

The use of android media in improving students' motivation in learning sports physiology

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Abstract. Android-based applications are being used in education research. In the lectures on Sports Physiology, especially on the material of the human respiratory system, there is complex range of material accompanied by terms in Latin or scientific language that are difficult to understand. Students experience difficulties and feel bored in taking part in Sports Physiology lectures, especially in understanding the scope of the complex material about the human respiratory system with conventional learning methods. The purpose of this study is to determine the effect of the application of learning media in sports physiology based on android to increase student learning motivation on the material of human respiratory system. The questionnaire was used as an instrument in this research. This research uses a design of pretest-posttest control group. The subjects in this research were students of sports coaching education at Yogyakarta State University which consisted of two groups, namely the control class and experimental class. The scores obtained were then analyzed using independent sample t-test to discover the increase in students learning motivation, between the control class and the experimental class. The results of this research indicate that Android-based sports physiology learning media has provided a significant influence on improving student motivation.

Keywords: *android, learning media, human respiratory system, motivation*

1. Introduction

In studying the Sport Physiology course, students are demanded to recognize how the mechanism/process of working organs in the human body. In learning activities, sometimes students do not understand the material being explained by the lecturer. Therefore, there is a desire for more students to know what is happening in the human body.

Material about the human respiratory system is one part of the material studied by students of Sports Coaching Education in Sports Physiology courses. Referring to the Semester Learning Plan (RPS) material of the human respiratory system is studied to equip students with the knowledge, skills and skills of the Physical Physiology practicum, as well as to analyze the relationship between organs in the respiratory system and the constituent tissue structures in relation to bioprocesses and disorders of respiratory system function humans that can occur, and presents the results of the analysis based on the study of literature on the effects of air pollution on abnormalities that occur in the function and structure of human respiratory organs. When the learning process of Sports Physiology in class, students are often difficult to understand and interpret the concepts learned, especially on the respiratory system material. This is because many foreign concepts have complex relationships [1].



Not infrequently also the teaching method with the rote approach makes students feel bored to follow the learning process in class.

One material that is difficult for students to learn is material about the human respiratory system because many foreign concepts have complex relationships and difficult to understand. The material of the human respiratory system has a perception of the level of material difficulty at the 22nd level out of 30 existing material levels, with percentages of 13.0% and 17.4% [2].

The process of learning physiology is in principle a form of student interaction with the object being studied. Not all physiological phenomena and symptoms can be observed directly by the sense of sight. One of them is a physiological phenomenon that occurs in the body. Therefore, the need for media that can explain and support the learning process of physiology.

At present, technological developments have increased very rapidly in the world of education. The world of education has been confronted with the emergence of the industrial revolution era 4.0, which is a substitute for the industrial era 3.0 with a marked physical cyber and manufacturing collaboration [3]. The emergence of industry 4.0 era is characterized by an increase in digitalization of manufacturing which is driven by four things: 1) increasing data volume, connectivity, and computing power; 2) new forms of interaction between machines and humans; 3) the emergence of capabilities, analysis, and business intelligence; and 4) improvement in digital transfer instructions into the physical world [4].

Utilizing media of technology in learning owns an essential influence on the pedagogical process. Nowadays, Android tools are tremendously next to student life. An Android device is not only used as a communication tool but also has the significant role to be innovated into an attractive and useful media for learning [5]. Technology in media has an important role in achieving learning objectives. Technology integrated into learning is part of a strategy to increase the effectiveness of the learning process. Technology is not a new issue. It is in accordance with the truth that at this time, most students have used mobile devices (smartphones or tablets) that have many of the latest applications. Smartphone which recently becomes trending is Android, hence the advancement of learning media using Android is promising in the current era.

The success of lecturers in designing learning strategies is one of the determinants of the success of the learning process. One of ways which can be conducted by lecturers to pursue the desired goals of learning are to determine the media that suits your needs [6]. As a basis for learning media, technology is expected to facilitate the transfer of knowledge from lecturers to students, hence the use of technology in the lecturing and learning process is expected to be an effective and innovative learning media.

The media developed in this study is a mobile application in Android which contains respiratory physiology material, such as the pictures and videos of the structure and composition of respiratory organs, the mechanism of O_2 and CO_2 exchanges in the Alveoli, the respiratory control and rate, the volume and capacity of lung, and factors that affect the respiratory rate. On the other hands, the android media displays animated buttons and backgrounds in order to make those who use this media interested. Android media is packaged in small units and complete, with the examples of clear illustrations, capable in displaying or visualizing physiological processes, repeating the material, providing tests to practice, and can be operated everytime. The ways to use the android media have been available in the menu. Hence, before using this media, the students are given the guides to open and understand the menu.

