

The Development of Physical Sports and Health Education Learning Media Based on Android Applications

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Abstract—Information and communication technology (ICT) is a necessity in the effort to achieve better educational outcomes. The purpose of this research was to develop Physical Sports and Health Education Learning Media with Android Application-Based, which involved students, teachers and academic experts in the ICT field, media and Physical Sports and Health Education learning. Focus Group Discussion (FGD) was used to develop the Media of Physical Sports and Health Education. The results showed that: 1) the learning material was concluded interesting (89%); 2) the content was considered arranged clearly (93%) was arranged very clearly. Thus, it can be concluded that Physical Sports and Health Education Learning Media Based on Android Applications was very helpful for students and educators in understanding and delivering learning materials for Physical Sports and Health Education

Keywords—development; media; physical education; health.

I. INTRODUCTION

Through the development of modern learning system nowadays, students do not only play the role of receiving messages, but also playing the role as communicators or message sender. In such situations and conditions, there will be what is called two-way communication and even multi-way communication. In learning communication, instructional media is needed to improve the effectiveness of learning objectives. The use of tools, facilities and infrastructure that have not been evenly distributed at the level of education starting from elementary school until senior high school starting from rural to urban areas, there are huge differences in the tools, facilities and infrastructure that are used as learning media. Inequality in the use of tools, facilities and infrastructure are the problems in achieving the learning process. It means that the learning process would occur when there is communication between the recipient of the message with the message sender/distributor of the supported by maximum learning media.

Today's world of education is entering the era of the media world, where the process of learning activities is required to reduce conventional methods and to be more inclined to use some media that are more interesting and motivate children in

learning. The current learning process emphasizes on process skills and active learning. Thus, the role of learning media is very important. There are several emphases of the context and function of learning media, namely; 1) media as a tool for a more effective learning process, 2) advance the teaching and learning process, 3) improve the quality of the teaching and learning process, 4) concretize something abstract to reduce the occurrence of erroneous interpretation of verbalism.

The development of learning models becomes a necessity in the millennial, digitalized era. It can build the students' interest and motivate them in teaching and learning process. The development of Physical Sports and Health Education (or Pendidikan Olahraga dan Kesehatan JAsmani, hereon refered as PJOK for short) learning models by using android applications found on smartphones characterize the needs of these millennial students that can be taken anywhere in any activities, will greatly assist and facilitate students in understanding the lessons in accordance with the curriculum applied. Specifically, it can be mentioned that the purpose of this study is the development of PJOK learning models based on android application. Research on the development of PJOK learning models becomes very important because; 1) it helps teachers in giving messages in the teaching and learning process, 2) it helps students in receiving messages in the teaching and learning process, 3) it helps teachers to make different learning media from year to year, 4) it helps teachers to find interesting learning materials and obtaining media easily. Thus, the development and implementation of the PJOK learning models based on the Android application at senior high school will significantly help in improving the quality of education in their respective schools for the progress of Sports and Health Physical Education.

II. DEVELOPMENT OF ANDROID BASED APPLICATIONS

A. *The results of the development of learning media material are as follows:*

- Learning PJOK Class X (Volleyball Game) Lower Passing: 1) Preparation before doing the basic passing under passing; stand with both feet shoulder width

apart and knees lowered so that body weight rests on both ends of the foot in front, close and straighten arms in front of the body so that the thumbs are aligned, and c. a glance at the approaching ball. 2) Basic motion of under passing; push both arms toward the ball coming with both knees and hips up and heels lifted off the floor, the direction the ball is coming right in the middle of the body, and the touch point of the ball that is right at the wrist. 3) End of basic passing under motion; heel lifted off the floor, hips and knees up and arms both straight and the view follows the direction of the ball.)

