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The Development of Learning Meadia Based on Digital Card Learning to Improve High Level of Thinking Skills and Basket Ball Passing Skills of Junior High School Students

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Abstract

This study aims to develop learning media based on digital card learning to improve high-order thinking skills and basketball passing skills of junior high school students and to determine the feasibility and effectiveness of the digital card learning media. The research method used in this research is Research and Development (RnD) using 10 stages of research; 1) problem identification, 2) data collection, 3) product design, 4) design validation, 5) product trial (small scale), 6) product revision, 7) usage trial (large scale), 8) final product revision, 9) effectiveness test and 10) final product. The research subjects used were 32 samples for small scale, and 64 samples for large scale. The data analysis technique was descriptive quantitative analysis. Based on the assessments results from some experts, both basketball and media experts, it shows that the media developed is in the "Very Eligible" category to be used with a percentage of 91% eligibility. Based on the results of the small-scale test, the results of student assessments were 83%. While the results of large-scale trials on research subjects, the percentage of product feasibility is 85%. The results of the analysis of the effectiveness test conducted through the paired t-test, it was obtained a significance value of 0.000 (influence on HOTS) and 0.000 (influence on passing skills) less than 0.05. Meanwhile, the results of the independent t-test were of 0.002 (HOTS) and 0.030 (passing skill).

Keywords: *Development; Digital Card Learning Media; HOTS and Basketball Passing Skills*

Introduction

The world has entered a modernization era. The current development requires humans to increase knowledge and skills in the form of ways of thinking, creativity, communication and collaboration (Henriksen et al., 2016: 27). The process of cognitive abilities in a person occurs when someone finds a problem, so that he can find ideas or solutions to solve the problem (Klieger & Sherman, 2015: 305). Basically, higher order thinking skills include creative thinking and critical thinking. It is interpreted as a process in generating new concepts, understandings or ideas through information gathering (Moore, 2015:

27). This is in line with the opinion of Rofiah et al (2013: 17) who also stated that higher-order thinking is the ability to manipulate, connect, and

Based on this statement, it can be concluded that higher-order thinking skills can be described as an imagination that can generate new ideas or the ability to reveal new possibilities in solving a problem that is taken from various points of view. So that with this future trend, it is considered to incorporate High Order Thinking Skill (HOTS) into the 2013 curriculum, especially the curriculum components in the aspect of objectives, content or materials, and the learning process. Because of the achievement of Higher Order Thinking Skills (HOTS), it is expected to be able to solve problems by thinking critically, creatively, innovatively, for the sake of a peaceful and harmonious human life together (Krisna et al., 2020: 43) To carry out aspects of learning and learning planning requires students who have a higher level of thinking or HOTS (Yaniawati, 2013: 109). The main purpose of High Order Thinking Skills is how to improve students' thinking skills at a higher level, especially those related to the ability to think critically in receiving various types of information, think creatively in solving a problem using the knowledge they have and make decisions in complex situations (Saputra, 2016: 91). Higher-order thinking which consists of two things, namely creative and critical thinking is needed in the learning process, especially in Physical Education, in order to achieve a quality learning process and be able to solve a learning problem with the creativity of students.

Physical Education can be said as a place that is useful for improving psychomotor and physical abilities (Rithaudin et al., 2019: 33). Physical Education in schools plays an important role in giving students the opportunity to directly participate in the learning process. The learning experience can be done with various methods, objectives, sources, and media provided to students as learning subjects. Physical Education learning currently has very minimal aspects of cognitive understanding, even though Physical Education should not only rely on psychomotor aspects but also cognitive aspects of students. This can be seen from observations at school; the cognitive aspect in Physical Education is barely implemented in the classroom, especially during theory. This is an evident where the Physical Education learning process is mostly carried out in the field so that it only focuses on the physical and psychomotor aspects of students, so that students rarely use their higher-order thinking skills. Whereas the educational process can be said to be carried out well if it meets three aspects, namely cognitive, psychomotor and affective (Rosdiani, 2013: 83).

