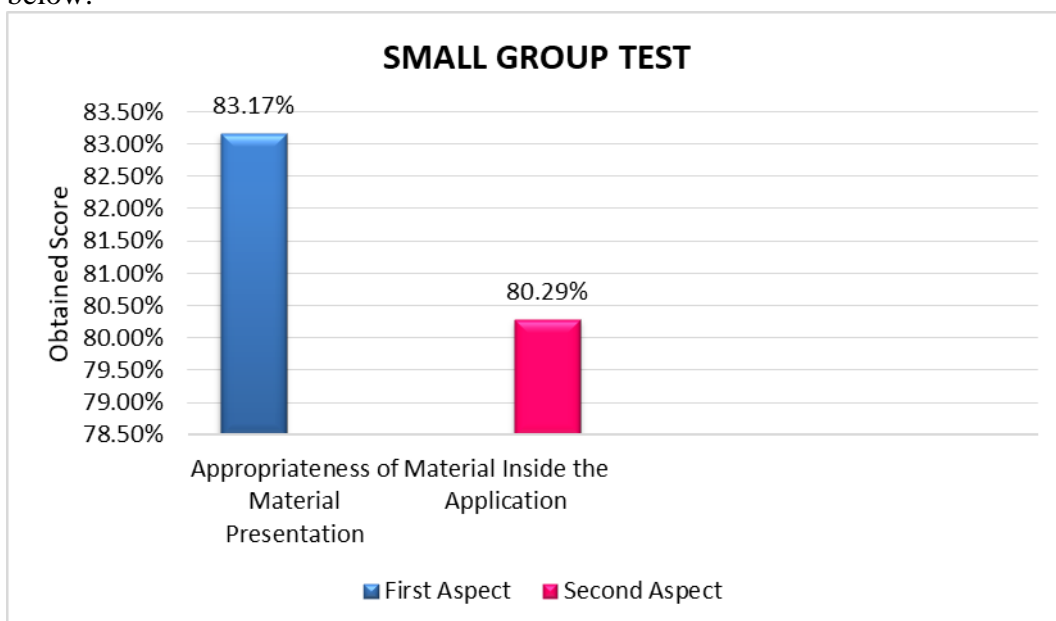


Figure 6. Small Group Test

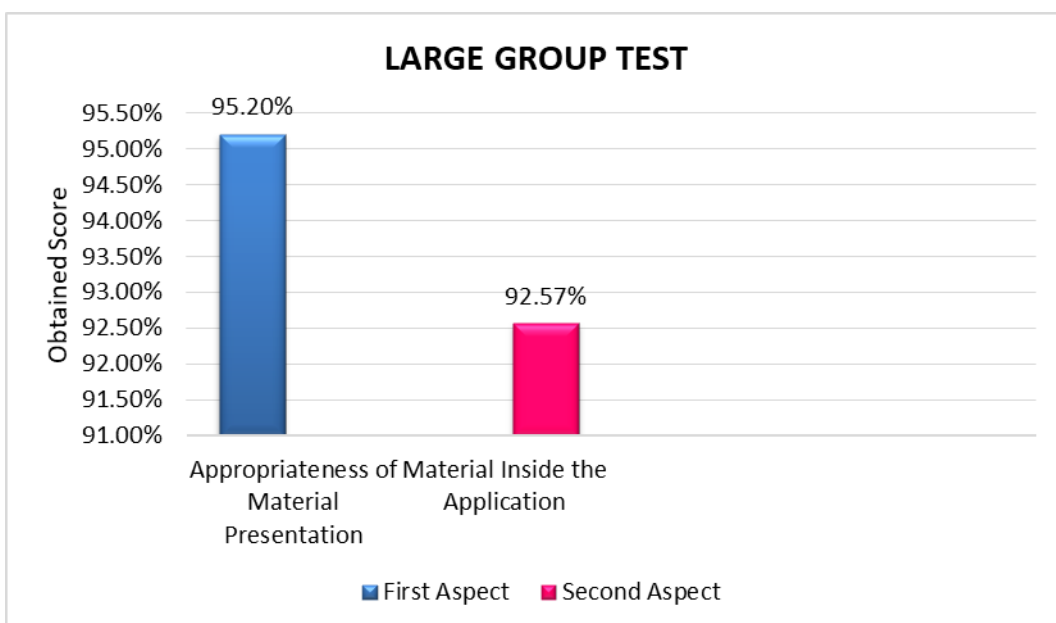


Figure 7. Large Group Test

Discussion

Based on the findings of data analysis on the background of the problems that have been described, the researcher contributes ideas to the problems that exist in students majoring in PJKR Unimed, namely lack of time in studying volleyball refereeing material, bored in studying volleyball refereeing material because they only use books even though the book is in e-shape-book, and also the lack of time to understand volleyball refereeing material during the volleyball refereeing learning process, therefore the researcher created a product

design design for developing android-based volleyball teaching media for students majoring in PJKR Unimed which was then discussed with lecturers and experts in the teaching media.

The 9-step Research & Development (R&D) method proposed by Borg & Gall (1989: 783) was used in this study. The step after discussing with product manufacturing experts is that the product manufacturing process takes approximately 1 month with the concept to be developed, namely product form, design, mechanism and how to use the product. As explained by Riantoso et al. (2016: 4) suggests that developing learning products or media can be done by adding a lot, modifying the size, modifying the height and low, modifying the size and can modify the shape.

This research was conducted on students majoring in PJKR Unimed class of 2022, from previous research conducted by Aprilianto (2021) with the title "Development of Android-Based Learning Media "Smart Volly" for Volleyball Learning for Class VII Students of SMP Negeri 1 Ulujami". This research is aimed at developing learning media based on Android, namely "Smart Volly" which aims to assist teachers in implementing volleyball material learning. This research includes the type of development research or Research and Development. It is carried out in stages: looking for potential problems, collecting data, designing products, validating designs, improving designs, testing products, and testing usage. The validation process was carried out to media experts, material experts, 2 teacher responses, tested on 15 small-scale students, and 32 large-scale students. The research subjects were class VII A students of SMP Negeri 1 Ulujami. Data collection technique is done by using a questionnaire. Technical