- Learning PJOK Class X (Volleyball Game) Upper Passing: 1) Preparation before doing the basic movement of passing over; stand with your feet shoulder width apart, knees lowered so that your weight rests on the front end of your foot, position your arms in front of your body with your palms and fingers stretched so that they form like a bowl in front of your face (face), and support to ball direction. 2) Basic motion of upper passing; push both arms towards the direction of the ball coming together with both knees and hips up and heels raised, the direction of the ball coming right in the middle of the face, and c. the touch point of a good ball is right about the fingers. 3) End of basic passing motion over; heels lifted off the floor, hips and knees up and arms straight, and gaze toward the ball.)
- Learning PJOK Class X (Volleyball Game) Upper Service Motion: 1) Preparation before doing the basic service movements above; stand up straight, look towards the ball (front), both legs stride (left foot in front, right behind) and left hand holding the ball in front of the body. 2) upper service motion; wave the ball up slightly back ± 1 meter using the left hand, the body is slightly bouncy backward and body weight on the back foot, swing the right hand together with body movements forward and the ball is hit using the right hand which is assisted by activating / whipping the wrist. 3) End of top service motion; weight is carried forward with the back foot (right) forward, and b. The view follows the direction of the ball's movements.)
- Learning PJOK Class X (Volleyball Game) Smash: 1) preparation before doing basic smash movements; stand with a stance facing the net, weight on the front legs, and a forward-looking view (net). 2) Smash motion; wave the ball up slightly back ± 1 meter using your left hand. 3) Prefix motion; step at least two steps and the last step wide, repulsive motion, refuse with both legs up and followed by swinging both arms forward, stroke, hitting the ball with the palm of the hand on the top of the ball with the wrist activated, landing motion, landing with both ends of your feet, together with your knees flat. 3) The end of the smash motion; the knees are lowered and followed by bending, the body weight is carried forward and the foresight is upward, and the arms are in front of the body side and relaxed.)
- Learning PJOK Class X (Volleyball Game) Combination of Motion Skills for Volleyball Game: 1) Combination 1: learning variation and combination of basic passing movements with consistent and precise in various situations. 2) Combination 2: learning variations and combinations of basic movements of the service on volleyball with consistent and appropriate in various situations. Combination 3: play volleyball with modified rules.)
- Learning PJOK Class X (Basketball Game) Throwing the Chest-Height Ball: 1) Preparation to do a chest-level ball (chest pass); standing with a stance, the ball is held with both hands in front of the chest, and the body is leaning forward. 2) Throwing the ball at chest level, push the ball forward by straightening both arms while the back foot is moved forward and weight is carried forward, and release the ball from both arms after the arms are straight. 3) End of chest-tossing motion; weight is carried forward, arms are relaxed forwards, and the view follows the direction of the ball.)
- Learning PJOK Class X (Basketball Game) Throwing the Ball From Over Head (Over Head Pass): 1) Preparation of throwing the ball from overhead (over head pass); standing in a stance toward the toss, the ball is held with both hands above the head, and the body is leaning forward. 2) Throwing the ball from the head (over head pass); swing the ball forward by straightening both arms while the back foot is moved forward and weight is carried forward, releasing the ball from both hands after both arms are straight, and the direction of the ball is straight and flat towards the chest of the ball receiver. 3) End of throwing the ball from overhead (over head pass); weight is carried forward, arms are relaxed forwards, and the view follows the direction of the ball.)
- Learning PJOK Class X (Basketball Game) Catching the Ball: 1) Preparation to bend the basic motion of catching the ball; standing with the feet stepping facing the direction of the ball coming, both arms extended forward toward the direction of the ball coming with the palm of the hand facing the direction of the ball coming, and c. weight rests on the front legs. 2) Basic motion of catching the ball (after the ball touches the palm of the hand, pull the front foot back, elbow bent until the ball is pulled close to the chest / body. 3) End of basic motion of catching the ball; body leaning slightly forward, body weight rests on the back legs, the position of the ball is held in front of the body, and the view follows the direction of ball motion.)
- Learning PJOK Class X (Basketball Game) Dribbling.

High dribbling. The point is to get close to the opponent's basketball as quickly as possible.

