



GROWING STUDENT CHARACTERS THROUGH INQUIRY-BASED SCIENCE PRACTICUM MODULE

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Abstract

This study aims to determine how the application of inquiry-based science practicum modules to student character. The method used in this research is experimental in the form of a pre-experimental design. The population of this research is the Adventist Junior High School in Singkawang, West Kalimantan. Through the saturated sampling technique, it is known that class VII A is the class used as the experimental class. To find out the student's character, a student character questionnaire was used. This research was conducted during the Covid 19 pandemic so that the learning process was carried out online. Based on the results of data analysis, it is known that in general, the character of students includes honest, hard work, thoroughness and carefulness, creativity, caring for the environment is classified as good.

Keywords: *Student Characters, Modules, Practicum, Science, Inquiry*



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INTRODUCTION

Education is indispensable for human life. The basic objective is to increase abilities, develop potential, educate, and build individual character (Hartini, et al., 2018). Education in Indonesia today should be able to create human beings with quality and character.

Cultivating character values is required in educational activities in every teaching and learning process (Derlina & Sriyanti, 2016). Character education is one of the nation's goals to be developed at every level of education in the hope of forming a generation with intelligent,

good and strong characters, character content must be included as an integral part of education starting from learning planning and implementation to evaluation (Darma, et al., 2019). Character is related to the values that are embedded in someone. Values are stable in a person for a long time and can be learned, with a tendency to be rooted in self (B & L, 2013). The formation of the character of students can be started from family, school, and community (Nazhruna, 2019). Character education can be implemented through science learning. In line with Retnosari, et al. (2017) stated that character education by teachers for students, one of which can be implemented through science subjects. By integrating character education into science learning it is hoped that it can give the impression that in science learning there are character values that have not been realized and need to be explored later so that they can be optimized in building the character of students. The science process and scientific attitudes that are formed in science learning can teach students about character education. This is because there is a slice between the scientific attitude in carrying out the scientific process in science and character education.

Republic of Indonesia Presidential Regulation No. 87 of 2017 concerning the strengthening of character education which states that to realize a cultured nation through strengthening religious values, honesty, tolerance, discipline, hard work, creativity, independence, democratic, curiosity, national spirit, love for the country, respect achievement, communicative, peace-loving, fond of reading, caring for the environment, caring socially, and being responsible need to strengthen character

education. According to Hartoyo, et al. (2019) in Kristiawan we are in the midst of a shift in moral and ethical values in the life of the nation and state; starting from the waning of awareness of cultural values, the threat of national disintegration, and the weakening of the nation's independence. It is proven that lately there has been a lot of news about deviant acts among school children. Departing from the mandate of the Presidential Decree and the character crisis, efforts are needed to foster character in students in the learning process. This is an obligation that is considered very important to be considered by all components in the education system, and most importantly the role of the teacher. It is in the hands of the teacher that learning outcomes which are one of the indicators of the quality of education are more determined (Kusumah, et al., 2020).

According to Handaka, et al. (2018), students' scientific attitudes can be developed through experimental activities in the learning process. Based on the previous explanation which states that scientific attitudes are in line with character education and Handaka's opinion, et al. (2018), then the inculcation of character values in students can be done through science learning. To make it easier for students to learn science, a learning medium is needed, one of which is a module. Modules can help students learn independently and trigger students to understand rather than memorize. Therefore in science learning, it is very appropriate to use a module, in this case, a science practicum module based on inquiry. Inquiry learning applies scientific attitudes related to the habituation of students' character values. The integrated character values in

learning activities are adjusted to the development of phenomena in the environment so that students can recognize, realize, apply and familiarize character values in life (Erinda, et al., 2018). In line with Hadiati, et al. (2019) which states that the use of instructional media can increase cooperation, critical attitude, and curiosity which is a character assessment.

Inquiry learning is more concerned with finding and seeking knowledge rather than acquiring knowledge. Through science process skills, students' abilities and self-confidence can increase, and in the end, students can solve problems in their lives (Nur, et al., 2016). Inquiry-based learning provides students the opportunity to practice science process skills and critical thinking skills and build knowledge independently (Suardana & Juniartina, 2020). According to Rustaman (2010), inquiry learning can develop basic skills, arouse student motivation, a basic vehicle for scientific learning, and be able to explore student creativity. In the process of inquiry, students learn the nature, concepts, facts, principles, and the process of seeking information through the scientific process stages and scientific attitudes. In line with Wahyudi & Lestari (2019) states that the inquiry-based optics practicum module that has been implemented has a good impact on science process skills and scientific attitudes of students. So it appears that process skills play an important role in the inquiry learning model.