analysis of data with descriptive qualitative and quantitative descriptive percentages. The results of the study were obtained based on the results of validation a) media experts, the display aspect was 78% or very feasible, the programming aspect was 82% or very feasible; b) material experts, aspects of the quality of learning materials 93% or very feasible, content aspects 94% or very feasible; c) the teacher's response is 94% or very appropriate; and d) student response is 86.9% or very feasible. Thus, it can be concluded that the android application "Smart Volly" is declared very feasible to be used as a medium for learning volleyball material for class VII junior high school students.

The selection of design forms and the manufacture of products in the form of a draft for the development of Android-based volleyball teaching media is a product of this stage, the necessary framework and requirements have been fully designed. On this occasion, researchers also discussed with experts about conducting product validation, the results of product validation are the basis for deciding whether or not the product can be used. In this validation, there were 4 (three) experts in this study, namely, material experts, media experts, grammar experts and learning experts.

In conducting product validation to experts, this states that the product is feasible for testing. Researchers conducted trials and the results of small group trials of material experts reached 85% and 72% with valid and quite valid categories, small group trials of media experts 72.5%, 70% and 80% categories quite valid and valid, small group trials grammar experts reached 72% and 72% with quite valid categories, small group trials of learning experts reached 86.67% and 76.36% with quite valid categories. Furthermore, where the value obtained is known that the scores of small group trials to students with 20 samples were obtained at 83.17% and 80.29% (valid or feasible) it can be said that the android-based volleyball refereeing teaching media product is feasible for use by students majoring in PJKR Unimed as learning media.

The next stage was a discussion with material, media, grammar and learning experts. In this stage the researcher provides documentation and also the product that is being

developed, then a decision is made to adjust the suggestions and improvements that have been given so that the researcher conducts a large group trial.