The utilization of appropriate media is one efforts in developing higher quality and effective learning. In the pedagogical process, learning media are needed that can be used to develop the motivation of students [7]. It is intended so that a learning process can be carried out efficiently and effectively. Students who use the media to support the learning process both inside and outside the classroom tend to be able to understand the content well and are more motivated to learn when using applications [8].

Android-based media is one alternative learning media supported by attractive visualization and has unique characteristics that can be used anytime and anywhere [9]. Development of an Android-

based learning media based on scientific stages with characteristics consisting of attractive, practical, and flexible visualizations. Evaluation of questions has made students able to repeat the material independently without limitation of time and place and improve memory of the material [10]. Android-based learning media are used to apply one of the learning styles in the 21st century. In addition, the use of instructional media has the potential to improve the performance of student learning outcomes in the cognitive domain [11].

The lack of abilities they have does not cause the low achievement of students, but the lack of learning motivation makes students do not direct all of their abilities [5]. Thus, lecturers are required to be more creative in the learning activities from determining the learning objectives, learning design, use of instructional tool, and a appropriate assessment model, so that an expected learning objectives may be achieved properly.

The use of Android learning media can increase students' motivation for the better [7]. Motivation is an intensity and guide of behavior. Behavioral intensity refers to the level of effort required to complete a task while the direction of behavior is a way to achieve goals in certain situations [12]. In the learning aspect, motivation is defined as an encouragement that moves students to learn and determine what the students want to learn for achieving the expected successful goals. The purpose of this study is to determine the effect of the application of learning media in sports physiology based on android to increase student learning motivation on the material of human respiratory system at Yogyakarta State University.

2. Research method

2.1. Design of research

This research is a quasi experiment. Data collection in this study was conducted at Yogyakarta State University in July 2019. The population in this research were students of sports coaching education at Yogyakarta State University in the 5th semester, who were studying Sports Physiology. In addition, they have an android smartphone and capable to use it. The sample used in this study consisted of two classes that is one from the experimental class totaling 30 students and one from the control class totaling 29 students. The sampling technique in this research is random sampling. The treatment was given the same in the control class and the experimental class, except that the experimental class was given the learning media of Sports Physiology based on Android.

2.2. Data analysis and collection

The data were collected by using two types of instruments, such as questionnaires and tests. The students were given questionnaires about learning motivation by using a Likert scale, in order to determine the students' motivation level before the learning process begins (pretest). Then, after the learning process ends, the other student is given a learning motivation questionnaire to be filled. The results were analyzed in order to determine the changes in students' motivation after following the learning process (posttest). The design used in this study was the pretest-posttest control group, as shown in table 1 below [13].

Table 1. Research design of pretest-posttest control group.

Class	Pre-test	Treatment	Post-test
Control Class	Y_1^a	X_1^c	Y_2^b
Experiment Class	Y_1^a	X_2^d	Y_2^b

^a Pretest of motivation

^b Posttest of motivation

^c Only using the learning media of power point

^d Using the learning media of power point and also android-based learning media of sport fisiology

The increase in students' motivation will be determined by the following normalized gain equality [14]:

$$\text{Gain score (g)} = \frac{\text{posttest score} - \text{pre-test score}}{\text{max. score} - \text{pre-test score}}$$

Data were analyzed using independent sample t-test to discover the increase in students learning motivation between the control class and the experimental class. Data homogeneity test and normality test are prerequisite tests that must be fulfilled. Statistical tests are used with the help of the SPSS program for Windows with a confidence level of 95%. The hypotheses in this research are as follows:

H₀: There is no significant difference in increasing students' learning motivation, between the control class and the experimental class

H_a: There is a significant difference in increasing students' learning motivation between the control class and the experimental class

3. Results and Discussion

This study focus in increasing student motivation by using Android-based learning media in Sports Physiology lectures. This study was conducted at Yogyakarta State University with a population of Sports Coaching Education students in the 5th semester. The samples in this research were consisted of a control class and an experimental class. In the experimental class, the learning media based on Android was developed and validated by media experts, reviewers, material experts, and lecturers of sports physiology. This learning media was implemented to make students enterprising and enthusiastic in learning Sports Physiology. This Android-based Sports Physiology learning media has characteristics that are practical, efficient, interesting. The range of material presented is complete, and has more varied evaluation questions and can be operated anywhere and anytime, hence students can repeat learning material independently wherever and whenever without the burden of time and place. The use of digital learning media continuously can facilitate students in learning and increase student motivation and memory [11]. The display of Android-based Sports Physiology learning media is seen in figure 1.

The subject of this study was about the human respiratory system in the course of Sports Physiology. Students' learning motivation questionnaire with a Likert scale was given to students to be filled out before the lecture process begins. The aim is to discover how students' motivation is initially. The development of students' learning motivation questionnaire instruments using the model of ARCS can be seen in table 2 below.

