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Original Article

The Effect of the SQ3R Learning Model (Survey, Question, Read, Recite, Review) on the Science Literacy Skills of STKIP PGRI Lumajang Students

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Abstract*: The goal of this study is to establish if there is a consequence of the SQ3R (Survey, Question, Read, Recite, Review) learning model on the science literacy skills of STKIP PGRI Lumajang students. This research uses the quasi-experimental method, which involves a control group and an experimental group. The researchers administered the treatment to the subjects in the form of pre-test and post-test. Students of the Mathematics Education Study Programme of STKIP PGRI Lumajang, Class 2022, were the sample of the research. Class A is the control class, and class B students as the experimental class; the number of students in each class is 36. The data were collected from the science literacy test. The test instrument was used in the form of descriptive questions and was validated by expert validators. The average score of the pre-test of the students' scientific literacy in the application of conventional learning models with the lecture method in class A is 59.1667, and in the application of the SQ3R method in class B is 58.6111. The conclusion is that the students' science literacy skills in the pre-test are the same. The average post-test score of the students' science literacy skills in the application of conventional learning models with the lecture method is 71.5278, and in the application of the SQ3R model is 85.9722. This means that the application of the SQ3R model has a better effect than the application of conventional learning models with the lecture method.*

Keywords: *SQ3R Model, Science Literacy Ability.*

I. INTRODUCTION

Scientific literacy is one of the most important aspects that everyone needs to have, both in everyday life and the world of work. People with a knowledge of science are supposed to be competent to solve real-world problems and create relevant scientific products. Based on data from the Programme for International Student Assessment (PISA), Indonesia's PISA ranking in 2018 declined compared to PISA results in 2015. In the reading literacy category, Indonesia ranked sixth from the bottom, or 74th, with an average score of 371 (Tohir, 2019). Overall, Indonesia's ranking in this category declined in 2018, when it was ranked 72nd (Fazzilah et al., 2020).

These results indicate that the scientific literacy of Indonesian students is still below the average PISA standard, which may indicate that the quality of science learning in Indonesia needs to be addressed.

In Indonesia, teachers do not seem to have a good understanding of the learning that leads to the formation of science literacy (Hapsari and Sukaesih, 2016).

Based on initial observations and interviews with the lecturers of STKIP PGRI Lumajang in the Mathematics Education Study Programme Year 2022 Class A and Class B, it was found that the scientific literacy of the students was still low for most of them. The low scientific literacy of the students is partly due to the variety of learning models used by the lecturers, which are still not optimal. Lecturers focus more on conventional learning methods using the lecture method. The accuracy of the use of the learning model is very important in the effort to achieve the learning objectives.

In response to the low level of scientific literacy among students, especially in the 2022 Mathematics Education Programme, efforts are needed to improve and innovate the learning process that is interesting and can encourage students to love reading. One alternative learning method that can be used is the SQ3R method.

II. LITERATURE REVIEW

The SQ3R (Survey, Question, Read, Recite, and Review) approach is a way of learning or studying texts (4 reading), particularly those found in books, scientific papers, and research reports, with the goal of understanding the text's content. The

SQ3R learning approach is also defined as guidelines for studying books that include checking, creating a list of questions, proactively reading, comprehending every response to the issue, and double-checking the responses to all of the questions. This method has the advantage that students can concentrate more on reading and understand the content of the material better. The method is practical and can be used in different learning approaches (Masykur et al., 2006).

According to Afiana et al. (2021), the SQ3R method consists of five stages: survey, question, read, recite, and review.

1. First step: Survey
   Students make observations to get an idea of the content of the text to be read.
2. Step two: Question
   Pupils generate some questions about the text they are going to read.
3. Step three: Read
   In this stage, students read actively, reading the text to find answers to the questions posed.
4. Step four: Recite
   Students check their reading to make sure that the answers to the questions are correct so that they understand the text they have read.
5. The last or fifth step: Review
   Students present the reading results of the text they have read. The stages of the SQ3R method are designed to overcome the problem of students' low reading comprehension skills.

The team at the Education Development Centre (EDC) says that literacy is more than the ability to read and write. Literacy is the ability of individuals to use all the skills and potential they have in their lives. According to Alberta (2009), literacy is not only the ability to read and write but also to increase the knowledge, skills and abilities that enable a person to think critically, solve problems, communicate effectively, develop potential and participate actively in society.

In reality, science literacy in Indonesia is still far from expectations. Students' science literacy is still not well facilitated in the learning process. Based on the findings of Angraini (2014), several factors contribute to students' low science literacy, namely (1) students have difficulty in answering the given questions because they have never studied the subject, (2) learners are not used to working on problems that use discourse, and (3) lecturers are not used to learning processes that support students' development of science literacy.

In response to the problem of science literacy skills at STKIP PGRI Lumajang, the researcher posed the problem: is there an effect of the SQ3R model (Survey, Question, Read, Recite, Review) on students' science literacy skills? This study aims to determine the effect of the SQ3R model (Survey, Question, Read, Recite, Review) on students' science literacy skills.