Higher Order Thinking Skills (HOTS) are of course also needed in big ball games such as football, volleyball, and basketball, both in theory and practice (Birgili, B & Soyadı, 2015: 71). In Physical Education learning with big ball materials, especially basketball games, Higher Order Thinking Skills (HOTS) are closely related to creativity and problem-solving skills in the field. This surely also supports the development of psychomotor aspects (skills) possessed by students. Through learning the basketball game, many benefits can be obtained, especially in terms of good cognitive, physical, mental and social growth. However, students' High Order Thinking Skills on basketball material are still lacking. For example, when students learn basic passing techniques, many students still lack of understanding and skills. Therefore, the description of the higher order thinking skills of students in schools needs to be seen (Adrizal, 2020: 1). To support the development of higher order thinking skills related to cognitive and skills in the learning process, a learning media is needed. Based on research from Frasidik (2017: 290) that media can improve students' higher order thinking skills (75%) and help teachers achieve learning goals. Media has many types, including audio, video, audio-visual media, images, etc. Falahudin (2014: 402) explains that media is anything that can distribute information from information sources to recipients of information. Media is a vehicle for distributing learning information or distributing messages.

In the current era, learning media have been widely developed both abroad and in Indonesia. The number of media that has developed, of course, does not make an educator or teacher confused or difficult to determine what media is used in learning, but it will make it easier for an educator or teacher to determine the media according to the circumstances of the students and the subjects given.

The previous literature shows that the development of smart card learning media in basketball refereeing is considered feasible but there are still limitations, namely the development of media that only focuses on the process of basketball matches and arbitration (Permatasari et al., 2020: 26). And there is also research on the development of media for training judo in refereeing gestures for the android-based fighting category, showing that the application makes it easier for Judo referees to understand but there are still limitations that the material presented is only judo (Pratama, 2021: 55).

Based on the observations conducted in 10 secondary schools in Sleman Regency, the 80% of the media used in the learning process are mostly using audio-visual media and LCD, so that the learning media used by educators are less varied. Those media have advantages and disadvantages. The weakness of audio-visual media according to Dila (2020: 21) states that audio-visual media is less able to display the details of objects that are presented perfectly. Therefore, it is necessary to develop a media that is more interesting and easy to understand to support Physical Education learning and can help teachers in teaching so that they can improve higher order thinking skills and students' skills. The development of the media that the researchers will make is the development of application-based digital Card Learning media developed from Smart Card media. Card itself means a card, but CARD also has an abbreviation, namely CARD – ATTRACTIVE – RESPONSIVE - DEVELOPMENT. CARD or cards can be said as media. Reinforced by the theory of Falahudin (2014: 407), the word media comes from Latin which is the plural form of "medium" which literally means intermediary or introduction. The meaning of ATTRACTIVE is to attract/interest, strengthened by the theory of Wisnuwardhani (2012: 62) saying that attraction is something that fosters mutual interest because of a fair mutual agreement regarding what they can get and what they have to give to each other. While the word RESPONSIVE, according to Khairiayah (2019: 200) response is a behavior that is influenced by responses and stimuli from the environment. The word DEVELOPMENT, reinforced by Development Theory according to Azam (2016: 39), is a change experienced by students towards their level of maturity which takes place systematically, progressively, and continuously, both physically and psychologically. From the abbreviation, it also means that students learn physical education using CARD or cards so that they are ATTRACTIVE/interesting, RESPONSIVE/responding, and DEVELOPMENT/develop.

Therefore, a Research and Development (RND) research is needed. One of them is by developing physical education learning media at the secondary school level based on android applications that can improve (cognitive) higher-order thinking skills and students' skills, especially in basketball passing.

Research Methods

This research method conducted in this research is Research and Development (R&D). R&D research aims to produce a product or develop an existing product. Sugiyono (2019: 297) said that Research and Development is a research method used to produce a certain product and can test the effectiveness of the product which is being developed. This study aims to produce a product in the form of *Digital CARD Learning* media.

The research development procedure is divided into several stages, namely: identification of potential and problems, data collection, product design, product design validation, small-scale product trials, product revisions, large-scale product trials, product revisions, effectiveness tests, final products or mass production of products.

The research subjects were 8th grade students of SMPN 2 Melati. To obtain the data, this study used a validated questionnaire instrument. The data that has been collected is then analysed using qualitative and quantitative data analysis techniques. Qualitative data analysis techniques were carried out to analyse data from the assessment of material experts and practitioners, as well as input from teachers. Quantitative data analysis techniques were carried out on the results of expert assessments and product test assessments of the products developed. Meanwhile, quantitative descriptive data analysis techniques

were carried out on data from preliminary study questionnaires, expert or expert assessments of the products developed as well as product test results data, effectiveness tests. The effectiveness test was carried out by Pre Test and Post Test to determine the cognitive and psychomotor improvement of students before and after using learning media that had been developed by researchers through systematic stages. To determine the assessment of student learning outcomes using a quasi-experimental method using the *non-equivalent control group design* method.

