

Development of Multimedia-Based Basketball Arbitration Learning Media

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Abstract

This development research aims to produce multimedia-based multimedia learning products that are valid and effective against the improvement of material understanding on the students of Basketball Coaching of Sports Education Department of Semarang State University. Research development is done through the steps: potentials and problems, data collection, product design, design validation, design revisions, product trials, product revisions, usage trials, product revisions, and mass production. The developed learning media contains basketball arbitration material that is a violation and foul signals, violation moves, fouls practiced by visuals, as well as games equipped with videos and quizzes. The result of the assessment effective learning media to increase students' understanding. In small groups, there was an increase from 75.26 to 84.74 with $t_{\text{value}} = 4.869$ and significance of $0.000 < 0.05$. After the media revision and tested in large groups, material understanding increased from 75.33 to 89.33 with $t_{\text{value}} = 6.548$ and significance of $0.000 < 0.05$. It was concluded that multimedia-based learning media developed pertained valid and effective as well as learning media can be accessed by using the laptop by installing adobe flash first and smartphone because this media already equipped with APK application so that direct can be used a smartphone by installing it.

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INTRODUCTION

The students of Basketball Coaching of Sports Education Department of Semarang State University are required to have knowledge and mastery of arbitration skills. One of the obstacles faced by most students is the difficulty of understanding arbitration material because the lecture material tends to be text-based without illustrations/supporting images. Lack of explanation of the theory and image or video of the movement of violations and errors in basketball games becomes a constraint factor for students in understanding signals, forms of mistakes, as well as offenses and also the language, used. Violations and errors that occur in the basketball game are more difficult to imagine by the students if the reading material is not equipped with illustrations of images or supporting videos, let alone rules in basketball game every two years have developed so that differences occur perception.

Seeing the problem, it is necessary to develop a valid and effective multimedia-based learning media to improve the understanding of basketball arbitration material by students of Special Basketball Science. Media is an intermediary or introduction, in transferring knowledge from the speaker to the learner. Gagne 'and Briggs in Arsyad (2006) suggest that instructional media include tools physically used to deliver learning materials, which include books, tape recorders, tapes, video cameras, video recorders, films, slides (picture frames), photos, images, graphics, television, and computers, which can stimulate learners to learn. Means is very important because without the means to make less effective learning. Also, the facilities can also help learners to find the various knowledge needed and encourage students to involve themselves in the learning process actively. This motivates teachers not to be left behind by their students in the mastery of technology and the development of modification of tools in the development of media in education. (Ahmad Ulil Albab, Tandiyo Rahayu, and Sugiharto, 2016).

According to Rachman, Sulaiman, and Rumini (2017), the advancement of science and technology can not be avoided along with the development of the era, not to mention the expansion of science and technology in the field of sports which is increasingly experiencing rapid development, namely the existence of interrelationship between one field with other fields . The term multimedia used can mean a program to deliver digital content entirely by using an integrated combination of text, audio, two-dimensional and three-dimensional images, video and animation.

Multimedia-based media is a learning medium that optimizes various aspects such as text, images, sound, and video. According to Kustiono (2009), multimedia-based learning media is a medium that uses computers to present and combine text, sound, images, animation, and video with tools and links so users can navigate, interact, work and communicate. In the world of education, multimedia is used as a medium of instruction, both in class and individually.

According to Cepi Riyana (2006) in Liska Sukiyandari, et al. (2012) multimedia in learning can be classified into three characteristics, namely: (1) multimedia is used as one of the learning elements in the classroom, (2) multimedia is used as independent learning materials and (3) multimedia is used as the only media in learning.

According to Vrbik, and Vrbik (2017), the demonstration using the video is specifically appealing as a medium for transmitting information. Submission of knowledge through this medium, one can learn to observe by describing a process of learning a concept. Increased attitudes and knowledge more effectively through this method and become an innovative technique in learning. Psychologically according to Megrabian (1981) in Cai, and Abbott (2013), through demonstrations as much as 93% of a person's communication is done non-verbally, because the human brain is more receptive to simultaneous object images than in linearly inclined languages. Real, contextual images within videos can help remove obstacles in receiving messages. Through visualization, the

issues and opinions can be more easily understood by the students. The video is an effective information delivery tool. However, the use of video alone is less effective than the combination of demonstrations through video and teachers (Cai, and Abbott, 2013).

