Universal Journal of Educational Research 8(11B): 5686-5692, 2020 http://www.hrpub.org
DOI: 10.13189/ujer.2020.082202

Student Perceptions of Mobile Learning Based Guidebooks

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Received April 10, 2020; Revised September 30, 2020; Accepted October 19, 2020

Cite This Paper in the following Citation Styles

(a): *[1] Darmaji, Dwi Agus Kurniawan, Astalini, Rahmat Perdana, Artha Lumbantoruan, Nengria Nasih, Sofiah Christine Samosir, Utari Prisma Dewi , "Student Perceptions of Mobile Learning Based Guidebooks," Universal Journal of Educational Research, Vol. 8, No. 11B, pp. 5686 - 5692, 2020. DOI: 10.13189/ujer.2020.082202.*

(b): *Darmaji, Dwi Agus Kurniawan, Astalini, Rahmat Perdana, Artha Lumbantoruan, Nengria Nasih, Sofiah Christine Samosir, Utari Prisma Dewi (2020). Student Perceptions of Mobile Learning Based Guidebooks. Universal Journal of Educational Research, 8(11B), 5686 - 5692. DOI: 10.13189/ujer.2020.082202.*

Abstract This study aims to look at differences in students' perceptions about the use of mobile-based practicums. This type of research is a mixed method, involving 117 students with 59 students in the physics education study program and 58 students in the chemistry education study program. Data collection uses an interview and perception questionnaire about mobile-based practicum guides using a Likert scale of 5, for data analysis using descriptive and inferential statistics in the form of an independent sample t-test. Based on the results of data analysis from the perception questionnaire produced for the basic physics practicum guide based on mobile learning, it can be concluded that the basic physics practicum guide based on mobile learning has a positive response, which was given by physics education study program students and Chemistry study program students with the perception results of educational study programs physics included in the frequency category 38 and the percentage are 64.4%. And for the perception of chemistry study programs, it is also included in the good category contained at frequency 28 with a percentage of 48.3%. There are differences in the two classes, and physics education students have a dominant category better than chemistry education students as shown by the t-test conducted. Therefore, it is recommended to use technology in the learning media to be taught, because it has various advantages in using it.

Keywords Perception, Practicum Guide, Mobile Learning

1. Introduction

The rapid development of technology has led to a variety of new applications, such as smartphones. Presently, the smartphone has become an obligatory requirement among students. According to [1], the development of technology can also be used as a learning medium that can support the learning process. In 2016 the Indonesian Internet Network Providers Association (APJII) surveyed the results showing that 89.7%, the largest internet users in Indonesia were students. The problem that needs to be addressed by educators is to direct students to better use the internet in the realm of education [2]. An example that still uses the internet a little is a basic physics course.

Physics is a science that is in contact with everyday life and scientific formulas and concepts. The physics education study program is one of the study programs which are available in a faculty of the teacher and education which aims to produce skilled graduates in various aspects of competence such as knowledge, understanding, and skills [3-5]. According to [6] for problem-solving can be carried out by guiding students to apply the existing knowledge in themselves. Transferable skills can be developed through the science learning process in classrooms or practicum in laboratories [7, 8]. Basic physics is a compulsory subject in the Physics

Education Study Program at the University of Jambi and weighs 4 SKS (3 SKS face to face and 1 SKS practicum). Basic Physics Practicum aims to assist students in solving problems of natural phenomena and train students' science process skills (SPS). Practicum activities are one of the methods used to clarify the material that has been learned. In order for practicums to be carried out, clear and easy practical guidelines are needed to use them.

The practicum guide is used as a reference for practicum both for students and for teaching assistants especially in reflecting material. The initial assignment or preliminary task is a way to study the experimental guide and related material before the practicum begins. The basic Physics practicum guide used today is a guide that can train students' science process skills. Practical activities require science process skills owned by students such as: formulating hypotheses; formulate a problem; identifying variables and analyzing data, and draw conclusions so as to find knowledge in achieving learning competence [9, 10]. A student's scientific skills process such as identifying problems, building hypotheses, observing, concluding, choosing methods, identifying variables, controlling variables, and making conclusions must explain the level of scientific creativity of students. Several studies have found this relationship between SPS and SC [11]. Students' science process skills are important skills to develop in education [12]. Process skills are also considered a scientific method used to train students' steps in finding things through experimental activities [13]. The observed aspects of science process skills (SPS) include observing, predicting, measuring, using tools, doing work, interpreting data, communicating, and concluding. Science process skills are highly demanded to be possessed by students in the learning process. Because understanding concepts and SPS are an important thing to have, the problems that arise in understanding concepts and SPS experienced by these students must be dealt with as soon as possible by a physics lecturer [14]. The use of basic physics practicum guides that are able to train student SPS greatly helps students in the process of carrying out practical work.

