-ISSN: 2721-1274
p-ISSN:2721-2718

THE EFFECT OF THE READING, QUESTIONING AND ANSWERING LEARNING MODEL ON STUDENTS' ACCELERATION ANALYSIS ABILITY IN FLUID MECHANICS PHYSICS EDUCATION 2021

Az Zahra Lintang Kinanti[1]Yushardi[2]
University of Jember3
lintaskinanti2@gmail.com
yus_agk.fkip@unej.ac.id

ABSTRACT

This study aims to determine and analyze the improvement in the use of the RQA learning model on the ability to analyze gravitational acceleration in Fluid Mechanics material. This type of research is a quasi-experimental study with the population in this study being Physics Education students of the University of Jember class of 2021. Sampling used cluster random sampling by randomly selecting class A as the experimental class and class B as the control class. The instruments used were a learning outcome test in the form of an essay of 5 questions and independent practicum. The average value of student learning outcomes treated with the RQA learning model was 71.97 and 64.80 for the learning model in general. Based on the results of the t-test calculation analysis using IBM SPSS Statistics version 25, there is a significant effect of the application of the RQA learning model on the analytical abilities of physics education students' 21

Keywords: RQA learning model, analytical skills, gravitational acceleration, fluid mechanics

INTRODUCTION

Education's primary goal is to develop and unlock the potential of students, who will eventually become more creative and independent. One common approach to achieving this goal is the application of educational technology. Given that we are now in the 21st century, the appropriate application of technology can ensure successful future development.

The development of technology in Indonesia is oriented towards skills. Law No. 20 of 2003 concerning the National Education System explains that developing skills and shaping the character and civilization of a dignified nation in order to educate the nation is the true function of national education. Certainly, there are challenges that cannot be met by students or teachers: education cannot be solved with the old methods. When educators explain basic material to students in class, learning problems inevitably arise. This can occur because the knowledge presented is not relevant to current developments in society.

Not only regarding technology, but also problems that can occur during the teaching and learning process are generally caused by students' lack of interest in reading, especially in physics lessons. Indonesia ranks 62nd out of 70 countries in literacy. It could be said that Indonesia is among the 10 countries with the

-ISSN: 2721-1274
p-ISSN:2721-2718

lowest literacy rates. This is based on the results of the PISA (Program for International Student Assessment) released by the OECD (Organization for Economic Cooperation and Development) in 2019. Low literacy interest in physics learning will certainly also impact student learning outcomes. Learning outcomes that are still considered less than optimal are the results of the learning process that does not address all aspects of the student's dimensions, namely cognitive, skills, and attitudes. The learning process is often still dominated by educators, which of course makes students' access to develop creatively through their activities less.

Based on the existing problems in education, there is one solution to improve it. To improve the learning process, it is necessary to implement a reading, questioning, and answering learning model. Using this learning model is expected to increase student activity through literacy processes, critical thinking, discussion, and analysis of problem presentation stages through experiments. Furthermore, this learning model is expected to improve student learning outcomes and train students to think systematically and logically.

Reading, Questioning, and Answering is a newly developed learning model based on constructivist learning theory. Implementation of this learning model has been proven to improve student learning outcomes by forcing students to read assigned material. This can be implemented and understanding of the material can be increased by almost 100%. This RQA learning model can also improve students' cognitive learning outcomes. Akmaliya (2016) in the field of Biology has an impact on student abilities with the results of an average increase in the cognitive, psychomotor, and affective domains of 11.77%, 72.85%, and 14.76%, respectively.

With these improvements, there are certainly weaknesses in this learning model. One of these is the inefficient use of time and the presentation of uninteresting problems. This can lead to student disengagement. To prevent this from happening, researchers will prepare by carefully allocating time to ensure a smooth flow and using mind mapping to engage students.

Based on the description of the background of the problem above, the author is interested in conducting research with the title "The Effect of the Reading, Questioning and Answering Learning Model on the Ability to Analyze Gravitational Acceleration in Fluid Mechanics of Physics Education Students 2021".

METHODS

This research was conducted at the University of Jember, with a population of 30 physics education students from the 2021 intake. The sampling technique used cluster random sampling, also known as random class sampling. The class samples were drawn from two classes: Class A using the RQA learning model and Class B using the conventional learning model. The study was a quasi-experimental study with a two-group pretest-posttest design. For ease of use, the research design is presented in the table below.