1. Low Dribbling is used to infiltrate, disrupt opponents' defenses and outwit opponents.
 2. Basic dribbling motion; begins with the preparation of standing with a stance, the body leaning slightly forward, weight resting on the front legs, with the movement of pushing the ball using the palm of the hand to the floor with the source of movement from the elbow assisted by the wrist activated, the height of the bouncing ball is limited or below the waist, eye sight when dribbling is free towards the front, and the end of the movement of both hands relax and the body is reestablished. You are free standing while holding the ball, exercises are done in pairs or in groups, as long as the movement is not allowed to intersect with friends, to instill the values of cooperation, courage, sportsmanship, and competitive).
 3. Quickly drive the basketball through obstacles (zig - zag) in the form of a chain run; lined up with reward formations, and this exercise is done in groups (in relay /run chain), to instill the values of cooperation, courage, sportsmanship, and competitive).
 4. Race fast taking basketball and herding through obstacles (zig-zag), in the form of a chain run; standing face to face with a distance of ± 10 m, and this exercise is done in groups, to instill the values of cooperation, courage, sportsmanship, and competitive).
- PJOK Class X Learning (Basketball Game) Basic Shooting Skills: 1) Shooting the ball with two hands; begins with preparation to stand upright facing the direction of movement in a stance, legs straight forward, knees slightly lowered, the ball is held in the lower side with both palms and fingers open, gaze toward the target shot, with the movement of pushing the ball towards front up to the arms straight, along with the hips, knees, and heels rising, release the ball from the hand grip when the arms are straight and the release of the ball is assisted by activating the wrists and fingers, the correct shape of the direction of the ball is to resemble a curved top dish, and the end of the movement of the two arms straight forward relax and the direction of view follows the direction of the motion of the ball.) 2) Shooting (shooting) with one hand; begins with preparations to stand upright facing the direction of movement in a stance, legs straight forward, knees slightly lowered, the ball is held on the bottom side with both palms and fingers open, gaze toward the target shot, followed by a movement to push the ball forward upwards using one arm so that your arms are straight. Along with that the hips, knees and heels rise, release the ball from the hand grip when the arms are straight, the release motion of the ball is helped by activating the wrists and fingers, the correct direction of the ball is resembling a parabola or curve, and the end of the movement of the two arms is straight forward relax and the direction of the view follows the direction of motion of the ball.) 3) Learning Variations in basic motion shooting; shooting basketball moving forward, backward, and sideways, shooting basketball in formation in line, shooting basketball in formation starting from the front of the basketball hoop 3) Learning Variation in basic shooting motion; shooting the basketball moves forward, backward, and sideways, shooting the basketball in the formation line up, shooting the basketball in the formation stretching from the front of the basketball ring and the basic motion of the lay-up shoot.
 - Learning PJOK Class X (Basketball Game) Combination of the Motion Absorbency of the Basketball Game. 1) Learning variations and combinations of capture motion skills with passing learning; standing face to face with a distance of ± 5 m, throwing and catching basketball moves forward, backward and sideways, do it repeatedly, and be done in pairs or groups, to instill the values of cooperation, courage, sportsmanship, and competitive. 2) Catching and passing the basketball in the backbone formation; standing face to face with a distance of ± 5 m, throwing moves moving places, carried out in pairs or groups, to instill the values of cooperation, courage, sportsmanship, and competitive, and do it repeatedly. 3) Passing and catching basketball balls in a circle formation; standing face to face with a distance of ± 5 m, after throwing moves moving places (from the middle of the circle move to the circle line and from the circle line move to the middle of the circle, do it repeatedly, and do in pairs or groups, to instill the values of cooperation, courage, sportsmanship, and competitive.)
 - Learning PJOK Class X (Basketball Game) Playing basketball. 1) Play half a field; in the form of two groups, team A places 2 players on field B, as well as team B places 2 players on field A, players may dribble, throw, and shoot while dribbling, players who are on field A and B may not crosses the midline, so only 2 players are entitled to attack on the opponent's pitch, the winning team is the team that can put the ball into the basketball hoop more, play 5-10 minutes long, to instill the values of cooperation, courage, sportsmanship, and competitive. 2) Playing basketball with modified rules; form you into two teams playing basketball using half the field. The number of players is 2 against 3 followed by 4 against 3 or 5 against 4, 2 attacking players and 3 defending players, 4 attacking

players and 3 defending players, 5 attacking players and 4 defending players, each player trying to put the ball into the basketball ring, with the basic movements that he has learned, the winning team is the team that mostly puts the ball into the basketball rig with the right technique, and is done in pairs or groups. To instill the values of cooperation, courage, sportsmanship and competition.