In addition to practicums, guides can train students' science process skills. The use of media can also help students in the learning process. [15] the learning process requires an interesting and enjoyable learning media as a source of independent learning for students. A media and practical guide can overcome the limitations in the implementation of the practicum, so students get their learning experience [16]. Media is a communication channel. Derived from the Latin word meaning "between," this term refers to something that carries information [17]. Media are forms of communication, both in printed form and in audiovisual form and its equipment. Media that is able to provide information precisely between the recipient of the information and the giver of information is a good medium [18]. With the media supporting the learning process, this will facilitate both educators and students in carrying out learning and have a positive impact on students in the implementation of learning, learning media need to facilitate educators [19]. Learning media that are widely used today, namely smartphones, are used not only for communication devices, but also as media for learning [20]. As time develops, both in the field of media technology and the media used for learning will also develop. The past few decades, humans have experienced a revolution in the computer sciences, not only in terms of their ability but also in terms of its use [15].

In line with the industrial revolution 4.0, various technologies have developed widely. The concept of Industry 4.0 assumes blurring the differences between the work of people and the work of machines [21]. The use of technology in the learning process in the current era is mushrooming everywhere, one of which is smartphone-based learning media. The technology is widely used as a learning medium, so it is very supportive of the learning process. According to [22] currently, education in Indonesia is much influenced by the industrial revolution 4.0, namely technology, information, and communication. In the field of education, the use of technology is focused on improving the quality of learning so as to improve the quality of education [23, 24]. Over the last few decades, information and communication technologies have improved greatly and the use of computers has become more widespread [24]. Through various advantages in the use of technology possessed, one of which is computer technology has inspired many experts in the field of education to empower it on a broader scale, so that the process of use is not limited to learning, but also becomes the main tool in the administration of education [25]. The use of technology to be used as a learning medium is no stranger to today. With that, the researcher wants to see the students' perception of the Basic Physics practicum guide based on mobile learning.

Perception is a process of students' interpreting, evaluating, accepting, giving opinions, and testing the data and sensory responses to what they see [26]. Students' perceptions usually occur during the learning process in the class both perceptions of learning materials, learning models used and the media used [27]. The influence on the social environment in which the individual lives can cause someone's perception to arise. Several studies have shown that m-learning applications can facilitate students in various ways; e.g., by creating ease in learning content and interacting with others, anytime and anywhere [28]. M-learning is learning that utilizes technology and mobile devices [28-30]. So the use of mobile learning can help students become better at learning. Innovative mobile learning makes the learning process easier and more attractive so it is effective for learning [29]. Researchers and relevant instructors need to pay more attention to how to effectively make use of mobile tools or learning strategies to attain good learning effects, or what kind of mobile learning in physical education will be the

development trend in the future [30].

According to [31] the research team observed the course of the learning process in the form of practicum using observation sheets. The Observation Sheet and Basic Physics Practicum Guide used today are still in the form of hard copy. The use of Observation Sheets and practical guides are less effective and efficient so as to make it easier to use the media as a support for the learning process. In addition to being less effective and efficient, the current practicum guides also spend a lot of paper so as to minimize the use of paper, the solution is to use observation sheets and basic physics practicum guides in the form of mobile learning. Since at this time students, in general, have been using smartphones to support the science process skills students can use observation sheets and basic physics practicum guides based on mobile learning that can be used anytime and anywhere so that students can prepare themselves in advance for practical activities. Therefore, to facilitate the implementation of practicum and increase students' insight, researchers consider looking at students' perceptions of the application of basic physics practicum guides based on mobile learning.

