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The Application of The PjBL Model uses WhatsApp and Zoom Meetings in Learning

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ABSTRACT: The current covid-19 pandemic has an impact on Capita Selecta Chemistry lectures. One of the efforts made is by implementing the PjBL model and utilizing several e-learning platforms in learning. The platforms most often used today are group whatsapp and zoom meetings. The aim of the present study was to use a knowing how the effect of implementing the Project Based Learning (PjBL) model assisted by WhatsApp Group (WAG) and zoom meetings on student learning outcomes and student responses to the applications used. This research is a research pre-experimental research with one-group pretest posttest design, experiments conducted in one class without a comparison class. The research was conducted at a State University in Bengkulu. With the research subjects as many as 24 students who took capita selecta Chemistry course. The instruments used in this study are learning outcomes tests and response questionnaires towards applications that used in learning. Data analysis techniques include average value, normality test, and hypothesis testing using the t-test using SPPS computer program for windows version 23. The results showed that there was an increase in student learning outcomes with the implementation of PjBL model assisted by WhatsApp and Zoom applications with pretest scores of 66.042, postest scores of 84.625 and the N-gain value data obtained was 0.547 in the moderate category. Student's response toward the use of WAG and Zoom Meeting applications was very positive. As many as 91.67% of students considered that WAG application was a very practical application and it was easily accessible to students, especially access to learning materials. The use of zoom meeting according to 70% of students is also very interactive and can replace face-to-face meetings.

Keywords: PjBL Model, WhatsApp, Zoom Meeting, Learning Outcomes, Capita Selecta

INTRODUCTION

Capita selecta in chemistry is one of the compulsory subjects in Chemistry Education Study Program at a State University in Bengkulu, Indonesia. The purpose of this course is to determine the latest developments in chemistry based on the results of research in the fields of Chemistry and Education. The course content includes the latest research developments in chemistry and chemistry education. So far, learning still applies the usual discussion method, assignment method and question and answer method. The application of the active learning model has not been implemented in the classroom.

In the midst of the current covid-19 pandemic, it is very difficult to do face-to-face learning so solutions are needed to help lecturers in delivering learning. One of the methods used is by implementing the Project Based Learning (PjBL) model assisted by the WhatsApp Group (WAG) application and face-to-face through the zoom meeting application.The PjBL model is a learning model that requires students to be able to produce a real product, and related to the knowledge aspect of creative thinking skills [1]. The PjBL learning model involves student activeness in solving problems, it can be done in groups / independently through several scientific steps to produce a product at a certain time which will later be communicated to others. In its implementation, students will be given assignments independently through the WAG application. Completion of tasks is carried out independently starting from the planning stage, preparation, to product exposure. Students are fully responsible for the project that will be produced by involving the roles of peers, lecturers, parents, and even the community.

Currently, mobile technology in learning has been widely used in online teaching at universities around

the world [2]. This online learning takes the form of using applications or web-based courses using computers or mobile devices. In practice, the PjBL model is usually applied with the help of WAG or zoom only. In this study, both the WAG platform and the zoom meeting were used in learning.

