

The Effectiveness of using Quipper School Teaching Materials towards Students' Cognitive Outcomes of Eleventh Grade Students of MIPA

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Abstract—In biology learning, particularly for excretion system material, it belongs to the system that occurs in the human body. All processes that occur in it unable to see directly. This is one of the obstacles faced by students in understanding the material about all processes that occur in human's body. In addition, lack of facilities in learning also inhibits the learning process. Lack of facilities in learning also will have an effect on the low students' outcomes. This study was aimed to know the effectiveness of using Quipper School teaching materials towards students' cognitive outcomes of eleventh-grade students of MIPA in SMAN 2 Selong. The types of this study were quasi-experimental research. The populations in this study were second-semester students of SMAN 2 Selong in academic year 2017/2018. Samples in this study were eleventh-grade students of MIPA in SMAN 2 Selong consist of 2 classes those were XI MIPA 5 as the experimental class and class XI MIPA 4 as control class. The techniques of Data collection were used test techniques. The analysis of result study was done by independent sample *t* test. The results showed that the mean score post-test experimental class was 81.5 and the control class was 73.6. Different test results with *t* test showed that the Sig. (2-tailed) was 0.000 < *p*, was 0.000 < 0.05.

Keywords—*excretion system, Quipper school, learning cognitive outcomes*

I. INTRODUCTION

Learning is a reciprocal relationship that occurs among the teacher and students along with the elements that exist in it so that there is a behavioural changing for students due to the learning process [1]. Learning process in an educational system is a unity which is intact and cannot be separated with other learning components such as, the students themselves, the learning facility as well as the goals and results to be achieved.

In the current of globalization era, the development of science and technology rapidly. The development of the technology is also a benchmark for the development of a nation's education by innovating media and teaching materials that are relevant to emerging technologies. The Use of learning resources is a way of overcoming the problems that occur in the implementation of the learning process [2], [3]. The use of developing the technology it is expected that learning becomes active and innovative. Active learning occurs when teachers are able to connect learning materials relevant to the real life that occurs in students [4].

In biology learning, particularly for excretion system material, it belongs to the system that occurs in the human body. All processes that occur in it unable to see directly. This is one of the obstacles faced by students in understanding the material about all processes that occur in human's body. In addition, lack of facilities in learning also inhibits the learning process. The learning process that occurs unable to run effectively if only by relying on textbook provided by the school. Lack of facilities in learning also will have an effect on the low students' outcomes. Therefore a tool of learning is needed in order to make the students are able to understand the material.

Hamzah & Nurdin in [5] stated that a lesson can be said to be effective if the learning process has been planned to generate the learning process [5]. Effectiveness is an effort that is used to achieve predetermined goals, as needed, and appropriate for the available facilities and time provided to get maximum results [6].

Based on the globalization growing rapidly, teachers are required to be able to create media are able to make students understand the concepts of biology easily, but the learning media used today is still less attention by teachers [7]. One of the innovations that teachers can be used to make learning more interesting is by using emerging technologies. Information technology is essentially a combination of telephone, computer, software, modem, Internet, E-mail, television, and radio has potential to provide innovation of learning [8].

Quipper School is a web-based online learning platform [9],[10]. The use of Quipper School as an additional resource can be an alternative way for students to add their learning resources. Quipper School also provides feedback to students so that they know their strengths and weaknesses after learning [11]. By Quipper School, teachers can put the materials to be taught, videos, animations, and exercises that can be accessed by students whenever and wherever as long as there is internet access using PC, laptop or Smartphone.

Based on the case above, the learning will be easier to manage particularly in terms of materials, placement, management, and assessment and are able to manage the environment and learning conditions needed by teachers and students [12]. By innovation of the learning materials, the students will be more interested in learning. It also has an effect on the teacher because Quipper School provides

convenience for teachers in giving assignment and exercises beyond of the schedule. So with these teaching materials, it is expected to affect the students' interest and outcomes.

The study was aimed to know the effectiveness of using Quipper School teaching materials towards students' learning cognitive outcomes of eleventh-grade students of MIPA in SMAN 2 Selong on the excretion system materials.

The rest of this paper is organized as follow: Section II describes proposed research method. Section III presents the obtained results and following by discussion in section IV. Finally, Section V concludes this work.