Therefore, the aim of this study is to look at differences in the perceptions of physics and chemistry students in using mobile-based practicum guides, with the following research questions

1. How are students' perceptions of using mobile-based physics practicum guides?
2. Is there a difference between physics and chemistry students in practicing using a mobile-based practicum guide?

2. Materials and Methods

Research Design

This study uses a mixed methods approach. Mixed methods can refer to the use of quantitative and qualitative data in answering research questions as well as being part of a larger research program and is designed as a complement to providing information related to different methodological approaches [32]. The type used is sequential explanatory.

Subject of Study

In this study students' perceptions were viewed in terms of perceptions of the variables of basic physics practicum based on mobile learning at FKIP Jambi University. This study involved 117 students, consisting of 59 students of physics education study programs and 58 students of chemical education study programs.

Instrument and Data Collection

Data collection uses an interview and perception questionnaire, questionnaire with five answer choices guided by the Likert scale with the categories of strongly agree, agree, doubt, disagree, and strongly disagree. The questionnaire was made through Google form technology which was then distributed using social media. Google software is a form that is easily accessible, free to use, simple to operate, and good enough to be developed as an evaluation tool in the learning process [33]. In addition to using the questionnaire perception data collection also uses a structured interview sheet that is accompanied by reasons (see figure 1). The questionnaire items of students' perceptions of the basic physics practicum guide based on mobile learning were 10 statements with each positive and negative statement having 5 answer options with Cronbach alpha 0.79. Student responses are expected from the questionnaire in the form of answers agree or disagree with giving a score for each positive statement as follows: Very Good = 5, Good = 4, Enough = 3, Not Good (ST) = 2, Very Not Good = 1. Scoring for each negative statement as follows: Very Good = 1, Good = 2, Enough = 3, Not Good = 4, Very Not Good = 5. The level of students' perception categories towards the basic physics practicum guide can be seen in the following Table 1:

Table 1. Levels of student perception categories

Category	Score Interval
Very Not Good	20.0 – 36.0
Not Good	36.1 – 52.0
Enough	52.1 – 68.0
Good	68.1 – 84.0
Very Good	84,1-100,1

Data analysis techniques using descriptive statistics obtained mean (M), median (Mo), maximum value and minimum value of perception, and using independent sample t-test.

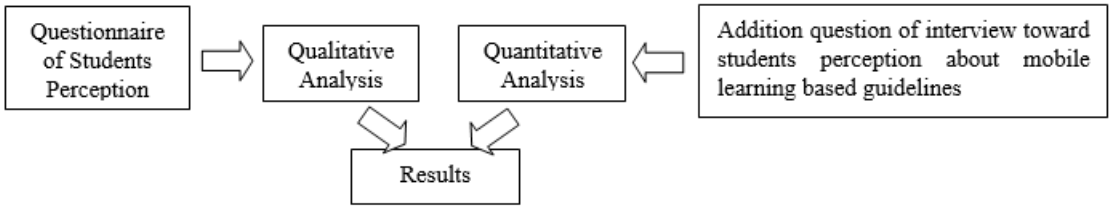

Figure 1. Data Collection

Table 2. Description of Perceptions About Mobile Learning Based Guidelines

Classification				Mean	Median	Mode	Min	Max	%
Department	Score Interval	Category	Total						
Physics	20.0 – 36.0	Very Not Good	0	71.1695	74.0000	72.00[a]	49.00	91.00	0
	36.1 – 52.0	Not Good	3						5.1
	52.1 – 68.0	Enough	13						25.4
	68.1 – 84.0	Good	38						64.4
	84.1 – 100.0	Very Good	3						5.1
	Total		59						100
Chemistry	20.0 – 36.0	Very Not Good	0	70.3621	71.5000	76.00[a]	49.00	85.00	0
	36.1 – 52.0	Not Good	1						1.7
	52.1 – 68.0	Enough	24						41.4
	68.1 – 84.0	Good	28						48.3
	84.1 – 100.0	Very Good	5						5.1
	Total		58						100

Table 3. The results of the Independents sample t-test

	T	df	Mean	Std.Deviation	*95% confidence interval*	
					Lower	*Upper*
Perception Students	16.473	117	3.0906	.14321	18.236	.6120
	16.473	108.267	2.2033	.20015	17.935	.8615

3. Results and Discussion

Description of student perception data about basic physics practicum guides based on mobile learning can be seen in the Table 2.