Result and Discussion

Result

A. Identification of Potential and Problems

The learning media used by educators is less varied, so that students are less enthusiastic in participating in learning. And there are still many students' basketball passing skills that are lacking, since in passing, it also requires good decision making.

B. Data Collection

The data collection that has been carried out consists of information about basketball learning materials taught to VIII grade junior high school students. The Basic Competence (KD) of Physical Education on basketball material for class VIII is 3.1 Understanding the concept of specific motion variations in various simple and or traditional basketball games; 4.1 Practicing specific movement variations in a variety of simple and traditional basketball games. And there are learning objectives that need to be achieved as well, namely understanding and practicing variations of the basic techniques of passing, catching, shooting and lay-up shoots in basketball games.

C. Product Design

Designing and constructing the products in Digital Card Learning media that will be developed include making storyboards, making media, and making questions.

D. Product Design Validation

Based on the validation carried out by material experts and media experts, it was obtained that the assessment given by media experts had a percentage of 90% with the criteria "Very Good", but there was a revision and improvement that had to be made. Those are changing the position of the button instructions that were previously located on the bottom, and then it was changed above the initial section. Next, we needed to change the background which was previously plain then it must be added with icons related to basketball learning materials. Furthermore, the materials expert gave an assessment of 92% with the criteria of "Very Good". However, there was a revision or improvement that had to be done, namely changing the previous videos section that there were only national team players then added who also did that but they had a student level, so that it will be more familiar to the students who use this media.

E. Product Revision

Revisions are made after getting advice and input from experts, both from media experts and material experts. Revisions are made according to what the experts suggest.

F. Small-Scale Product Trial

Small-scale product trials were conducted on 32 respondents from class VIII D SMP Negeri 2 Mlati. Based on a small-scale trial, it was obtained that the value was 83.43% and included in the "Very Eligible" category.

G. Large-Scale Trial

After the product has gone through a small-scale trial phase and has been revised, then the product is then tested on a larger scale or trial use. Based on the usage trial, it was obtained that 85% of the assessment results were included in the "Very Eligible" category and 1 respondent from the teacher of SMP Negeri 2 Mlati who gave an assessment of 92% on the Digital Card Learning media and was included in the "Very Eligible" category. ".

H. Effectiveness Test

The effectiveness test was carried out by doing the initial questions or pre-test which had previously passed the analysis stage and produced 19 items. The method is a quasi-experimental method using a non-equivalent control group design. After the pre-test was carried out, the class groups that used the Digital Card Learning media were selected. The selection of groups that used Digital Card Learning media was the class that had a small average pre-test score. The effectiveness test was carried out for one week, on the first day doing a pre-test and on the next seven days taking post test data. After the data is collected, the tests that must be carried out are 1) descriptive analysis, 2) normality test, 3) homogeneity test, 4) paired samples t test, and 5) independent samples t test. Class groups that use Digital Card Learning media are coded “A”, and “B” for those who use book media.

1. Descriptive Analysis

The group from the HOTS pre-test data in group "A" has the same class average as group "B". However, from the post-test results, group "A" has a higher average than group "B". Then, it can be seen that the group from the pre-test data for the passing skills of group "A", the average class result is smaller than group "B", but from the post-test results group "A" has a higher average than group "B".

2. Normality Test

Based on the normality test, it can be seen from the sig value of the HOTS A pre test, HOTS B pre test, HOTS A post test, HOTS B post test, HOTS AB pre test, HOTS AB post test, A passing pre test, B passing pre test , post test passing A, and post test passing B are all normally distributed as seen from the Shapiro-Wilk test. All data are more than 0.05.

Table 1. Normality Test ResultsTabel

	Shapiro-Wilk		
	Statistic	Df	Sig.
Pre Hots B	.898	16	.075
Pre Hots A	.920	16	.166
Post Hots B	.926	16	.212
Post Hots A	.949	16	.478
Pre Hots AB	.898	16	.075
Post Hots AB	.926	16	.212
Pre Pass B	.946	16	.426
Pre Pass A	.944	16	.405
Post Pass B	.910	16	.114
Post Pass A	.898	16	.074
Pre Pass AB	.946	16	.426
Post Pass AB	.910	16	.114

3. Homogeneity Test

Based on the test results above, it can be concluded that the HOTS AB pre-test, HOTS AB post-test, AB-passing pre-test, and AB post-test pass data are similar data because of the sig value. > 0.005.