- Learning PJOK Class X (Soccer Game) Ball Feeding: 1) Feeding using the inside foot; starting position feeds the ball with the inside of the foot, starting with standing facing the direction of movement, place the foot resting on the side of the ball with knees slightly bent and shoulders facing the direction of movement, the posture of both arms beside the body slightly outstretched, the ankle to be used for kicking is rotated out and locked, and the view is centered on the ball. 2) Movement to pass the ball with the inside of the foot; attention readiness partner / partner is ready or not to receive the ball bait, pull the leg that will be used to kick back then swing forward towards the ball, and put the foot on the ball right in the middle of the ball. 3) The end of the ball feed motion with the inside foot; transfer the weight to the front foot with the foot used for kicking placed in front and foresight.
- Learning PJOK Class X (Soccer Game) Feeding using the outside legs: 1) Preparation for basic movements Feeding using the outside legs; begins with a standing attitude facing the direction of the ball's movements, place the foot resting beside the ball, the posture of both arms beside the body is slightly outstretched, the ankle to be used for kicking is turned inward and locked, the view is centered on the ball. 2) Movement to feed the ball with the outside legs; attention readiness partner / partner is ready or not to receive the ball bait, pulls the leg that will be used to feed back, and then swing forward towards the ball while the foot is turned inward and the foot in the ball right in the middle of the ball. 3) End of the ball feed motion with the outside legs; bring the weight to the front while the kicking foot is placed in front and foresight.
- Learning PJOK Class X (Soccer Game) Feeding using the instep: 1) The starting position of feeding the ball with the instep; begins with a standing position facing the direction of movement, place the foot resting on the side of the ball with the knees slightly bent and shoulders facing the movement, the posture of both arms beside the body slightly outstretched, the ankle to be kicked pulled back and locked, and the view focused on the ball. 2) Movement to feed the ball with the instep; attention readiness partner / partner is ready or not to receive the ball bait, pulls the leg that will be used to kick back then swing forward towards the ball, and put the foot on the ball right in the middle of the ball. 3) End of the ball feed with the instep; bring the weight to the front while the kicking foot is placed in front of and the ball in front of the ball.
- Learning PJOK Class X (Soccer Game) Controlling the Ball: 1) The initial position of stopping the ball with the inner leg; begins with the attitude facing the direction the ball is coming and centering the gaze toward the motion of the ball, and rotate the ankle to be used holding the ball out and locked. 2) Movement to feed the ball with the inside of the foot: reach out the foot that will be used to hold the ball in the direction of the ball coming, and pull back to follow the direction of the ball when the ball hits the inside foot, until the motion of the ball is stuck and stops in front of the body. 3) The end of the ball feed motion with the inside foot: bring the body weight forward while the unused foot holds the ball into the weight and foresight.
- Learning PJOK Class X (Soccer Game) The basic technique of stopping the ball with the outside foot. 1) Starting position stops the ball with the outside foot; stand facing the direction of the ball's movements, place your foot resting on the side of the ball, stand with your arms at your sides slightly stretched, and your ankles to be used stop rotating in and lock in and focus on the ball. 2) Movement to stop the ball with the outside foot; pull the foot that will be used to kick back, when the ball touches the outside foot, put the foot on the ball right in the middle of the ball. 3) End of motion to stop the ball with the outside foot: bring the body weight forward while the unused foot holds the ball into a weight, and look ahead.
- Learning PJOK Class X (Soccer Game) Dribbling with the inside legs: 1) The starting position of dribbling with the inside legs; begins with a standing position facing the direction of movement, foresight, and the posture of both arms beside the body relaxed, ankles turned outward and locked. 2) Movement of dribbling with the inside foot; push the ball with your inner foot towards the front with your foot slightly opened forward with your foot moving, and the ball moving forward rolling on the ground. 3) End of movement; stop the ball with the sole of the foot on the top of the ball, the weight of the body is on the unused foot, and look ahead.
- Learning PJOK Class X (Soccer Game) Dribbling with the outside legs: 1) Starting position dribbling with the outside legs; begins with standing facing the direction of movement, foresight, the posture of the arms at the sides of the body stretched out slightly, and the ankles turned inward and locked. 2) Movement of dribbling with the outside foot; push the ball with the outside foot towards the front with the foot slightly raised from the ground while the foot rests in motion, the weight of the foot rests on the foot that is not used dribbling, and the ball moves forward not far from the