Research conducted by Mada (2015) shows that through the audio-visual media the average understanding of learners against the rules of the game in learning basketball results is quite good. Research by Liska Sukiyandari (2012) produces a multimedia learning software product in the form of a CD (compact disc) learning *Penjasorkes* for basketball game material that is suitable for use in the process of teaching and learning activities. Research by El-Sayed, Elmashad, and Ibrahim (2017) suggests that learning with video-assisted demonstrations contributes to higher learning outcomes and the method becomes an essential part of being a communicator of knowledge and improving student skills compared to direct delivery by teachers.

METHODS

This research uses a kind of development research that is developing multimedia-based basketball arbitration learning media. Research is done through ten steps: (1) potential and problem, (2) data collection, (3) product design, (4) design validation, (5) design revision, (6) product test, (7) product revision, (8) use, (9) product revision, and (10) mass production (Sugiyono, 2008). To find out the effectiveness of learning media development results conducted small group trial and a large group at basketball coaching students Department of Sports Coaching Education Semarang State University. The data obtained were analyzed using paired sample t-test to test the improvement of material understanding before and after using multimedia-based learning media.

RESULTS AND DISCUSSION

The Result of The Development

Multimedia-based learning media was developed by low student understanding of basketball arbitration material with an average of only 55.6, the highest score of 75 and the lowest at 27.5. This lack of understanding shows that in the lecture activities of students are experiencing constraints. Some of the obstacles faced by students include the source of the lecture material on arbitration of basketball used by lecturers in the form of arbitration rules book without any illustration, a picture that clarifies the material. The majority of students have difficulties in understanding the material.

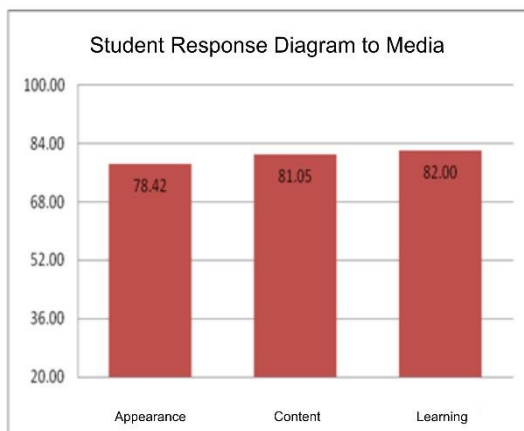
Based on the problem, data was collected from various related sources through interviews with lecturers and students. Based on the results of the interview it is known that arbitration learning applied to students has been done with dominance in practice. Lecturers do not do theoretical learning in the classroom. Students are provided with material resources in the form of basketball arbitration regulations and get a chance to read it and when it comes to arbitration practice. Based on this problem and data retrieval, it is necessary to develop multimedia-based learning media product, because the theory of basketball arbitration rules can be illustrated with images and videos that are expected to clarify the material.

The result of validation by the material arbitration experts reached 4.75 from the scale of 1-5 or 95%, which means that the material arbitration that exists in the media is very valid because it is considered the material has a very good quality for learning and from the aspect of the content is also very suitable with arbitration material ball basketball. There are some things suggested by arbitration experts that on the quiz should be added with the video for more clarity. The results of the assessment by the learning expert obtained an average score of 4.63 on a scale of 1-5 or 92.5%, which means that the material listed on the media is very suitable with learning. This learning expert also advises that in the quiz should be shown a clearer picture. The

results of the assessment by the media expert obtained an average score of 3.95 on a scale of 1-5 or 79.09% which means that the initial media products have been classified as valid from the aspect of display and programming. There are some suggestions that are improvements on quiz questions that should be made random and repairs to the icon answer "less precise."

Based on the suggestion from the three validators then made improvements to the initial product that is the revision on the quiz part is the sequence of questions on the quiz made random, plus video and replace the clearer picture. The question on the quiz is made random so that between users of one with other users get different problems, while the use of video in the quiz problem so that media users can see it more clearly.

