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<https://ejournal.upi.edu/index.php/penjas/article/view/48676>DOI: <https://doi.org/10.17509/jpjo.v7i2.48676>**Effects of Interactive Media on Critical and Creative Thinking****Mochamad Ridwan\*<sup>1</sup>, Rahmawati Al Adha Nikmah <sup>2</sup>**<sup>1</sup>Sport Education, Universitas Negeri Surabaya, Surabaya, Indonesia<sup>2</sup>School of Physical Education and Sport Training; Shanghai University of Sport, China**Article Info***Article History :**Received July 2022**Revised July 2022**Accepted August 2022**Available online September 2022**Keywords :**creative thinking, critical thinking,  
Physical Education***Abstract**

Physical Education Teacher Education (PETE) need to support the student's critical and creative mindset building in various ways and strategies. One of them is by using interactive learning media. Interactive media can provide a stimulus for student development. Interactive media can facilitate the teaching and learning process because it allows students to actively think critically and creatively in performing motor tasks so that they do not get bored during the learning process in the field. The research method used was a quantitative method using a pre-experimental and one-group pretest-posttest design. Samples of this study were selected using simple random sampling. The data obtained were analyzed using Paired Sample T-test. The student critical thinking skill data show the sig value or p-value of (0.000). The student creative thinking skill data show the sig or p-value of (0.000) with a significant level of 0.05. It indicates a considerable influence on the use of interactive media. Therefore, it could be a solution to overcome problems by improving critical and creative thinking skills. In general, the use of interactive media can be developed according to the needs of the material provided by PETE to their students.

## INTRODUCTION

Education is vital in improving human resources because a top country can be recognized for its education. A good education enables people to have good character, behave professionally, and aim for a global mindset (Nugraheni et al., 2013). Education has two main components; students and educator is related to teaching and learning activities. Along with the advancement of technology and science, education is required to develop students' potential. The potential maximization depends on the educator's ability to bring up the particular subject (Zulhelmi et al., 2017). A pleasant teaching and learning atmosphere enables the student to understand the basic concept easily, so their cognition and skills are likely to be honed. The new era and advancement of technology should be adapted with an improved teacher's capacity; therefore, lesson objectives can be fully reached.

Physical education sport and health major is not only about physical movement on the field, but it is also related to the critical thinking skill of the student and his/her creativity while doing the teacher's instruction in terms of movement. Students' creativity and critical thinking in physical education sports and health majors can be categorized as logical reasoning skills for making a movement decision. A series of scientific learning processes is one way to enhance the student's mindset to reach the learning objective.

Technology, notably multimedia, is often used in the educational sector. Media is a supporting tool for communicating information between the resources and the message receiver. Moreover, media in education holds an essential role in the learning process. The success of the learning process can be affected by two components: the use of the learning method and learning media. Equally important, the use of media aims to enhance the stimulation of students in the learning process. Therefore, using media in the learning process needs good preparation to reach the learning objective optimally.

On the other hand, using media creatively can accelerate and enhance the efficiency of the learning process, so the learning objective can be reached optimally (Kurnia & Nita, 2018). In addition, the use of media has many benefits, especially in the learning process, including the interaction and communication between students and teachers, so it helps in the appropriateness

and usability of the material. One of the media that has many benefits is computer multimedia (Prastika et al., 2015). Computer multimedia or often called interactive multimedia.

During this time, physical education and health teacher only delivers the material orally or demonstrably. Media use is essential for a teacher to deliver learning and material to students in the learning process. Interactive media is often referred to as a product made by a digital system service computer-based with video, text, audio, or budging picture. The teachers use interactive media concepts to deliver the material to the students. The use of interactive media enhances the student's critical thinking and innovation; the statement from Saadé et al., using learning which uses technology enhances the student's thinking skills in terms of academic ability and environment.

The critical thinking concept is an essential point in education within the learning process until the target of the learning indicator (Suroto et al., 2021). Critical thinking is needed in the learning process because it is logical reasoning that focuses on believing and making decisions students need critical thinking skill kill is needed by the students to finish the assignment in learning (Nurrohmi et al., 2017). Therefore, critical thinking skill becomes a demand which must be completed in the learning process (Nurrohmi et al., 2017). The importance of critical thinking skills in students is caused by the changing era and the advancement of technology that require students have critical thinking skills (Pradana et al., 2017). Critical thinking skill needs to be mastered by every student to solve a problem in finishing an assignment so that in finishing it, they can make a decision logically and correctly (Kurniawati, 2018). The primary development of this research refers to the previous interactive learning media influencer active learning media, which enhances the student's critical thinking skills with a difference of 6.7%. Concerning this, the researcher will develop not only the students' critical thinking skills but also the creative thinking needed to resolve the problem of their assignment given by the teacher. In addition, there is a critical issue which states that the critical thinking skills of particular people in Indonesia are still less; proven by the study Trends in International Mathematics and Science Study (TIMSS) in 2011, which reveals that Indonesia is in the third rank from the bottom of 32 achievable countries

(Abdurrozak & Jayadinata, 2016). The effort to be creative is related to someone's enthusiasm to do something. Creativity is often interpreted as someone's ability to create a product (Supardi, 2015). According to the background explanation above, the researcher will research the influence of interactive media on critical and creative thinking.

