

The Effect of TANDUR Learning Model on Science Literacy of Class X Students at SMAN 5 Padang

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Abstract – This study aims to decide the effect of TANDUR learning model on students' scientific literacy ability. This type of research is a quasi-experimental research design using Randomized Control Group Posttest Only Design. The population used is the students of class X MIPA SMAN 5 Padang registered in the 2019/2020 school year. Sampling using a purposive sampling technique, obtained class X MIPA 2 as an experimental class and class X MIPA 3 as a control class. The instrument used was a written test with a matter of scientific literacy skills. Data analysis was performed by hypothesis testing using SPSS software. The results of this study show that there is a significant influence of the TANDUR learning model on students' scientific literacy.

Keywords – TANDUR model, Science Literacy.

I. INTRODUCTION

Education is an effort to prepare students to meet challenges in the future. Education is an effort to realize the learning process so that students actively develop the potential needed by themselves, society, nation, and country (Undang-undang No. 20 Tahun 2003). Education is now in the 21st century. 21st-century education aims to produce quality human resources (Mukminan, 2014). The 21st-century learning paradigm emphasizes the ability of students to find out from various sources, formulate problems, think analytically, collaborate, and collaborate in the learning process (Daryanto, 2017).

The efforts made by the government to improve education in Indonesia to be able to produce graduates who have 21st-century learning skills is by implementing the 2013 curriculum (Abidin, 2014). One of the subjects applied in the 2013 curriculum is biology. Learning Biology has demanded

students to use technology in presenting work or product (Lufri, 2007). One of the external challenges in learning biology is the ability of scientific literacy (Permendikbud No. 59 of 2014).

Science literacy is the ability to use scientific knowledge to make decisions about nature and its changes (Hayat, 2011). Science literacy can be measured through PISA (Program for International Student Assessment) conducted by the Organization for Economic Cooperatives and Development (OECD) every three years. Indonesia joins to PISA study in 2000. The results of the PISA study show that the scientific literacy ability of Indonesian students in the field of science is still relatively low. In 2015 Indonesia obtained a score of 403, ranked 62nd with 70 participating countries and in 2018 Indonesia's score dropped to 396, ranked 74th out of 79 participating countries.

Solutions to help improve students' scientific literacy skills can be done through the learning process. The learning process needs to apply a learning model that can train students' scientific literacy skills (Winata, 2018). The selection of the right learning model can lead to optimal student learning achievement (Permendikbud 2014 No 59). One learning model that can be used is the TANDUR learning model (Enroll, Experience, Label, Demonstrate, Review, and Celebrate). The TANDUR Learning Model is designed to increase student activity by providing learning experiences through observation, investigation, and discussion of problems found in daily life (Wahyuningsih, 2015).

Based on the problems that have been explained, the researcher conducted a study entitled "The Effect of TANDUR Learning Model on Science Literacy of Class X Students at SMAN 5 Padang".

II. METHODOLOGY

The research is a quasi-experiment. This study uses two sample classes namely the experimental class and the control class. The sample is determined using a purposive sampling technique. In the experimental class, treatment was given using the TANDUR learning model and the control class using a scientific approach. The instrument used was a written test in the form of objective questions. This study uses a randomized control group design posttest only design.

III. RESULTS AND DISCUSSION.

A. Results

Results of the analysis of the hypothesis test using SPSS software version 16. The test criteria are if the significance is > 0.05 then the hypothesis is rejected, if the significance is < 0.05 then the hypothesis is accepted.

Table 1. Results of analysis of scientific literacy data of sample class students.

Parameter	Class		Description
	Experiment (x_1)	Control (x_2)	
average	66.11	60.33	$x_1 > x_2$
Normality Test	0.09	0.20	Normal
Homogeneity test	0.23		Homogeneous
hypothesis test	0,00		Significant

Based on Table 1, it is written that the experimental class data have a significance of $0.00 < 0.05$. This shows that there are significant differences in the ability of scientific literacy between the experimental class and the control class.

B. Discussion

Science literacy is one's ability to use scientific knowledge, identify scientific questions, explain scientific phenomena, and draw conclusions based on evidence to understand and make decisions regarding nature (Bybee, 2010). Someone literate in science will be able to utilize the knowledge he has to appreciate and understand the impact of science on life, solve problems and make decisions with responsibility for using the scientific knowledge he has (Dillon, 2009). To empower students' scientific literacy skills, innovation is needed in learning science, such as by applying interactive learning models so that students can build their knowledge and seek answers to their problems (Mukti, 2019). The ability of scientific literacy can be improved by applying the TANDUR learning model.

Based on the results of research that has been done this shows that the TANDUR learning model can improve students' scientific literacy skills. The application of the TANDUR learning model has a positive impact on students' scientific literacy abilities. The syntax in the TANDUR learning model can help give students a challenging and pleasing impression on learning. This Learning Model encourages learners' success; enables students to make their learning experiences real, able to practice, and creates meaningful content for students (Zeybek, 2017).

The first stage is "enroll", at this stage motivating students to learn and understand the learning objectives. Learning that can encourage enthusiasm and arouse the curiosity of students related to learning topics is believed to be able to build science process skills that are part of aspects of science competence (Susilawati, 2018). The second stage is "experience", at this stage students are invited to experience the material by exploring students' knowledge about the material to be learned based on their experience. Learning that connects with real-life can affect aspects of the context of science in scientific literacy (Kristiyowati, 2019).

The next stage is "label", at this stage students discuss with group members in conducting reference studies. Learners look for information by reading books and scientific literature. Through reading and understanding, its contents can help students in understanding the content of science needed in scientific literacy (Fang, 2010). Through discussion, activities are also able to expand and strengthen students' knowledge (Alberida, 2018).

The fourth stage in this TANDUR model is “demonstration”. At this stage, students demonstrate the results of investigations that have been carried out from the discussion activities. At this stage, all students are allowed to exchange information. This activity makes active students can provide feedback to each other. The next stage is “review”. At this stage, a repetition or conclusion is made of the material that has been studied. If students can conclude the learning outcomes, this shows students already have science skills in communicating (Setiadi, 2013).

The last stage is “celebrate”. At this stage, the group of students with the highest points will be given a reward. Giving rewards makes students race against each other to get high points. The celebration of learning outcomes can give students a sense of happiness and motivate students to study spirit (Sujatmika, 2018). So that this TANDUR learning model can make students in the experimental class more active in the learning process than students in the control class. This is following the advantages of this TANDUR model which can form the mindset of students from the narrow to broader and more comprehensive in viewing and solving problems faced in life (Daryanto, 2017). One reason students can learn better is that they feel happy to participate in the teaching and learning process so that the potential and intelligence of students can develop optimally and optimally (Suryani, 2013).

The low scientific literacy ability of the control class students is also caused by the lack of students being actively involved in the learning process. The learning process which emphasizes more on the teacher (teacher-centered) causes the maximum potential and ability of students to think (Zubaidi, 2013). Because during the learning process students only listen to the explanation from the teacher and take notes given by the teacher. So that in the learning process students lack active thinking about the material being studied. Learning that involves active students in thinking activities makes students work together in a process (Sigler, 2007). The learning process that increases student activity can also improve student skills (Desgamalia, 2019).

IV. CONCLUSION

Based on the results of research and discussion that has been presented, it can be concluded that there is a significant influence on the application of the TANDUR learning model to the scientific literacy of students in class X of SMAN 5 Padang.

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