The product was tested in a small group of 19 the students of Basketball Coaching of Sports Education Department of Semarang State University. The respondents were given the opportunity to study the media and were given a questionnaire about the response to the media. A total of 9 students (48%) had very high responses, 42% of students gave a high response, 5% was enough, and 5% were very low. Viewed from the average of 80.38 in the high category, which means that the media is based on the appearance, content, and suitability of learning has a high quality. Details can be seen in the diagram of Figure 2.



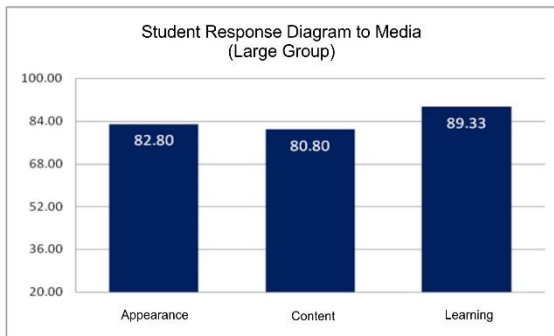
Picture 2. Student Response Diagram to Media

The average student response to media display is 78.42 (high category). This shows that the media display has a high quality because it is seen that writing and picture in the media are quite clear, has a menu and buttons that are easy to use and clear functions. Media is also equipped with music and sound support. Existing writing using clear letters, equipped with clear pictures and videos and attractive colors. The average student response to the contents of the material is high with an average of 81.05, which means that the content of the material is more clearly understood, using language, picture, and a clear matter. The average on the learning aspect reaches 82 in the high category, which means that the initial product of the media contains materials that are easy to learn, menatik, provide benefits in learning, easy in selecting the study menu. The movements shown are clear. In the evaluation section, it is deemed to have a matter by the material. In general, students feel more happy, interesting learning with multimedia because the material is more easily understood.

Based on the results of testing in small groups, there are some suggestions from students as media users as a reference in revising the product. Some suggestions from students are to clarify the picture, video, and sound. Based on this suggestion, a little revision is made of changing pictures, videos, and sounds that are less clear.

After the improvements made by clarifying the sound, video, and picture are tested. As in small groups, before using the media, students get a chance to open a quiz to answer the questions as pretest data. Furthermore, students get the opportunity to study the material and after completion get a chance to re-answer the quiz as post-test data. In this group of students were also given a questionnaire about the response to the media. The revised product is tested in the next group of 15 the students of Basketball Coaching of Sports Education Department of Semarang State University. The results of the students' responses showed very high results. As many as 53% of students have a very high response, as many as 40% of students give a high response and as much as 7% are categorized enough. The

average shows the value of 85.01 (very high category), which means that the media has very high quality.



Picture 3. Diagram Students Respond to Media (Large group)

Average student response to the display of 82.80 (high category). This shows that the media display has a high quality because the writing and picture in the media are quite clear, has a menu and buttons that are easy to use and have a clear function. The media also comes with music and voice support. Existing writing using clear letters, equipped with clear pictures and videos, and attractive colors.

The average student response to the contents of the material is high is 80.80, which means that the contents of the material more clearly understood, using language, picture, and a clear matter. The average on the learning aspect reaches 89.33 (very high category), which means that the media product contains the material that is very easy to learn, more interesting, give benefit in learning, easier in selecting study menu. The movements shown are clear. In the evaluation section, it is deemed to have a matter by the material. In general, students feel more happy, more interested in learning with multimedia because the material is more easily understood.

Before becoming a final product, it is necessary to make revisions according to user suggestion. Based on the suggestions from the students in this large group, the media is improved again by emphasizing the less obvious video and picture to be further clarified. After the revision, it is ready to be mass produced so it can be used as a learning media in basketball arbitration.

The Effectiveness of Multimedia-Based Basketball Arbitration Learning Media

The effectiveness of multimedia-based basketball arbitration learning media in its application in lecturing activities can be seen in the improvement of material understanding by students from before and after using media. This effectiveness can be seen in small and large-scale groups during media trials. Before using the media, the average understanding of basketball arbitration material was 75.26, and after studying the material using multimedia, media had increased to 84.74. The result of t-test is $t_{\text{value}} = 4.869$ with a significance value of $0.000 < 0.05$, which means that there is a significant increase in students understanding about basketball arbitration material after using multimedia learning. As many as 37% of students experienced a low level of material understanding, as many as 31% of students had sufficient improvement and 32% of students had high increases. The data shows that the use of media in the initial product has not fully impacted the high increase in understanding basketball arbitration material, so from the media aspect it still needs to be done repairs again.