Table 1. Two Group Pretest-Postest Research Design

-ISSN: 2721-1274
p-ISSN:2721-2718

Class	Pretest	Treatment	Posts
Experiment	Y1	X1	Y2
Control	Y1	X2	Y2

Information :
X1: Learning uses the RQA learning model
X2 : Learning using conventional learning models
Y1: Pretest was given to the experimental class and control class before treatment.
Y2: Posttest is given after treatment in the control class and experimental class.

The data collection tools in this study were multiple-choice tests to determine cognitive outcomes and independent practicum sheets to determine student activities using the RQA learning model.

Hypothesis testing in this study used a t-test comparing the average scores of the control and experimental classes. The data obtained will be accumulated to find the average. Before analyzing the data, it is necessary to score each sample group and then process the data using the following steps:

1. Calculating the mean and standard deviation
2. Data normality test
3. Homogeneity test
4. Pretest mean equality test
5. Hypothesis testing

The t-test is used to determine the similarity in students' initial abilities in both sample groups. Therefore, this study aims to determine the differences between the RQA learning model and students' analytical abilities. The hypotheses tested are as follows:

H0: There is no difference in the results of students' analytical abilities due to the influence of the RQA learning model and conventional learning.
Ha: There is a difference in the results of students' analytical abilities due to the influence of the RQA learning model and conventional learning.

RESULT & DISCUSSION

A preliminary test was conducted at the beginning before the RQA learning model treatment to determine the initial abilities of the two sample groups. The average value obtained for the experimental class was 40.13 with a standard deviation of 12.58. Meanwhile, in the control class there was an average value of 38.97 with a standard deviation of 13.2. After obtaining the pretest data from the control and experimental classes, homogeneity and normality tests were needed. This was necessary to determine the feasibility before administering the treatment. The results of the normality and homogeneity tests and the average pretest are as follows:

Table 2. Normality and Homogeneity Test of the Average Pretest Score

Class	**Average**	**Fh**	**Ft**	**th**	**Tt**
Experiment	40.13	1.41	2.19	0.66	2.31
Control	38.97				
Conclusion	Homogeneous	Initial Ability of Students 21			

Information :

-ISSN: 2721-1274
p-ISSN:2721-2718

Fh : Fhitung
Ft : Ftable
th : thitung
tt : ttable

The results of table 2 indicate that the pretest scores of both classes are normal, there is no divergence or relevant difference, so that the control class and the experimental class are given unequal treatment. In the experimental class, the application of the RQA learning model is applied, while in the control class, the application of the conventional learning model. After there are differences in treatment, both classes will be given a posttest to see if there are differences caused by different learning models, the average posttest results in the experimental and control classes are 71.97 and 64.80, respectively. The following is a table for the normality and homogeneity test of the posttest:

Table 3. Normality and Homogeneity Test of the Average Posttest Value

Class	**Average**	**Fh**	**Ft**	**th**	**Tt**
Experiment	71.97	1.81	2.19	2.77	1.97
Control	64.80				
Conclusion	Homogeneous	There is a significant difference			

Table 3 shows that the posttest scores for both classes were normal and homogeneous. It can also be concluded that there were differences due to the influence of the learning model. This is evidenced by the th > tt values, with a value of 2.77 > 1.97.

Next, regarding the responses from the 2021 class of students, the following is given:

Table 42021 Physics Education Student Response Results

No	**Question**	Δx	Δxi	%	**Note**
1	Is the level of understanding of fluid mechanics concepts easier when using modules?	10	10	100	SB
2	Does the module make it easier to learn fluid mechanics concepts?	10	10	100	SB
3	Is the presentation of the module interesting?	8	10	100	B
4	Is the language used easy to understand?	10	10	100	SB
5	Is using the module more exciting?	10	10	100	SB
6	Have you read all the descriptions of the modules?	6	10	100	CB
7	Does having a module make you like reading the material?	10	10	100	SB
8	Do the images in the module help understand the material?	10	10	100	SB
9	Does mind mapping make it easier to understand the material?	10	10	100	SB
10	Do the practice questions in the module make it easier to understand the material?	9	10	100	SB
	Amount	93	100	93%	SB

Information :
SB : Very good
B: Okay
CB : Good enough

-ISSN: 2721-1274
p-ISSN:2721-2718

The results of the study showed that the ability to analyze gravitational acceleration in fluid mechanics using RQA learning was superior compared to conventional learning models. This can be proven from the average posttest scores in the experimental and control classes, respectively, which were 71.97 and 68.40. In addition, the table regarding student responses showed that 93%, with a score of 10 for 7 questions, a score of 9 for 1 question, a score of 8 for 1 question, and a score of 6 for 1 question. One of the questions with a score of 6 was "Have you read all the descriptions of the module?" This caused a slightly low knowledge score because students lacked interest in reading. The large percentage of interest in learning will have a role in increasing their knowledge.

