Application of Scientific Literacy in Research Class Activities

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Abstract: This study aims to describe the application of scientific literacy in research class activities at SMA IT Abu Bakar Boarding School Kulon Progo. This research is a descriptive study with a qualitative approach. The subjects of this study were school principals, vice principals in curriculum, literacy program managers and research methodology teachers. Methods of data collection by interview and documentation. The results of the study are as follows: (1) The implementation of the research class activities includes providing material, writing proposals and research results, presenting research results, printing research results, and assessing. The guidelines used today still use modules from research smes. (2) The implementation of scientific literacy is carried out by making reading movements before or when learning is carried out, campaigning for literacy culture, and selecting reading materials for students.

Keywords: Aplication; Research Class Activity; Scientific Literacy

Introduction

The era of globalization which is taking place very quickly through advances in technology and science requires every nation to be able to adapt to keep up with existing developments by preparing quality human resources (Malik, 2019). Scientific literacy is one of the efforts in dealing with current technological advances (Coccia, 2019), especially for the children of the nation's generation. With the existence of advanced technology, more and more information can be accessed and obtained easily. The ease of accessing this information causes a lot of news or information that is not accurate because it is not filtered properly, causing a lot of fake information to circulate. Therefore, to address this need to be balanced with the provision of attitudes and knowledge for students. One of the things that can be done is through scientific literacy.

Scientific literacy is an ability to understand science, communicate science, and apply scientific abilities to solve problems (Adriyawati et al., 2020; Jufrida et al., 2019) so that they have a high attitude and sensitivity towards themselves and their environment in making decisions based on scientific considerations. Scientific literacy is a knowledge and understanding of scientific concepts and a process that is carried out in making decisions and having participation in society, culture, and the economy (Alneyadi, 2019; Valladares, 2021). Scientific literacy is an ability possessed by someone in identifying a problem through an understanding of science. The existence of scientific literacy can instill critical thoughts and efforts to solve problems using scientific knowledge. With scientific literacy, it is expected that students can develop their mindset to carry out new innovations in other fields of knowledge through scientific knowledge. So that students have a reference in the context that will be investigated through scientific knowledge and can expand their realm of thought to conduct research in other fields. This directly supports research activities for students at school.

Schools are a place in education to obtain facilities and infrastructure to help children develop problem-solving skills in their surroundings. At school later students can be encouraged to carry out an analysis of their environment to find problems and solve problems or find new things in their analysis so that they can be developed into information. According to data from the Indonesian Institute of Sciences (LIPI) in 2019, there were only 1,994 proposals from the Youth Scientific Work (KIR). This is not comparable to the number of

high school students in Indonesia, which currently reaches 4.8 million students (Media Indonesia, 2019). From these data it can be concluded that research conducted among students is still very low. Not only that, based on PISA (Program for International Student Assessment) data, the scientific literacy ability of Indonesian students is still below average when compared to international average scores and in general is at the lowest PISA measurement stage. According to data from PISA released by Pratiwi (2019)in the Journal of the Ministry of Education and Culture, Indonesia is ranked 62nd out of 69 countries with a score in 2015 of 403 while the average score for OECD (Organization for Economic Cooperation) countries and Development) is 493. In 2018 Indonesia ranks 74th out of 79 countries with a score of 396 while the average OECD score is 489 (Sains, 2019). The score and ranking obtained by Indonesia are still in the low category because they are consistently in the bottom 10.

Based on the data above, it can be said that literacy in Indonesia, especially scientific literacy, is still very low. This condition can have an impact on the quality of human resources which will be lower and the progress of science and technology in Indonesia will be hampered. Therefore, the application of literacy, especially scientific literacy, needs to be improved, one of which is by creating a literacy program like what has been done by SMA IT Abu Bakar Boarding School Kulon Progo-Yogyakarta. The literacy program is carried out by carrying out reading movements before the implementation of learning in class begins. Apart from that, SMA IT Abu Bakar Boarding School Kulon Progo-Yogyakarta has activities in the field of research for its students, namely research class activities.

Research class activities started with the extracurricular activities of Youth Scientific Work (KIR) which were then included in additional subjects, namely research methodology subjects. This is based on the fact that Abu Bakar High School is a scientific research school that prioritizes products in the form of research results from students. However, the implementation of KIR activities was considered not optimal, so a policy was made in the form of adding research methodology subjects in which there were research class activities that were mandatory for students of grades X and XI. For the material provided, it does not use standard textbooks because it is still limited to taking theories that exist on the internet and some use research UKM guides that have previously been attended by subject teachers. The implementation of this activity aims to foster a spirit of curiosity and students' sensitivity to those around them. It is useful to help the formation of human resources through education. Apart from that, this activity is also expected to help students to be able to develop their ideas in order to increase literacy and foster a critical spirit.