WhatsApp or known as WA is very popular application in the community. WhatsApp is an internet-based application that allows each user to share various kinds of content according to its supporting features [3]. In the past, communication was still via telephone or SMS, now using WA application, you can simultaneously use it to sending news via short messages, calling even a video call. This application is a lot of enthusiasts because it is more economical, it can take advantage of several application features with only internet quota.This internet-based application has the potential to be used as a communication medium, because it makes easier for users to communicate and interact with each other without spending a lot of money in its use, because WhatsApp does not use credit, but uses internet data [4]. According to Larasati, WhatsApp is an application that can be used to send messages to each other quickly and can send photos, videos, pictures, stickers, voice notes, send lecture materials in pdf or word form also can share other information and discuss each other [5].Almost all smartphones, android support this WA application, so that it becomes popular quickly compared to other similar applications, the features in it are also easier. Even today, this application is able to make group meetings for 8 people. The latest information can be more than 10 people. Based on Rahartri [6] states that WhatsApp is superior to other chat applications, because it is simple and easy to understand; the WhatsApp application is quite lightweight, saves battery, and can save internet data. Along with the current development, lecturers and students must be more creative in taking advantage of current technological developments. Among them is the use of WA in learning. In WA, you can send documents in the form of photos, PPT files, pdf files and even send learning videos. In groups, lecturers and students can discuss directly. It can also be set up where only lecturers teach and send lecture materials.WhatsApp as an alternative media in providing information, improving performance, an effective learning discussion tool also being an effective and useful communication medium for its users [7,5,8]. In implementing learning, the Zoom Cloud Meeting application is used for face-to-face lectures. The Zoom Meeting application is a video-based learning media, which can be used for learning as well as for meetings, seminars and others. The zoom meeting platform is free to use for 40 minutes. For paid zoom accounts there is no time limit. With the Zoom Meeting application, students and lecturers are able to communicate directly using the video feature in the application.

This research is important, because besides utilizing existing applications in learning, it also applies the PjBL learning model which requires students to think critically and creatively. Students are assigned to make projects about the latest developments in the field of chemistry and in the field of chemistry education through the Capita Selecta Chemistry course and communicated through the applications that will be applied, they are WAG and Zoom. The expected results include complete documents regarding the latest developments in chemistry and chemistry education and can be used as a reference for students to make their final project/thesis.

METHODS

This research is a pre-experimental research with one-group pretest posttest design, experiments conducted in one group/class without comparison groups/classes. The aim is to compare student learning outcomes before being treated and after treatment or posttest [9]. In this study, the treatment given was learning using the PjBL learning model assisted by the WAG and zoom meetings application.

Place, Time and Subject Study

The research was conducted at a State University in Bengkulu. With the research subjects as many as 24 students who took the Capita Selecta Chemistry course, with details of 3 men and 21 women.

Data Analysis

The instrument used in this study was an essay test of 10 questions. The tests used are in the form of pretest and posttest which aim to determine the ability of students before and after learning using the PjBL learning model assisted by WAG and zoom meetings applications. In addition to the test, a response questionnaire was also distributed to the applications used in learning. Data analysis techniques include

average value (mean), normality test, and hypothesis testing using the t-test using SPPS computer program for windows version 23. Hypothesis testing was carried out to determine whether there were differences in student learning outcomes in the capita selecta lecture before and after learning using the PjBL learning model assisted by WAG and zoom meetings applications. The response questionnaire is seen from the percentage of student positive responses to the application that used.

RESULT AND DISCUSSION

Capita Selecta in chemistry learning applies a project-based learning model. Where students are given project assignments which are done in groups, where each group consists of 4-5 students. The assignment of this project is announced in the WAG application. The use of wag is very effective and fast in conveying important information related to learning. Many previous researches have made use of learning materials and have shown positive responses. Based on previous research, WhatsApp mobile learning activities show that the learning process facilitates learning, helps students find solutions to learning difficulties and easily construct and share knowledge, and supports research into useful information for learning for a majority of students in experimental sample [10].In this study, combining the pjbl model with the wag application and the zoom meeting application in the discussion process in class. Students are required to observe, read and make project assignments. Learning activities using the PjBL model can be seen in Table 1.