In large group trials where material experts reached 92.5% and 92% with categories (very valid or very feasible), large group trials of media experts reached 90%, 90%, 92% with categories (very valid or very feasible) , trials of large groups of grammar experts reached 80% and 96% with the category (valid and very valid/decent and very feasible) and learning experts reached 93.33% and 94.55% with the next (very valid or feasible) category where The value obtained is known that the large group trial with 50 student samples obtained scores of 95.2% and 92.57% (very valid or very feasible). This means that the Android-based volleyball refereeing teaching media product for students majoring in PJKR FIK Unimed meets the criteria or is suitable for use.

CONCLUSION

Based on the results of small group trials, revised revisions, wider group trials, revised improvements, it can be concluded: the android-based volleyball refereeing teaching media for students majoring in PJKR Unimed that has been developed can be used during the learning process.

1. Teaching media has been created for the process of learning refereeing material in volleyball for students.
2. This teaching media (product developed) provides convenience and benefits and is appropriate for students when learning volleyball courses on volleyball refereeing material.
3. Development of volleyball teaching media based on Android technology in the form of applications that can help, increase understanding and provide motivation to increase student knowledge regarding technological developments in developing learning facilities, especially volleyball refereeing material courses.

REFERENCES

- Adiska Rani Ditya Candra, Rumini, (2016). Pembinaan Prestasi di Pusat Pendidikan dan Latihan Olahraga Pelajar (PPLP) Provinsi Jawa Tengah. *Journal of Physical Education, Sport, Health and Recreations.*(1): 49-51.
- Aprilianto, N. R., Zhannisa, U. H., & Ardiyanto, A. (2021). Pengembangan media pembelajaran berbasis android “Smart Volly” untuk pembelajaran bola voli siswa kelas VII SMP Negeri 1 Ulujami. *Journal of Physical Activity and Sports (JPAS)*, 2(2)
- Borg, Meredith D. Gall Joyce P. Gall Walter R. (2002). *Educational Research An Introduction*. 7th ed. AS: Allyn and Bacon.
- Borg, R.W. & Gall, MD. (2007). *Educational Research: An Intoduction Fifth Edition*. New York: Longman.
- Ginting, Meilinia Diakonia. (2019). Penggunaan Telepon Genggam Pada Masyarakat Perbatasan (Survei Pada Kecamatan Tanjung Beringin, Kabupaten Serdang Bedagai, Provinsi Sumatera Utara). *Jurnal PIKOM (Penelitian Komunikasi dan Pembangunan)* 20(1): 58.
- Gustian, D. (2017). Pengaruh Pertumbuhan Perusahaan, Keputusan Investasi, dan Keputusan Pendanaan terhadap Nilai Perusahaan pada Perusahaan Manufaktur yang terdaftar di Bursa Efek Indonesia 2010-2014. Fakultas Ekonomi Universitas Negeri Padang
- Kasih, Indra, Albadi Sinulingga, Ferdinan Lumbaraja. (2022). “Journal Sport Area Development of Test Forms of down Passing Techniques in Sensor-Based Volleyball Games.” 7(2): 300–309

- Kasih, Indra, Bangun Setia Hasibuan, and Galih Priyambada. (2020). Development of Polarization of Data Processing Talent Scouting Test of Android-Based Volleyball Sports". *Turkish Journal of Physiotherapy and Rehabilitation* 32(3): 2300–2303. www.turkjphysiotherrehabil.org.
- Nurhayati, Maya. (2019). Implementasi Model Pembelajaran Tactical Game Terhadap Hasil Belajar Teknik Dasar Passing Bawah Permainan Bola Voli." *Jurnal Educatio FKIP UNMA* 53(9): 1689–99.
- Putro, A. A., Suherman, A., & Sultoni, K. (2018). Aplikasi Program Kebugaran Daya Tahan Kardiovakular Berbasis Android. *Jurnal Terapan Ilmu Keolahragaan*, 3(1), 1-11
- Riantoso, S., Simanjuntak, V. G., & Yunitaningrum, W. (2016). Modifikasi Media Pembelajaran Pendidikan Jasmani di SMP Menyuke Kabupaten Landak. *Jurnal Pendidikan dan Pembelajaran*, 5(4).