foot on the ground. 3) End of dribbling with the outside legs; stop the ball with the sole of the foot on the top of the ball, the weight of the body is on the unused foot, and look ahead.

- Learning PJOK Class X (Soccer Game) Shooting the Ball to the Goal: 1) Shooting the ball with your inner legs; widely used to shoot the ball at goal from close range and shoot the ball by turning the ball. 2) Shoot the ball using the instep; widely used in firing the ball from a distance and horizontally.

B. Application Manufacture

The design and manufacture of applications involve several people who have competence in their fields. The people involved in designing this application are;

1. Bachelor of Information Technology Education,
2. Learning media expert, language expert, material expert of Physical Sports and Health in Volleyball, Basketball and Football.

The application development has a purpose and objective, in which the most basic thing in the development of this application is to maintain the quality and needs of the users (in this case, teachers and students). There are several aspects to be considered in the research development application:

- PJOK Learning Materials
 1. Color choices displayed,
 2. The suitability of text color choices with the options menu,
 3. Font model selection.
 4. Menu choices displayed,
 5. The placement of the selection buttons,
 6. The composition of the selection buttons,
 7. The composition of each slide,
 8. The clarity of instructional instructions,
 9. The selection of material provided,
 10. The delivery of material in terms of language,
 11. Learning instructions,
 12. Media model displayed,
 13. The size of the video displayed,
 14. The clarity and permanence of the sample movements and
 15. The level of difficulty in understanding the material presented.
- Learning Contents of PJOK
 1. The truth of the content,
 2. The depth of the material,
 3. The scope of the material,
 4. The actuality of the material,
 5. The speed of video access used,
 6. The relationship between video and material,
 7. Video quality,
 8. Video model selection,
 9. Video efficiency shown,
 10. The efficiency of the text used and
 11. The learning motivation inflicted.

Based on the results of the study of experts in their fields obtained that the applications distributed to teachers, students, expert teams, shared with the application links located on Android phones, so the useful input is obtained to determine the next steps, as follows: 1) Material expert validation and media, 2) Phase I (team) revision, 3) Expert Team Validation, 4) Phase II (team) revision, 5) Student testing, 6) The final product is an Android-based learning media.

By involving the students, teachers and academic experts in the fields of ICT, media, and learning process of Physical Sports and Health, Physical Sports and Health Education Media Development, which used Focus Group Discussion (FGD) obtained the results of media development that: 1) PJOK learning materials 89% concluded interesting, 2) the content or learning content of PJOK 93% concluded very clearly.

TABLE I. PJOK LEARNING MATERIALS

Content	Interesting	Less Interesting	Not Interesting
PJOK learning materials	89%	11%	-

TABLE II. THE CONTENT OR LEARNING CONTENT OF PJOK

Content	Very Clearly	Clear	Unclear	Not Clear
The content or learning content of PJOK	93%	7%	-	-

III. CONCLUSIONS

Through the explanation above, it can be concluded that "The Development of Physical Sports and Health Education Learning Media Based on Android Applications" is very helpful for students, educators in understanding and conveying physical and physical education learning materials.

It is proven that Information and Communication Technology (ICT) is a must in an effort to achieve better educational outcomes.

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