TABLE 1. Learning Activities with PjBL model

Phase	Learning Activities
Determination of project assignment	The initial stage of students looking for their own problems, related to the latest educational research developments, designing activities to be carried out, looking for information from the latest journals
Develop project planning	The project assignment is to write articles with browsing a lot of literature both from books and journals.
Arrange a schedule	Lecturer and students agree together to create a timeline and deadline for when the project can be completed
Monitor students and project progress	Lecturers monitor project assignments done by students and evaluate them continuously while consulting and getting direct guidance with lecturers via WhatsApp
Rating results	At this stage students make presentations and questions and answers via zoom meeting application. The lecturer assesses the results of the article that students have completed as well as discussing the topic of the latest research developments in chemistry education.
Evaluating experience	Lecturer and students reflect on the activities and results of projects that have been carried out. The lecturer evaluates the progress of each group, giving feedback about the level of understanding that students have achieved. The final project is an article which will be reviewed for its feasibility through a review process by a lecturer who teaches the Capita Selecta in Chemistry course. Eligible articles will be published in the journal / proceeding.

Capita selecta in chemistry materials as well as group project assignments were carried out in 6 meetings and presented in the Table 2 below:

TABLE 2. Learning Implementation

Meeting	Implementation date	Theory
1	23 October 2020	Higher Level Thinking Skills (HOTS)
2	30 October 2020	Model Problem Based Learning (PBL)
3	06 October 2020	TGT Cooperative Learning Model with Truth or Dare Game Media
4	13 November 2020	The STEM approach and the Kahoot application
5	20 November 2020	Project Based Learning (PjBL) model based on STEM
6	27 November 2020	Learning Model Team Assisted Individualization (TAI) and Creative Problem Solving (CPS)

Before the PjBL model treatment assisted with the WhatsApp and zoom meeting application, students were given pre-test questions in the form of essays on the capita material. And after applying the model and application, students were again given post test questions. The following are the results of the students pretest and posttest, can be seen in Table 3.

TABLE 3. Average Pretest Scores, Postest Scores, Gain and N-Gain

Average				
Pretest scores	Post test scores	Gain	N-gain	N-Gain category
66,042	84,625	18,583	0.547	Moderate

Based on Table 3 above, it can be seen that the value has increased, from pretest to postest. N-gain (normalized gain) is used to measure the increase in cognitive learning outcomes between before and after learning [11]. From the N-gain value data, it was obtained 0.547 in the medium category. This means that there is an increasing in student learning outcomes with the implementation of the PjBL model assisted by the WhatsApp and Zoom applications. Improved learning outcomes can also be seen in the Figure 1:
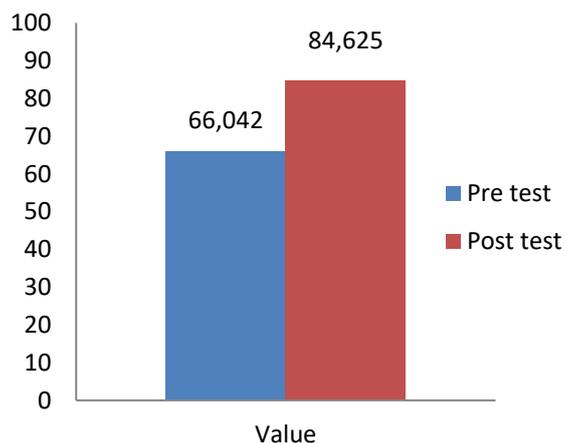
FIGURE 1. Graph of pretest and posttest scores

Based on the results of the normality test using SPSS for windows version 23, a significance value of 0.773> 0.05 was obtained. This means that the value data is normally distributed. The results of the t test on the experimental class, the sig (2-tailed) value is 0,000, which means less than 0.05. So it can be concluded that there is a significant difference between the pretest and posttest scores (after

being given treatment).The application of the PjBL model in teaching makes students more active, creative and more responsible for a given project. The PjBL model makes students build knowledge based on what they experience themselves, will be more enthusiastic, increase student learning motivation, make students enjoy learning and collaborate with friends in a team has a sense of responsibility for each other to complete a given project [12,13,14]

The use of applications in learning makes student learning outcomes increase, students do not feel bored and enjoy learning that taking place. This is in line with previous research which states that the use of learning applications, one of them is Adobe Flash, it can increase student's motivation and enthusiasm for practicing. Adobe Flash can be used to create interactive learning media effectively and efficiently also easily accessible to students. The development of science and technology is very fast in line with the rapid use of ICT (Information and Communication Technology) as media, and learning using media is very effective compared to traditional learning [15,16]. Alperi also states that the use of learning methods, learning media, can improve student achievement and competence [17].