Table 2 shows that the scores obtained from 117 students with valid data acquisition for students' perceptions about the basic physics practicum guide based on mobile learning with a minimum value of physics education study program is 49.00, a maximum score of 91.00 with an average of 71.1695, median 74.0000, mode 72.00 and minimum value of chemistry study program is 49.00 maximum value 85.00 with an average of 70.3621, median 71.5000, and mode 76.00.

Based on table 2, it can be seen that there are dominantly different perception results, namely physics students have a dominant perception with a good category compared to chemistry education students in practicing using a mobile-based guide, to strengthen it can be seen in the independent t-test test in table 3 follows.

From table 3 it can be seen that the value obtained (t arithmetic) with the value of t table. T-table values can be found in the t table with a significance value of 0.025 (2-tailed test) with a degree of freedom (df) 117. In this study, the results for t table are 1.97658, whereas the value of t arithmetic can be seen in Table 3. (column t) which is 16,473. The hypothesis testing criteria is that there is a rejection value of H0 [33]. So, it can be concluded that there are significant differences in the perception of physics students with chemistry in practicing using a mobile-based guide. It can be seen from Table 3 that the average value of students 'perceptions is 3.0906, which means it can improve students' perceptions of practicing.

Based on the results of these data it can be interpreted that the basic physics practicum guide based on mobile learning is feasible to use. The results obtained are in accordance with research conducted by [34], based on the results and responses of students' teaching and learning processes using the developed mobile learning device, the product in terms of feasibility can be said to be very good and has a good level of interactivity and is able to make students active in practicum.

There are differences in perceptions of students of physics education study programs that are higher compared to chemistry education study programs against basic physics practicum guides based on mobile learning because when filling out questionnaires the perception of answers from chemistry students is still doubtful so that chemistry study program students are in the good category with a percentage of 48.3%. Whereas more physics study programs answered that they agreed with the use of basic physics practicum guides based on mobile learning so that physics education study program students were in the good category with a percentage of 64.4%. In other words, physics education students have the desire to use basic physics practicum guides based on mobile learning. According to [18], mobile learning is presented to overcome a problem in learning activities, which is useful to facilitate and provide a way for students to be able to understand the material explained by the lecturer.

Based on interviews with 22 students consisting of 13 physics education students and 9 chemistry education students, from the interviews obtained information that 100% of physics and chemistry education students have a smartphone/tablet PC with an Android type. E-learning as a medium that uses the internet, including e-learning is the use of internet technology to deliver a series of solutions that can increase knowledge and skills. E-learning or internet enables learning to use teaching methods and technology as a means of learning. According to them, the use of smartphones (android) is a necessity in the present. The interviews also obtained information that the use of smartphones can help students to study wherever and whenever, and can increase student knowledge. Students also said they preferred learning media by using smartphones (Android) because the students considered their use to be more practical, accessible anywhere and anytime, as well as more, introducing students to ICT technology in learning. In line with research conducted by [35-39], an android application is used as one of the media to facilitate students to find information and understand the concept of optical devices. The reason students prefer learning media using Android is that it is easy to use, can be accessed at any time, and introduces students to ICT technology in learning. Based on the results of the interview, it can be said that the use of basic physics practice based on mobile learning is included in the good category because the response of the average student answers positive choices for the interview sheet accompanied by reason [40-43].

4. Conclusions

Based on the results of data analysis from the perception questionnaire produced for the basic physics practicum guide based on mobile learning, it can be concluded that the basic physics practicum guide based on mobile learning has a positive response, given by physics education study program students and Chemistry study program students with the perception results of educational study programs physics is included in the frequency category 38 and the percentage are 64.4% and for the perception of chemistry study programs it is also included in the good category contained at frequency 28 with a percentage of 48.3%. And there are differences in these two classes, and physics education students have a dominant category better than chemistry education students as shown by the t-test conducted. Therefore, it is recommended to use technology in the learning media to be taught, because it has various advantages in using it.

Acknowledgments

We thank the chair of the Physics Education study program for giving us the opportunity to work together. We would also like to thank the head of the Physics Education laboratory at Jambi University, who has provided the opportunity to be able to conduct research at the Jambi University Physics Education laboratory. In addition, thank you to all Physics Education students who participated in this study.

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