A) Research Methods

The type of research used in this study is a quasi-experimental method. Quasi-experimental research aims to determine the effect of independent variables (treatment) on dependent variables (outcomes) under controlled conditions (Arikunto, 2010).

This study used two classes, the experimental class using the SQ3R learning model (Survey, Question, Read, Recite and Review) and the control class using a conventional learning model with the lecture method.

The population of this study is the students of STKIP PGRI Lumajang. The samples used randomly were students of the Mathematics Education Programme year 2022, class A and class B. Class A is the control class (using the conventional learning model with lecture method), and Class B is an experimental class (using the SQ3R model).

The data collection methods employed in this study were pre-test and post-test. The pre-test score is taken at the beginning of the activity, before the learning process is carried out, while the post-test score is taken at the end of the activity, at the end of the learning process. In addition, the research data was analyzed descriptively and quantitatively. In order to determine the effect of using the SQ3R (Survey, Question, Read, Recite, and Review) learning method on students' scientific literacy, the data was analyzed using the independent samples t-test with a significance level of 5% using SPSS for Windows.

III. RESULTS AND DISCUSSION

A) Results

Table 1. Homogeneity Test Results

Pre-test

Levene Statistic	df1	df2	Sig.
,200	1	70	,656

Table 1. shows that the significance of homogeneity is 0.656 (≥0.05). This means that the variables in the experimental and control groups are homogeneous, with a Levene statistic of 0.200.

Table 2. Pre-test t-test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Pre-test	Equal variances are assumed.	,200	,656	,204	70	,839	,55556	2,7176
	Equal variances are not assumed.			,204	68,9	,839	,55556	2,7176

Table 2. It can be seen that the 2-way significance value (t-tailed) is 0.839 ≥ 0.05. Therefore, there is no significant difference in the scores between the experimental and control groups.

Table 3. Analysis Results for Pre-test Mean

Group Statistics

	Model	N	Mean	Std. Deviation	Std. Error Mean
Pre-test	1	36	59,1667	10,79021	1,79837
	2	36	58,6111	12,22475	2,03746

Table 3. shows that the total average pre-test score of the student's literacy skills in the application of conventional learning models with the lecture method class A (1) is 59.1667, and in the application of the SQ3R method class B (2) is 58.6111. It can be concluded that the students' scientific literacy skills in the pre-test are the same.

Table 4. Posttest t-test Results

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Post-test	Equal variances are assumed	3,071	,084	-6,548	70	,000	-14,44	2,2060
	Equal variances are not assumed.			-6,548	64,16	,000	-14,44	2,2060

Table 4. It can be seen that the 2-way significance value (t-tailed) is 0.000 <0.05. It can, therefore, be concluded that there is a difference in the scores between the experimental group and the control group.

To see which learning model is more effective, look at the mean in the following descriptive statistics:

Table 5. Analysis Results for Postest Mean

Group Statistics

	Model	N	Mean	Std. Deviation	Std. Error Mean
Postest	1	36	71,5278	10,67838	1,77973
	2	36	85,9722	7,82117	1,30353

Table 5 shows that the overall average of students' science literacy skills in the application of conventional learning models with the lecture method is 71.5278, and in the application of the SQ3R model is 85.9722. This means that the application of the SQ3R model has a better effect than the application of conventional learning models with the lecture method.

The presentation of the research results above shows that there is an effect of the SQ3R model on the science literacy skills of 2022 class B students in the Mathematics Education programme.

B) Discussion

The test of homogeneity is a test performed to determine whether two or more groups of sample data come from populations that have the same variance (homogeneous). This test is a prerequisite for the t-test. This test is used to ensure that the groups of data come from the same sample.

Science literacy is the ability to use scientific information, identify issues, and draw conclusions based on evidence in order to comprehend and assist others in arriving at choices about the natural world and the alterations caused by human activities (PISA). There are 3 indicators used to measure students' science literacy skills, namely, indicators of explaining scientific phenomena, indicators of designing and evaluating scientific investigations, and indicators of interpreting data and evidence scientifically. Science literacy is considered important or has benefits because it aims to foster critical thinking and creative problem-solving skills. In addition, science literacy also enables people to select the right information and understand pictures, charts, and tables in scientific information.

Based on the t-test results, it show that there is a difference in students' science literacy skills between the group of students treated using the SQ3R model and the group of students treated using the conventional model, namely lecture. In total, the group of students who were treated using the SQ3R model had higher mean results than the group of students who were treated using the conventional model.

The significant difference between the class group taught using the SQ3R model and the class group taught using the conventional model shows that students' science literacy skills are influenced by the learning model, even though they are given the same course and the same test questions and have equivalent facilities. The difference in students' science literacy skills is thought to be influenced by the different treatment of students, namely treatment in the form of applying different learning models. This means that the application of the SQ3R model has a better effect on the students' science literacy skills compared to the application of conventional models, namely lectures.

This finding is in line with research conducted previously by Fiqi Lestari (2022); in her research, the SQ3R reading technique (Survey, Question, Read, Recite, Review) is a question-and-answer generator that can encourage text readers to process material deeply and broadly. Emilda's (2020) research indicates a significant level of the mean difference test in the experimental class (sig. 0,001 < 0.05). As a result, pupils who utilize the SQ3R approach have a better ability to comprehend the content of reading than those who don't employ it.