In the implementation, students were created WhatsApp Group (WAG). Then the group assignments will be shared via WAG. Other students / groups discuss through the WAG. The final results of the discussion will be recapitulated by group members and shared again in the WAG. The difficulty in this WAG is that you cannot see in detail the ongoing discussion process because you have to scroll up first. Active students can be seen, but have a little trouble because sometimes their writing is overwritten by their friends' comments. The following is a graph of the students' pre-test and post-test scores in the experimental class 1 using PjBL model and WAG application.

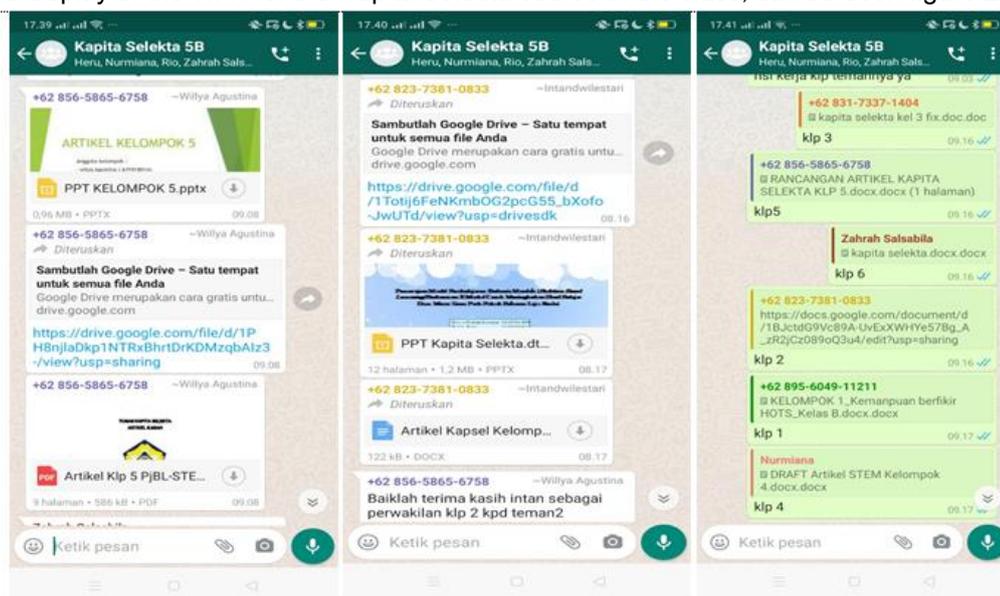Below is a display of the WAG of the Capita Selecta course in the class, can be seen figure 2:

FIGURE 2. WhatsApp Group (WAG) student display

PjBL learning steps with the help of the WhatsApp application and zoom meeting have been carried out as follows:
1. Lecturers make WAG for Capita Selecta Class
2. Students are given a link to join the group
3. Lecturers open the lesson, convey learning objectives, divide students into groups for project assignments to be carried out
4. Students are asked about the latest developments / issues related to education. Then together with the group began designing an assigned article project.
5. The given project assignment is given a deadline for submitting the assignment
6. The lecturer still controls the project assignments per group and its progress
7. Submission of assignments sent directly by representatives of group members through the WAG
8. The lecturer first checks the resulting project assignments before they are presented in the forum.

9. Group presentations are conducted at the WAG. Before learning is carried out, the presentation group must send their project assignments to the lecturer and the class WhatsApp group and the presentation group must be ready to master the material and discuss in the WhatsApp group.
10. The next step is for the presenter group to present the material, giving the opportunity to ask questions, input, and suggestions from other groups and answer questions raised by other groups. Finally, an evaluation of the presentation and questions and answers was conducted by the lecturer.
11. Presentations were made through the Zoom Meeting. Zoom meeting is used so that the material presented can be well received by other groups. The discussion process will also be more interactive.