## METHODS

The research methodology used is quantitative as experimental research. This so-called methodology will use pre-experimental and one-group pretest post-test design. The act of determining the sample is selected by simple random sampling.

### Participants

The population of the research was all the students of SMKN 2 Buduran Sidoarjo. The sample used is a class of X (BDP) Bisnis Daring dan Pemasaran (Online Business and Marketing) participated by 44 students. 28 male and 16 female students. The reason for using this sample is because of the level of critical thinking and creativity of the samples; students in the class mentioned are not recognized in physical education and health lesson yet.

### Instrument

This research is conducted through media intervention and questionnaires to measure the pretest and post-test scores related to the student's critical and creative thinking skills. Further action is taken by giving the material using interactive media in PPT, pictures, and low-passing slow-motion videos on volleyball subjects.

The Instrument implemented to measure critical thinking skills is a closed-ended questionnaire validated by the validity and reliability test under 0,05 derived from 17 questions, as well as an alpha Cronbach score 0.846. The indicator utilized to formulate, analyze, and evaluate the problem will likely convey something based on facts. In addition, the Instrument employed to measure creative thinking skills is a questionnaire. The validity test score is 0.75, and the alpha Cronbach's score is 0.69. The indicators used are the level of curiosity, imagination, statement originality, questioning ability, and the freedom to state opinion from a particu-

lar point of view.

### Procedure

This research is conducted in approximately eight meetings. The first meeting is administered to measure creative and critical thinking skills. The following six meetings are carried on to apply decided action related to interactive media. Then the last meeting is the post-test to measure the ability mentioned, creative and critical thinking skills after implementing the interactive media.

### Data Analysis

The first data testing regulation is the data normality test. The normality test used in this research is using kolmogorov-smirnof on spss 22. Because the result of the normality test is normal distribution, so the next step is doing a t-test (difference testing), a parametric test which is used a t-test dependent sample (paired sample t-test). T-test (difference testing) is used for testing the significance of two means which are coming from pretest and post-test data distribution. The first data testing regulation is the data normality test. Normality test used in this research is using kolmogorof-smirnof on spss 22. Because the result of the normality test is normal distribution, so the next step is doing a t-test (difference testing). The parametric test used is a t-test dependent sample (paired sample t-test). T-test (difference testing) is used for testing the significance of two means coming from pretest and post-test data distribution.

## RESULT

The prerequisite test used is the Kolmogorov-Smirnov normality test with the effort of SPSS 22. The result of the normality test is shown in Table 1. Table 1 showed creative thinking skill pretest and post-test obtained from Asymp. Sig. (2-tailed) were more extensive than the significant standard ( $\alpha = 0,05$ ), with the result that the sample was usually distributed. The data of critical thinking skill pretest and post-test got from Asymp. Sig. (2-tailed) were more extensive than the significant standard ( $\alpha = 0,05$ ), with the result that the sample was usually distributed. The samples which were typically distributed fulfilled the requirement to administer the parametric test using paired sample t-test supported by SPSS 22.

### *Creative Thinking Skill*

Table 2 shows the result sig. (2-tailed) acquired was less than the significance standard ( $\alpha = 0,05$ ) with the result that there was a significant difference between creative thinking skill pretest and post-test with learning media. Therefore, it was concluded that learning media effect on students' creative thinking skills.

### *Critical Thinking Skills*

The result of paired sample t-test is shown in Table 3. Table 3 shows the result sig. (2-tailed) attained was less than the significance standard ( $\alpha = 0,05$ ), with a significant difference between the pretest and post-test of critical thinking skills with learning media. Therefore, it was concluded that learning media effect students' critical thinking skills.

**Table 1.** Normality test

No	Data of Ability	Asymp. Sig. (2-tailed)
1	Creativity pretest	0.054
2	Creativity post-test	0.054
3	Critical thinking pretest	0.200
4	Critical thinking pretest	0.200

**Table 2.** Paired Sample T-Test Result

No	Data of Ability	Asymp. Sig. (2-tailed)
1	Creative Thinking Skill	0.000

**Table 3.** The Result of Paired Sample T-Test

No	Data of Ability	Asymp. Sig. (2-tailed)
1	Critical Thinking Skill	0.000

## DISCUSSION

The prominent of this research finding of that interactive media could solve the critical thinking and creativity skills in the learning process of physical education and health major. The establishment of effective physical education result primary was that the teacher could stimulate students' thinking and analysis skills when mixed up with physical activities. Furthermore, tactics and strategies needed for specific assignments and movement would emphasize the importance of students' logical reasoning skills to make the right decision

so that they would not get fed up with activities done only in the field in line with the importance of interactive learning media.