Effendi et al. (2017) argue that the SQ3R learning method is a learning method designed to help students understand the subject matter with the stages of survey, Question, Read, Recite, and Review.

But in the SQ3R learning method there are also advantages and disadvantages. By using the SQ3R method (Survey, Question, Read, Recite, and Review) students will understand more about the material taught, train students to read and understand the meaning of a reading. (Syahrin et al., 2022). With the application of the SQ3R method, students can understand the reading more easily. This is because the SQ3R method is a systematic method. In this study, the application of the SQ3R method has slightly changed (modified), namely at the survey stage used, namely short readings and at the read stage after students have finished reading, researchers provide explanations in simple language because children with learning difficulties have difficulty understanding the reading they read, besides that, remedial provision is also held from the Read stage to the Review stage if students have not been able to answer reading questions and retell the reading orally. The findings of this study showed that the improvement of students' science literacy skills was influenced by the SQ3R method.

However, researchers realize that internal and external factors determine the success of students' science literacy skills in learning.

Internal factors such as age, physical condition, level of fatigue, motivation, and discipline. While external factors such as the lecturers, the learning methods, the infrastructure, the social environment, the family, etc. Nurfadillah et al (2017) detailed the factors that cause students' science literacy skills, namely interest in science, motivation to learn, lecturers' strategies in learning and school facilities. One of the parties that can help learners have good science literacy skills is the teacher.

Learning strategies, learning content, learning facilities, learning media and supportive learning activities can be designed by lecturers to optimize the development of learners' science literacy.

Science literacy needs to be developed early, at the primary school level, so that students have increasingly complete competencies at the same time. Potential science literacy skills are developed at the primary level with the existence of science learning content equipped with basic competencies in the areas of knowledge, skills and, of course, the development of attitudinal aspects.

The steps of the SQ3R learning model are to survey the reading to get a general idea of what is to be read, then to create your own questions, the answers to which are expected to be contained in the reading to make it easier to understand the reading, and to review the material that has been learned.

In applying the SQ3R model, students are facilitated to construct knowledge, not just record information. Reconstruction of knowledge by students is done through survey, Question, Read, Recite, and Review. Problem-solving is not just routine problems, but problem solving that requires freedom, judgement and creativity as well as the knowledge possessed by current students. Thus, the SQ3R model really prepares, trains, and familiarises students to always think critically about all the problems they face. Students learn to organize complex problems, not problems that only have one correct answer.

The implementation of learning provides reading opportunities and fully involves students in building knowledge.

The SQ3R model has many advantages compared to other reading methods. The advantage of the SQ3R method is that students are more likely to easily master the content of the reading. Because before reading, students are required to do a reading survey first to get a general idea of what will be read.

The SQ3R model is able to activate students in learning in class. Learning activities like this are meaningful learning activities, not just activities to receive and memorize material given by lecturers. Through reading activities, children are given the chance to pose questions and attempt to discover the answers on their own, fostering critical thinking, active learning, and significant education. Students retain the information they acquire over extended periods of time.

Through the application of the SQ3R model, students find it easier to understand the learning material, so it has a big effect when students work on test questions. Students have been able to solve problems based on scientific phenomena that exist in problem-solving, and students have been able to connect science concepts and science applications quite well. Explaining phenomena scientifically is the easiest problem for students to understand.

The SQ3R learning paradigm has the advantage of having a survey phase at the start of the learning process, which sparks students' interest in the content to be studied and can boost their motivation. Soedarso (2010) argues that the SQ3R model has advantages because by using this method, readers tend to understand and master the content of reading more easily.

The implications of this research finding for learning are as follows:

First, to improve students' science literacy skills, the SQ3R learning model can be used as one of the learning methods. The SQ3R model can be implemented through the submission of problems that must be solved by students at the beginning of learning. Through this model, students are required to play an active role in solving problems, digging up information, exchanging ideas, and working collaboratively so that they experience the learning process meaningfully.

Secondly, lecturers must look closely at the course material and then choose topics that are able to raise contextual problems in accordance with the real situation in the field. Thus, the problems that students solve are everyday problems.

Third, the SQ3R model requires lecturers and students to be active and creative in learning. This means that both lecturers and students must exert all their power and efforts and play a maximum role according to their respective roles in learning. In addition, lecturers and students are required to be creative in creating contextual problems, finding sources of information, and solving problems.

IV. CONCLUSION

1. There is an effect of the SQ3R model (Survey, Question, Read, Recite, Review) on the science literacy skills of the year 2022 class B students in the Education Profession course in the Mathematics education study programme.
2. The application of learning with the SQ3R model is significantly better than the conventional learning model.

Advice

1. Lecturers are advised to use the SQ3R model in courses taught on certain subjects by considering the characteristics of this learning model.
2. The SQ3R model demands students' activeness and independence in learning, so both of these must be conditioned in advance so that the application of the SQ3R model can run smoothly according to the predetermined learning plan.
3. Before implementing the SQ3R method, facilities and infrastructure, as well as learning resources that support the implementation of this learning, must be well prepared.

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