II. PROPOSED METHOD

The type of study was quasi-experimental research because not all variables appear and experimental conditions can be controlled and strictly controlled. The population in this study were students of SMAN 2 Selong even semester in academic year 2017/2018. Samples in this study were students of eleventh grade MIPA in SMAN 2 Selong as much 2 classes that were XI MIPA 5 as the experimental class and XI MIPA 4 as control class.

The independent variable in this research was Quipper School teaching materials and the dependent variable was the students' cognitive outcomes. In the experimental class is given treatment by learning using Quipper School teaching materials while for control class is given the treatment of learning by using commonly learning model used by the teachers. The research design can be seen in Table I below.

TABLE I. RESEARCH DESIGN

O1:	Pre-test, learning cognitive outcomes on experiment class before treatment
O2:	Post-test, learning cognitive outcomes on experiment class after treatment
X:	Treatment by applying biology teaching materials <i>Quipper School based</i>
O3:	<i>Pre-test</i> learning cognitive outcomes on control class
O4:	<i>Post-test</i> learning cognitive outcomes on control class without treatment

Data collection techniques used were test techniques to measure students' learning outcomes of experimental class and control class. The form test was multiple choice. Before the test is given to the learner who will be the target of the research, the previous test instrument was tested in a class that has studied the material to see the validity, reliability, distinguishing, and difficulty level of each item. Data analysis was done to test the hypothesis of this study.

The data analysis used in this study was independent sample t-test using SPSS 20 program. This test was aimed to see the difference treatment was given towards experimental class and control class.

III. RESULT

Quipper School can be accessed through the website www.quipperschool.com using laptop devices, computers and smartphones. This teaching material can be accessed anytime and anywhere as long as it still has internet access. By utilizing the smartphone owned, the students will be easier in accessing teaching materials as other learning resources. This is in line

with the opinion of Darmawan in [12] stated that the source of information and learning resources are not only obtained through textbooks, newspapers, audio-visual and electronic, but can be obtained sources of information through the Internet network [12]. Quipper School based teaching materials are designed with the aim to provide facilities to students to be able to learn independently and with new innovations students learn to be increased interest.

Based on the study has been done, the mean score of pre-test and post-test in control and experiment class found such as described Table II.

TABLE II. MEAN SCORE PRE-TEST AND POST-TEST FOR EXPERIMENTAL AND CONTROL CLASS.

	Mean score pre-test	Mean score post-test
Experiment class	58.2	81.5
Control class	58.1	73.6

Class/ grade	Pre-test	Treatment	Post-test
Experiment	O1	X	O2
Control	O3	-	O4

Before the hypothesis is tested, we need to conduct a prerequisite test, which is the normality and homogeneity of data.

The normality of data analysed by Kolmogorov-Smirnov Test and can be seen in Table III.

TABLE III. NORMALITY OF DATA

One-Sample Kolmogorov-Smirnov

Test

	pre-test_exp eriment	pre-test_contr ol	Post-test_exper iment	Post-test_control
Kolmogorov -Smirnov Z	1.074	1.293	1.190	.873
Asymp. Sig. (2-tailed)	.199	.071	.118	.431

- a. Test distribution is Normal.
- b. Calculated from data.

Because the value of Sig. is > than *p* value (0.05), then the distribution of data is normal. And the homogeneity of data analysed by Levene Test. And the result of homogeneity of data can be seen in Table IV.

TABLE IV. HOMOGENITY OF DATA

		Levene Statistic	df1	df2	Sig.
pre-test	Base	1.218	1	129	.272
Post-test	d on mean	1.888	1	127	.172

Because the value of Sig. is $>$ than p value (0.05), then the data is homogen. Because the data is normal and homogen, we can continued the test of hypothesis. To test the hypothesis it is done by independent sample t -test. Different test results can be seen in Table V.

TABLE V. THE RESULT OF HYPOTHESIS TEST

		Levene's Test for Equality of Variances		t -test for Equality of Means		
		F	Sig.	t	df	Sig. (2- tailed)
Post- test	Equal variances assumed	1.88	.172	8,997	127	.000

IV. DISCUSSION

Based on hypothesis test is done, the Asymp value known as. Sig. (2-tailed) is $0.000 < p$, is $0.000 < 0.05$. So it can be concluded that there is a difference between learning that used Quipper School teaching materials with the lessons commonly used by teachers. In line with the previous research conducted by Purmadi in [13] stated that learning by using web-based teaching materials can improve students' learning outcomes, this can be seen from the increase of the score from pre-test to post-test with an average pre-test score was 52.03 and post-test score was 83.90 [13].