Indirectly this is one of the efforts in growing and developing a research culture in students. Developments in science, technology and art cannot be separated from research. Therefore, with the findings from the research results, there is progress in terms of technology, science, and art. The support provided by the school for research activities for students is expected to be a provision for students to face future developments. In addition, it can also produce output that has quality in terms of critical thinking, creative, and being able to solve problems that exist in the surrounding environment from the results of research conducted by students.

Based on the background above, the researcher will discuss "Application of Scientific Literacy in Research Class Activities at SMA IT Abu Bakar Boarding School Kulon Progo-Yogyakarta"

Method

Types of research

This research is a qualitative research using a descriptive approach (Turale, 2020). Researchers will explore existing phenomena in the field by collecting data from informants to obtain facts related to scientific literacy and research class activities at SMA IT Abu Bakar Kulon Progo to be processed and presented without adding data that is inconsistent with the findings. The researcher chose a method using descriptive qualitative research because it intends to present data in a systematic, factual and accurate manner regarding the facts that exist in SMA IT Abu Bakar Kulon Progo.

Time and place

This research was conducted from March 2020 to June 2020 at SMA IT Abu Bakar Boarding School, Ngerandu, Triharjo, Wates, Kulon Progo.

Data source

The data sources in this study amounted to 5 people, namely the principal as a source to obtain information about the process and background of the research class activity program. Deputy Head of Curriculum as a source for obtaining information on research methodology subjects related to research class activities. Literacy Program Manager as a source for obtaining information related to the implementation of scientific literacy in schools. The Research Methodology Subject teacher who also supervised the research class activities at SMA IT Boarding School Kulon Progo who was the main informant for obtaining information regarding the management of the research class activities.

Data collection technique

Researchers collected data using interview techniques and documentation studies (Roberts et al., 2021).

Instrument

Research instruments or tools in qualitative research are the researchers themselves who determine the research focus, choose informants as data sources, collect data, analyze, and draw conclusions from the data obtained.

Data Validity Techniques

Researchers used technique triangulation and source triangulation to test the validity of the data obtained.

Data analysis

The analysis used by researchers has three stages, namely data condensation, data presentation, and drawing conclusions**.**

Result and Discussion

Implementation of research class activities

Research class activities were only attended by two class levels, namely students of class X and students of class XI. Face-to-face meetings between teachers and students are held once a week with a duration of 1 hour each meeting in the subject of research methodology. At this meeting the teacher will deliver material related to research and see the progress of the preparation of proposals and the results of research carried out by students based on the guidelines and references owned by the teacher.

Research class activities at SMA IT Abu Bakar Boarding School Kulon Progo have guidelines listed in the academic guidebook on co-curricular activities. What is discussed regarding research class activities in the book only generally discusses the objectives and what areas of research are carried out, but not specifically. Therefore, the teachers supporting the research class activities re-sorted the material in the UKMP module to suit the students' abilities and presented it again using language that was easy for students to understand. This is because the module is commonly used for the tertiary level and if there is no re-sorting it is feared that the child will not be able to understand the content of the material presented. After that the teacher makes details of the material based on the existing guidelines, then summarizes it and arranges it in sentences that are easier for students to understand. The material that will be delivered to students will also be added from other references from the internet.

More detailed guidelines for research class activities are currently being developed and have not yet been implemented. So that the guidelines used still use modules from UKMP (Research Student Activity Unit) UNY have not used guidelines from the school itself. The use of this module was because in the first year the research class activities took place, the school collaborated with UKMP UNY in managing research class activities. The need for guidelines in the implementation of learning is contained in the Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 103 of 2004 concerning Learning in Elementary and Secondary Education which explains that the purpose of having guidelines is to become a reference for educators (subject teachers, class teachers, and mentor teachers) extracurricular activities) individually or in groups in developing learning implementation plans (RPP) and implementing learning in various modes, strategies, and models for local content and/or the subjects taught. This confirms that the need for a guideline in the implementation of activities in education.

The provision of material is carried out at the beginning of the semester to introduce and deepen knowledge for students regarding the field of research, but as time goes on the teacher's activities will also provide more in-depth material for students who still lack problems in the process. Material tends to be given more in class X, when class XI only discusses material in general according to student needs and is not explained in detail anymore. After the provision of material is complete, proceed with making a research proposal. Making proposals and compiling research results will always be monitored by the teacher directly or via email.