Table 2. Grating of students' motivation questionnaires.

Variable	Sub Variable	Indicators	Item
Learning Motivation	Attention	a. Relating to learning	2
		b. Persistence in doing assignments	2
		c. Attempt for learning	2
	Relevance	a. Anecessity for learning	2
		b. Initial knowledge of the subject	2
	Confidence	a. Study individually	2
		b. Not easily surrender	2
		c. Be confident to your ability	2
	Satisfaction	a. Complacency with the result received	2
		b. Feel glad for the subject	2
		c. Comprehend the subject	2
Total Question			22



Figure 1. Display of sports physiology learning media based on android.

In the end of the lecture process, students were instructed to return to fill out the questionnaire of learning motivation to discover the students' learning motivation to study after attending the lecture. In further analysis, the data used are normalized data gain from the students' learning motivation before learning and also after learning. An increase in the average students' motivation in the control class and the experimental class is seen in table 3 below.

Table 3. Results of students' motivation level in learning.

	Class control		Class ekperiment	
	Pre-test	Post-test	Pre-test	post-test
class average	61.47	69.05	59.79	90.30
lowest score	47.27	56.36	46.36	80.90
highest score	74.54	81.82	69.09	97.27
score of average	0.09		0.33	
N	29		30	

The measurement results in table 3 show that in the experimental class, the average increment in student learning motivation is greater than in the control class. Furthermore, to discover whether there is a significant difference between a control class and an experimental class, an independent- sample t-test with prerequisite tests for normality and homogeneity of data is needed. The results of the normality test are seen in table 4 below.

Table 4. Results of normality test.

No.	Kolmogorov-Smirnov ^a			Shapiro-Wilk			Conclusion
	Statistic	df	Sig.	Statistic	df	Sig.	
Control	.092	29	.200*	.977	29	.765	Normal
Eksperiment	.111	30	.200*	.969	30	.512	Normal

From the results of the normality test, it can be seen that the gain data in a control class, and an experimental class are normally distributed. This is seen from the value of *sig.* which is greater than 0.05 that is 0.765 in a control class and 0.512 in an experimental class. Therefore, the normality test is fulfilled and then the homogeneity test of the gain data and also the independent-sample t-test are analyzed to see the effect of the Android-based learning media to increase student motivation. Homogeneity test and also independent-sample t-test results are presented in table 5 below.

Table 5. Results of homogeneity test and independent-sample t-test.

Test data	Sig.	Conclusions
Levenes' Test	.076	Homogenous
T-test for Mean Equality	.000	Ho was rejected (in increasing students' learning motivation, there were significant differences in both groups)

In table 5 above, it can be concluded that the data on students' learning motivation is homogeneous data. This is based on the Levene's Test results with the value of *sig.* 0.076 ($sig > 0.05$). Then, from the t-test results can be seen that, the grade of *sig.* is 0.000 ($sig < 0.05$). These results indicate that there is a significant difference in the increase in students' motivation in the control class and the experimental class, and a better improvement is shown in the experimental class.

Based on the observations, the students were able to use the Android media and tried all of the buttons. There were several students who only skim the material and videos, and immediately tried the tests which available in the menu. All students looked happy and interested in using the media, like when the learning hours were over, they still used the application. The learning activity became more active.

The use of technology-based media has been proven to increase students' learning motivation and encourage the process of learning more enjoyable, interesting, and attractive [15]. In this regard, the

learning process of sports physiology requires learning media in order to increase students' learning motivation. This is because, the motivation is a propulsive force in students that insures the process of students' learning activities, so the objectives of learning can be achieved as it should be. In learning process, motivation can foster enthusiasm, happiness, and passion to learn in the class. The students who have high motivation tend to have much energy in conducting lecture activities. Thus, the intensity of students' learning efforts is determined by their motivation. Efforts made in the learning process based on high motivation can lead students to the good learning achievement [16].

Using of learning media based on Android create student-centered lecture process and can foster students' desires to strive for deeper learning. However, this learning media of sports physiology at least fulfils characteristics are flexible, interesting, and clear visualizations, and contains more varied evaluation questions [7]. Relevance in question is the suitability between the materials presented with the Semester Learning Plan (RPS) of the applicable sports physiology course. In learning media, relevance is a very important factor. Flexible means that students can use it as a learning facility anytime and anywhere. Then, an interesting and clear visualization is intended to add attraction so that, students do not feel bored in operating learning media to develop their knowledge [17].

4. Conclusion

Based on the results of the research that has been described, it was concluded that there are significant differences in the improvement of students' learning motivation where a better increase occurs in students who utilize learning media based on Android.

To optimize students' learning motivation for sports coaching education, several suggestions are suggested which are (1) the need for developing equal media for other subjects and material, (2) further research is required with another variable concerned to the use of learning media based on Android.

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