The effectiveness of media usage in large groups can also be seen from the improvement of material understanding. Before using the media, the average understanding of basketball arbitration material is 75.33, and after studying the material using multimedia media has increased to 89.33. t-test result obtained $t_{\text{value}} = 6.548$ with the significance value of $0.000 < 0.05$, which means that there is a significant increase understanding of students about basketball arbitration material after using multimedia learning. Judging from the normalized gain of 13% of students experiencing a low increase in material understanding with a normalized gain of less than 0.3, as many as 40% of students experienced a moderate gain increase at intervals of 0.3 to 0.7 and as many as 47% of college students had a high increase with the normalized gain above 0.7. The data shows that the use of media on the product after the revision

gives a better impact on improving the understanding of basketball arbitration materials.

The development of multimedia-based basketball arbitration learning media for the students of Basketball Coaching of Sports Education Department of Semarang State University is conducted through ten stages of activity. They are starting from a problem or obstacles faced by students in understanding the material basketball arbitration. Less learning utilizes instructional media and is more dominated by practical activities by giving students complete responsibility for self-study of arbitration material from the arbitration manual to be the dominant factor why students tend to experience difficulties.

The arbitration manual used as the course reference does not come with an illustrated picture that makes it easy to understand the material. This condition encourages the need for multimedia-based learning media that presents pictures and videos of signals or signs of basketball arbitration, violation, fouls and games. The use of picture illustrations and videos in the media is expected to be used as a substitute for demonstrations conducted by lecturers, even having more value because it can be seen repeatedly by students. Werkanis (2005) in Umiatik (2017) states that the method of demonstration is a way of teaching by showing an object or behavior that shows the meaning of human potential in acts of action.

The results of the previous research indicate that the use of demonstration method is very supportive of the process of teaching and learning interaction in the classroom. By using the demonstration method, the attention of the students can be concentrated on the lesson being given. Errors that occur when the lesson is in the story but can be overcome through observations and concrete examples. So that the process of acceptance of students to the lessons will be more memorable in depth, the use of demonstration methods encourages students to participate actively and gain hands-on experience and can develop their skills (Santi, Dhafir, and Bustamin, 2017).

The students of Basketball Coaching of Sport Education Department of Semarang State University are not only required to have skills in practicing arbitration, but the practice is based on existing theories, and considering that students' understanding of basketball arbitration is still low, a demonstration of integrated arbitration in a multimedia-based media is required so students can learn, repeatedly observe before take their arbitration abilities in the field.

Learning media developed improves the understanding of basketball arbitration material because media content equipped with videos has a demonstrative nature of giving a motor explanation. According to Vrbik, and Vrbik (2017), demonstrations using the video are specifically appealing as a medium for transmitting information. Submission of knowledge through this medium, one can learn to observe by describing a process of learning a concept. Increased attitudes and knowledge more effectively through this method and become an innovative technique in learning.

Psychologically, Megrabian (1981) in Cai, and Abbott (2013) suggests that non-verbal demonstration communications are more acceptable (93%) because the human brain is more receptive to simultaneous image objects than in linearly inclined languages. Through more and more contextual and real pictures in the video can help remove obstacles in receiving messages. Through visualization, the issues and opinions can be more easily understood by the students. The video is an effective information delivery tool.

Research by El-Sayed, Elmashad, and Ibrahim (2017) shows that learning with video-assisted demonstrations contributes to higher learning outcomes and the method becomes an essential part of being a communicator of knowledge and improving student skills compared to direct delivery by teachers.

CONCLUSION

Multimedia-based multimedia basketball arbitration learning media for the students of Basketball Coaching of Sports Education

Department of Semarang State University is a media product developed using Macromedia flash CS-6 software. The media contains basketball arbitration material such as signals arbitration, violation, fouls and games whose content consists of text, voice, and video to clarify the material as well as equipped with a quiz to measure self-ability about material understanding. Multimedia-based multimedia learning media basketball arbitration is effective in improving the understanding of basketball arbitration material as evidenced by the results of trials on the students of Basketball Special Science Semarang State University in small groups and large groups.

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