Proposals that have been completed are followed by data collection in the field to collect the required data. After the data was collected, students continued compiling the results of the research to complete chapters IV and V. The results of the research were then presented and put together to be printed as a student scientific journal. The journal books will be distributed to parents/guardians of students according to their class. This stage only applies to class XI students, for class X students it is enough to submit the results of preparing a proposal in accordance with a predetermined time. The results of the preparation of proposals and research that have been collected are then assessed.

Application of scientific literacy

SMA IT Abu Bakar Boarding School Kulon Progo has a literacy program in order to increase literacy culture for students. One such literacy is scientific literacy. In the implementation of scientific literacy, those who have a stake in supervising this literacy activity are class teachers because the literacy activities carried out are dominantly carried out in the classroom. Before or during learning, students will be required to

read books related to the material to be discussed that day. This applies to all subjects and for scientific literacy in highly related subjects, namely biology, physics, and chemistry. The opinion of Holbrook and Rumnikmae (2009) in Abidin et al. (2021) is also in accordance with this from a second point of view which states that scientific literacy is in line with a view that places more emphasis on science learning for all. After reading and discussing the material discussed, the teacher will continue with questions and answers with students regarding the reading material students have read. The reading material can be in the form of books, news, or scientific journals.

The coordination of the program management team with the teachers was carried out during the early semester meeting activities. The meeting will discuss reading activities for students and the achievements to be achieved from these activities. The literacy program, especially scientific literacy, is carried out so that students can deepen and increase knowledge and knowledge with the hope that from the knowledge and knowledge possessed, students can relate it to the surrounding environment to find things that can be observed and studied as motivation for students to do research. With this literacy, it is expected that students are not only limited to knowing and acquiring knowledge from reading material but can also implement it in their surroundings. This is in line with the opinion of Toharudin et al. (2011) who formulate that scientific literacy is an ability possessed by someone to be able to understand science, communicate science (oral and written), and apply scientific knowledge to solve a problem so that it can foster attitudes and high sensitivity to self and also the environment in making a decision based on scientific considerations. This reading movement is one of the strategies in implementing the scientific literacy movement in schools. According to the Ministry of Education and Culture, the main strategy of the scientific literacy movement in schools is cross-curricular scientific literacy, namely the application of scientific literacy in a consistent and comprehensive approach in schools to support the development of scientific literacy for each student. Scientific literacy skills are explicitly taught in the subjects.

The running of this literacy program is not only carried out by teachers but also assisted by the literacy program management team. The contribution of the management team in implementing the literacy activity program at SMA IT Abu Bakar Boarding School Kulon Progo is to support the implementation of activities so that they can run well by selecting reading books to be read by students. Selection of reading books is carried out based on book categories, in which books entered and used by students will be seen for their titles, values contained therein, and other things that may not conflict with SARA and pornographic content because it can affect students' mindsets. The incoming book collection is obtained from grants, donations, and buying.

Campaigns regarding literacy culture are also carried out by literacy program managers by inviting students to take part and be directly involved in competitions that have a relationship of extracting deep and complex ideas and creating scientific works which are recorded in the form of school journals, journalism, and so on.

Another contribution made is inviting students to take part in competitions held regarding literacy by introducing current, actual problems and involving students in scientific observations in the surrounding environment to obtain results that can be tried out and worthy of competition.

The implementation of the literacy program has several obstacles including the lack of student interest in books and the lack of student interest in reading. This is because students are more likely to be interested in online games. This interest can be seen from the observations made by the teacher and the discussion between the teacher and students. From the results of observations and discussions conducted by the teacher, it is known that students' interest in online games is due to several factors, namely the influence of friends who play online games and as entertainment because they are bored with learning at school. In addition, available reading materials such as books and scientific journals related to research are still lacking. Therefore, students' interest in reading is smaller than interest in playing online games.

Conclusion

Based on the results of research regarding the management of research class activity programs at SMA IT Abu Bakar Boarding School Kulon Progo, the following conclusions can be drawn:
1. The stages of conducting research class activities are providing material, making proposals, collecting data, presenting research results, and printing student research results. Guidelines for special activities used for research class activities are still in the development stage so currently they still use modules from Research UKM.
2. Schools have programs regarding literacy, one of which is scientific literacy, which is implemented by making reading movements before or during lessons, campaigning for a culture of literacy, and selecting reading materials for students.

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