		Levene Statistic	df1	df2	Sig.
Pre Hots AB	Based on Mean	.001	1	30	.981
Post Hots AB	Based on Mean	.150	1	30	.701
Pre Pass AB	Based on Mean	.001	1	30	.979
Post Pass AB	Based on Mean	.108	1	30	.745

4.*Paired Samples T* Test

Based on the results of the paired samples t test, it can be concluded that there is a significant difference between 16 students from group B (without using Digital Card Learning application media) and group A (using Digital Card Learning Application media). However, if we look at the test, the significance value group A is smaller than group B. It indicates that the Digital Card Learning learning media provides a more significant improvement.

	No Data	df	Sig. (2-tailed)
Pair 1	Pre Hots B - Post Hots B	15	.025
Pair 2	Pre Hots A - Post Hots A	15	.000
Pair 3	Pre Pass B - Post Pass B	15	.034
Pair 4	Pre Pass A - Post Pass A	15	.000

I. Product


Chest Pass
- Pengertian
- Fungsi


Video Teknik Dasar
Chest Pass


CARD 2
BOUNCE PASS
Tujuan Pembelajaran:
Langkah-langkah:
PENGERTIAN
VIDEO


Bounce Pass
- Pengertian
- Fungsi


Video Teknik Dasar
Bounce Pass
- Badan sedikit condong ke bawah
- Melangkah sambil melurukan tangan dan


Over Head Pass
- Pengertian
- Fungsi


Video Teknik Dasar
Over Head Pass
- Di saat melangkah sambil tangan
melempar bola ke temannya


PETUNJUK TOMBOL


INFORMASI


PROFIL PENGEMBANG


PROFIL DOSEN PEMBIMBING

Discussion

Digital Learning Card is a product development which is based on application to utilize students in more physical education learning. The results of this study are in line with research (Swadesi & Kanca, 2019, p.830) which states that the use of application-based learning models is very helpful for teachers and students in the process of understanding physical learning materials. This is in accordance with the development of this digital card learning media, which is expected to increase students' higher-order thinking and passing skills. This is done by understanding the sentence and video material in the application first, then students increase their thinking skills by working on HOTS questions and practicing skills through the results of understanding the material that has been studied. Students can pass by observing the situation of the defender first, then the new student makes the best decision to make variations or combinations of passing with his or her friends so that his or her passing can be effective and not be easily taken by the opponent. This is strengthened by (Asogwa et al., 2020, page 1) which stated that the provision of video technology-based learning models can improve students' self-concept in Physical Education. Subsequent research shows that the use of augmented reality can benefit the learning process, especially on student motivation (Cabero-Almenara & Roig-Vila, 2019, p. 1).

Learning media is an important aspect in the student learning success as a self-development process that includes various benefits (Burhaein et al., 2021, p. 198). Interactive media-based learning with the latest technological interactions draws students' attention into the learning process (Vogt et al., 2019, p. 1424). As with the development of application-based media products developed in this study, it has gone through several stages to become products that can be used in the physical education learning process. This test has gone through the assessment of several experts and resulted in a product with the "Very Eligible" category. Several stages have been passed, including: 1) knowing the problem, 2) data collection, 3) product design, 4) design validation, 5) product testing, 6) product revision, 7) usage trial, 8) product revision. final product, 9) effectiveness test and 10) final product.

The results of this study proved to be an effective learning media to be used in the learning process to improve the HOTS and basketball passing skills of junior high school students seen from the suitability of the product and the effectiveness test of the media.

Conclusion

Based on the results of research and discussion of digital card learning passing basketball media, it can be drawn:

A. The provision of learning media based on digital card learning could improve students' higher-order thinking skills and passing basketball skills. This was done by the way of the students understood the material in the form of sentences and videos in the application first, then students sharpened their thinking skills by working on HOTS questions and practiced their passing skills from the results of understanding the material that had been studied.

B. Based on the results of research on the development of digital card learning media, it can be concluded that the media is suitable for use by junior high school students, especially for the VIII class.

C. Digital card learning media is proven to be effective in improving students' HOTS abilities and basketball passing skills. These results were obtained through the paired sample t test with a significance value of 0.000.

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