Based on the findings of the study above, the differences learning outcomes between the experimental and control classes were influenced by the use of Quipper School materials that combine animation, video, images and audio in teaching materials. Because of these combinations, students become more interested in learning. Thomas in [14] stated that the use of animations on learning such as text, images, graphics, audio and video in learning such as biology can help students in understanding the lesson because with the help of animation students' understanding of a subject becomes more meaningful. With the animation can help students to see how processes that cannot be seen directly without additional tools [14].

Learning outcomes are special abilities for the cognitive, affective or psychomotor aspects. The result of learning according to Bloom's taxonomy is then developed into four domains of cognitive, affective, sensorimotor, and social [15], [16]. Lim, *et al.* in [17] share the results of cognitive learning into 3 sub domains that is discussed with knowledge,

knowledge in organizing, and cognitive strategies. Oral knowledge relating to ideas, knowledge in context with concepts and relationships, while for cognitive initiation by means of information and information arrangement [17]. In the context of learning outcomes, the position of students is a subject to be warned. While the students as a subject with the inherent variables in the students themselves who serve as targets in value. These variables are related to physical and nonphysical, in this case covering with ability and personality.

Learning outcomes are achieved by students will be used as a reference to see the achievement of learning objectives that have been planned. From learning outcomes is achieved by students as well, teachers are able to provide an evaluation of the method is used during the learning, so that teachers are able to correct their mistakes that occur during the learning process.

Quipper School is one of the learning media in the form of Electronic Learning (E-Learning). The function of E-Learning is as a supplement that students have the freedom in choosing, that is whether to use e-learning or not in the learning process, supplement (complement) means that e-learning is created to complement existing learning materials in class, and substitution means that e-learning serves as a substitute for its purpose so that students can manage or combine learning that is fully face to face learning, in part with conventional methods, and partly or completely using the internet.

Quipper School is an online learning facility that can be accessed by teachers and students by online. The facilities in Quipper School make it easy for teachers to provide materials and tasks to students. by this Quipper School students also are able to increase students' knowledge about the material to be taught and measure their ability and understanding of the material taught through the questions given by the teacher in the Quipper School teaching materials. This teaching material can be made as additional teaching materials by students who can be accessed anytime and anywhere as long as connected with internet connection.

The interesting about Quipper is the interaction of teachers with students and social media integration that allows teachers to build social relationships with their colleagues and also with their students easily. Quipper school consists of two parts: namely as a Link for teachers and the second sebgai learning media for students. Quipper as a link is used by teachers to manage their classes online and check into their students' activities so teachers can create educational content, send assignments and exam questions [10].

In the learning, teachers are to be creative in creating a creative and fun learning atmosphere. Teachers must be able to adapt various conditions of learning activities, so that the learning process becomes more effective [17]. In addition to the effectiveness of students' cognitive learning outcomes, the use of teaching materials based on Quipper School can increase the interest of the students. This can be seen from the enthusiasm of students in following the lesson. Quipper School is a Learning Management System (LMS) whose use can be done anywhere and anytime. LMS in its use is also easy as long as the internet access is stable. This is in line with the opinion of Mtebe in [19] which states that the LMS in the implementation easy to use and easy to learn so that students do not find it difficult in accessing information that exist in the system [19].

Because the teaching materials with Quipper School can be accessed using a smartphone then students can maximize the use of their smartphone as a source of learning. This is in line with the opinion of Akpan in [20] which states that the existing features in the smartphone can be used as a learning resource by maximizing its use as a learning resource so as to enhance the learning process with the smartphone they can access information, pictures, and video [20].

V. CONCLUSION

This research has presented the effectiveness of using Quipper school teaching materials towards students' cognitive outcomes of eleventh grade students of MIPA. It is concluded that the teaching materials with Quipper School can be accessed using a smartphone, furthermore students can maximize the use of their smartphone as a source of learning.

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