The students should master creative and critical thinking skills that cannot be separated to solve the problems, which means the skills should be improved and honed. Therefore, the intervention has to be administered concerning the ability mentioned in appropriate situations when facing problems (Supardi, 2015).

Advances in technology require educators to make the best use of it as learning media that can improve creative and critical thinking skills. Internet employment provides particular solutions that can hone skills and broaden knowledge (Mohammad Yazdi, 2012). Employment of interactive media should also adapt to the student's characteristics because their intelligence various in mastering the lesson. The more appropriate content and its media, the better result get in mastering the subject. Media is categorized as interactive media and is not emphasized in hardware systems; instead, it tends to students' learning characteristics in responding to the stimulus displayed on the screen. Critical thinking skill is labeled as metacognitive skill covering the process of thinking carefully about a subject and idea when the thinker skilfully sets his/her intellectual standard. The thinker continuously analyzes and evaluates particular information to get a better conclusion (Atabaki et al., 2015).

Creative thinking skill is equally important in solving problems in the teaching and learning process. As stated by (Nuryanti et al., 2016), Creative thinking is essential for facing life's challenges. Critical and creative thinking skill, as well as problem-solving skill, is crucial to an individual. The skills include conceptualizing, applying, analyzing, synthesizing, and evaluating information obtained from observation, experience, reflection, logical reasoning, or communication as a guideline to conclude (Muhlisin et al., 2016). One of the educator's duties is to facilitate the learning process that contains creative and critical thinking skills to attain information independently and actively to create cognitive behavior in the students (Patonah, 2014). The student's creative thinking skill process starts from knowing the problems to communicating the thinking result. Creative thinking includes fluency, suppleness, originality, and clarity in completing the task (Fardah, 2012). Employing interactive media to solve the phe-

nomenon improved critical thinking skills and creativity. Interactive media has many choices that can be used for delivering material. The students can produce creative ideas to solve problems through interactive media.

Critical thinking, compacted with creativity, will produce the appropriate innovation to solve a real problem (Anugraheni, 2020). The employment of interactive media gets full attention in an instructional learning activity with the momentum of material mastery which can be arranged by its user (Soepomo, 2013). As an innovation in football, interactive media plays a vital role in developing students' competence in several aspects (Munawar & Hendrawan, 2019). Media conduction stimulates the imagination to creatively create and develop an idea to solve problems (Fitriarosah, 2016). Thus, interactive media is necessary for football subjects because it can facilitate students' creative and critical thinking skills when completing specific tasks given by teachers. It is also implied that creative and critical thinking skills comprise cognitive and metacognitive aspects, considering the ability to identify problems, raise questions, identify relevancy and irrelevancy, and create different ideas. It is in line with (Kurniawati & Nita, 2018) research that multimedia lesson based is likely to strengthen critical thinking ability. The statement mentioned was supported by the score improvement from the first cycle, which was 0,43 to 0,8 in the second cycle. In addition, another research states that interactive multimedia is most likely able to improve students' skills in critical thinking, proven by the result analysis of the t-test that was  $t$  count 2,107 >  $t$  table 2,093 (Zulhelmi et al., 2017). Web-based learning that uses technology best can improve critical thinking skills, especially for mastering concepts (Salleh et al., 2012).

An obvious advantage of interactive media was that it could visualize a former complex movement using certain media, for instance: PowerPoint, pictures, and slow-motion video that could be separated into a stimulus to comprehension for students related to volleyball. In addition, the media helped the student comprehend the subject material and fix problems in teaching and learning. Finally, the media could also be used to strengthen and enhance creative and critical thinking when completing the physical subject tasks and getting hold of the subject concept.

## CONCLUSION

Based on the research result and discussion point explained, it can be concluded that there were some benefits gained from interactive media proved in the creative and critical thinking students score for male and female students of marketing and online business class SMKN 2 Buduran Sidoarjo. The media conduction enabled students to visualize low pass movement, which was formerly difficult and hurtful to be administered; the ball was not properly touched, and the hand position was also incorrect by using media for instance, PowerPoint, pictures, and slow motion video. It meant that the media was powerful to enhance and strengthen the students' critical and creative thinking ability when completing low-passing movement tasks resulting in concept mastery of the subject.

## CONFLICT OF INTEREST

The authors declared no conflict of interest.

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