Learning about fluid mechanics using RQA learning has a higher value than learning in general. This is based on RQA learning encouraging students to think critically after reading something. There are several phases designed in this learning model. The first phase is presenting a problem packaged by delivering information about the fluid mechanics material. This aims to help students remember the main points. Then, the second phase is leading students to form a hypothesis by expressing an opinion or raising a question about why it could occur. Next, a practicum or experiment is conducted so that students are able to answer the questions they have created. Students are encouraged to do this independently and actively. And the final phase is the conclusion. Students, after conducting an experiment to obtain an answer to the proposed hypothesis, will conclude the results of the experiment.

Based on the results of this study, the use of the RQA learning model was able to improve the analytical skills of the 21st batch of students. Of course, there are also obstacles to this RQA learning model, namely that students or participants are forced to prepare individually before the lesson begins. This can result in some students not achieving optimal results.

The results of the research and hypothesis testing were considered successful. The average analytical ability score of students in the experimental class tended to be higher than that of the control class. The experimental class used the RQA learning model, while the control class used a conventional learning model. Therefore, it can be concluded that the learning model significantly influences students' analysis of Fluid Mechanics for Physics Education students at the University of Jember, graduating class of 2021.

CONCLUSION

Based on the research results obtained, data analysis, and hypothesis testing, it can be concluded that there is a significant influence between the RQA learning model and students' analytical skills in fluid mechanics. This is evidenced by the higher scores in the experimental class and the influence of the learning model of 53.22%.

BIBLIOGRAPHY

Hariyadi, S, Corebima, AD, Zubaidah, S., Ibrohim. 2017. The Comparison of the Question Types in the RQA (Reading, Questioning, and Answering) Learning Model and Conventional Learning Model. International Journal of Humanities

-ISSN: 2721-1274
p-ISSN:2721-2718

Social Sciences and Education (IJHSSE). Vol. 4, Issue 7, July 2017,(Online)http://dx.doi.org/10.20431/23490381.0407002www.arcjournals.org.

Kurniawati, L. & Mitarlis. 2020. Development of CPB Media with Mind Mapping Strategy on Hydrocarbon Material to Increase Students' Interest in Reading. UNESA Journal of Chemical Education. Vol. 9 (3): 379-386.

Nurafni, A., Pujiastuti, H. & Mutaqin, A. 2020. Development of Trigonometry Teaching Materials Based on Local Wisdom. Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang. Vol 4 (1) : 71-80.

OECD. (2012). PISA 2012 Results in Focus. Program for International Student Assessment, 1–44.https://doi.org/10.1787/9789264208070-en

Purwanto, A. (2018). The Influence of the Reading, Questioning, and Answering (RQA) Model on the Critical Thinking Skills of Class XI Science Students of SMA PGRI 6 Banjarmasin on the Concept of the Human Coordination System. Journal of Biological Education. Vol. 4(1): 44–52.

Rahmawati, R, A., Sarwi, S., & Darsono, T. 2019. Compiling Physics Science Teaching Materials as an Effort to Improve Students' Science Literacy on the Theme of Sound. Unnes Physics Education Journal. Vol. 8(2): 193-207.

Silfianah, I. 2020. Development of Multiple Representation-Based General Chemistry Textbook Using Guided Inquiry. EduChemia (Jurnal Kimia dan Pendidikan). Vol. 5 (2): 2502-4787.

Sudin, Duda, HJ, & Supiandi, MI (2018). The Influence of the Questioning-Answering Reading Model on Students' Critical Thinking Skills on the Topic of the Human Respiratory System. JPBIO (Journal of Biology Education). Vol. 3(1): 1–8.

Ummah, K., Ami, MS, Meishanti, OPY 2021. Development of a Biology Learning Module Based on Reading, Questioning, and Answering (RQA) Virus Material for Class X. Journal of Biology and Its Learning. Vol. 5 (2): 19-25.