WhatsApp is used as a medium for discussion. Interaction through the WhatsApp application is used to support classroom learning [18]. Capita Selecta's lecture discussions on the development of the latest issues in education are becoming more interesting and creating a more pleasant atmosphere. Thus, students get a lot of the latest information about the current development of educational science. Through WAG, students can send and receive photos/images, videos, files in the form of word, pdf and others.

Below is a summary of the strengths and weaknesses of the WhatsApp application, based on the results of the research that has been done, can be seen in Table 4:

TABLE. 4. Strengths and weaknesses of the WhatsApp application

Strengths	Weakness
For the task deadline, the lecturer as admin has the right to deactivate messages from students	There is no notification / special column for sending assignments
Comments given individually can be done by 'Reply Privately' by tapping and holding your finger on the message on student assignments / comments privately on the WAG. By clicking on the 3 vertical dot symbol at the top right of the screen.	The memory of files / folders, photos, or videos that can be sent to WAG is limited to 16 MB. So that for the experimental class assignment 2 there is a sending assignment via email.
Students are all familiar with the WA application. Easy / uncomplicated application interface.	There is no special column for student assignment assessment.
Applications can be via Android, it can also be via WhatsApp Web.	
There is already a video conference feature, but it's limited to a few people.	

The response of 24 students to the effectiveness of application that used, WhatsApp and zoom meetings application, can be seem in Table 5:

TABLE 5. Percentage of student responses to the WAG and Zoom Meeting Applications

NO	INFORMATION	PERCENTAGE (%)
1	I like learning to use online learning systems like WhatsApp.	25
2.	Using the zoom application is effective as a substitute for face-to-face meetings in class	70
3	WAG is an interesting medium in capita selecta learning	58.33
4	WAG makes me more responsible, disciplined and makes it easier to collect assignments.	79.17
5	WAG makes it easy for me to access learning materials.	91.67
6	I can improve my understanding of the development of selective Capita through learning videos / group presentations uploaded through WAG	70.83

From the Table 5, students prefer face-to-face learning rather than using the WAG application. Only 25% of students enjoy studying through WAG. Students consider that face-to-face learning is more effective, it can be seen from the percentage of students using the zoom application 70%. 91.67% of students considered that the WAG application was a very practical application and was easily accessible to students, especially access to learning materials.

Based on direct observation to students, some of the disadvantages of the Zoom Meeting application include: (1). The signal must be good, so that the meeting can run well. (2). Before using the zoom, it is certain that students have a quota first, because the quota is quite wasteful. (3). The language used has no choice of Indonesian. However, the use of the Zoom Meeting application is considered very practical and attractive. This is due to the direct interaction between lecturers and students. Lecturers can observe activities carried out by lecturers, through the video feature displayed by students. Communication can be done well, because it is done orally / not in writing. The oral communication process has better results and can be received more clearly than written communication [19]. Then, besides that, the use of the Zoom Meeting application is one of e-learning media that makes easier for students, saves costs and is more flexible.

CONCLUSION

From the research results, it can be concluded there was an increase in student learning outcomes with the application of the PjBL model assisted by the WhatsApp and Zoom applications with a pretest scores of 66.042 and postest scores of 84.625 and the N-gain value data obtained was 0.547 in the moderate category. And there is a significant difference between the pretest and posttest scores marked by the sig (2-tailed) value, 0.000, which means less than 0.05. Student response to the use of the WAG and Zoom Meeting applications was very positive. 91.67% of students considered that the WAG application was a very practical application and was easily accessible to students, especially access to learning materials. The use of Zoom Meeting according to 70% of students is also very interactive and can replace face-to-face meetings.

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