Science learning that has been carried out so far is still conventional, where science learning is carried out through experiments that only prove a theory, without going through a process of discovery (inquiry). This causes the

inability of students to carry out the scientific process. Besides, this learning process has not been able to insert character values that must be built by students. Even though the character values must be built by students through science learning.

The Covid 19 pandemic that is currently happening requires social distancing and online learning. It is undeniable that this also affects science learning that is carried out in schools. To get around this, the inquiry-based science practicum module used in science learning is packaged in an application that can be installed on a smartphone so that it can be used by students and teachers to do online learning. So that the pandemic that occurs does not become an obstacle for students to continue learning science and the use of modules can make it easier for students to learn, can build student knowledge independently, train students' science process skills and train character through learning that is carried out.

Based on the explanation above, it is necessary to apply to learn using inquiry-based science practicum modules so that they can train students in scientific activities that involve basic skills contained in science process skills, and in the end, can support the formation of student character. Through the inquiry-based science practicum module, it is hoped that the learning carried out will be more effective and efficient and can instill the character values of students.

METHODS

This research is quantitative research with experimental methods. The form of this research is a pre-experimental design. This study has a "One-Shot Case Study" design. namely

by design, there is a group given treatment, and then the results are observed (Sugiyono, 2006). This research was conducted at SMP Advent Singkawang because this school is one of the schools that implements an online school. The population in this study were all students of class VII SMP Private Advent Singkawang which consisted of one class. Through the saturated sampling technique, the research sample was obtained, namely all students of class VII A Advent Singkawang Private Middle School, totaling 16 students. The data collection technique used to determine the character of the student was a measurement using a student character

questionnaire sheet. This questionnaire content has been validated by three validators with a relevant assessment of 96%. The data obtained were then processed and analyzed. Data were analyzed based on ideal scores to identify the frequency distribution of the % ideal scores. The step of measuring the ideal criteria is to find the maximum ideal score, find the ideal minimum score, calculate the ideal mean and ideal standard deviation. After knowing the ideal criteria, then they are categorized as very good, good, good enough, and not good according to Table 1.

Table 1. Interpretation of Student Character Assessment Categories

Rating Category	Interpretation
Very Good	Students always do things related to honesty, hard work, conscientiousness and thoroughness, creativity, and caring for the environment.
Good	Students often do things related to honesty, hard work, thoroughness and care, creativity, and caring for the environment.
Pretty Good	Students rarely do honest things, hard work, thorough and careful, creative, and caring for the environment.
Not Good	Students never do anything related to honesty, hard work, conscientious and careful, creativity, and caring for the environment.

RESULTS AND DISCUSSION

Science learning carried out in this study is emphasized to build student character values according to Hemafitria (2018) social interaction has shown a considerable degradation. This can be seen from the moral crisis of values due to globalization. One of the moral crises that occur is a character crisis. According to Amini (2017), character education has a higher meaning than moral education

because character education is not only about right-wrong issues, but how to instill habits of good things in life, so that children/students have awareness, and are high understanding, as well as concern and commitment to apply virtue in everyday life. For this reason, Science Learning does not only emphasize the mastery of concepts and science process skills but also must always be related to the cultivation of character values.

The learning carried out using the inquiry-based science practicum module was carried out during the Covid-19 pandemic. Therefore, the implementation of learning and measuring student character is carried out online with the study from the home system by prioritizing physical distancing. Learning using inquiry-based science practicum modules is carried out in three meetings. The first meeting was held for the orientation stage, formulating problems, and conveying hypotheses. The second meeting was held for students to collect data and test hypotheses. The third meeting was held to make conclusions conveyed in the form of student percentages and reinforcement by the teacher.

The source of learning in learning is in the form of an inquiry-based science practicum module which is packaged in the form of mobile learning. According to Suyatna, et al. (2018), along with the development of science and technology in the world, it takes educators/teachers who can modify printed learning resources to become non-print. This module is distributed to students via the WhatsApp group. All students are asked to install this application on their respective smartphones. The teacher also helps

students who have problems installing the application. Most students do this with enthusiasm because it is something new to them. There are obstacles faced when installing, namely some student smartphones do not support this application, but this problem can be overcome by installing via Google Drive sent by the teacher so that all students have modules on their respective smartphones.

Second, through the zoom application, the teacher briefly explains how to use inquiry-based science practicum modules on the interaction material of living things and their environment as well as the learning model implemented. Students are asked to use the module according to the stages of the inquiry model which consists of the orientation stage, formulate problems, convey hypotheses, collect data, test hypotheses, and make conclusions. The teacher also asks students to do the tasks contained in the module, namely by filling in the question fields provided and conducting experiments. Students are asked to document the answers to the questions and carry out the experiment to be collected. Figure 1 shows the documentation for using the module.

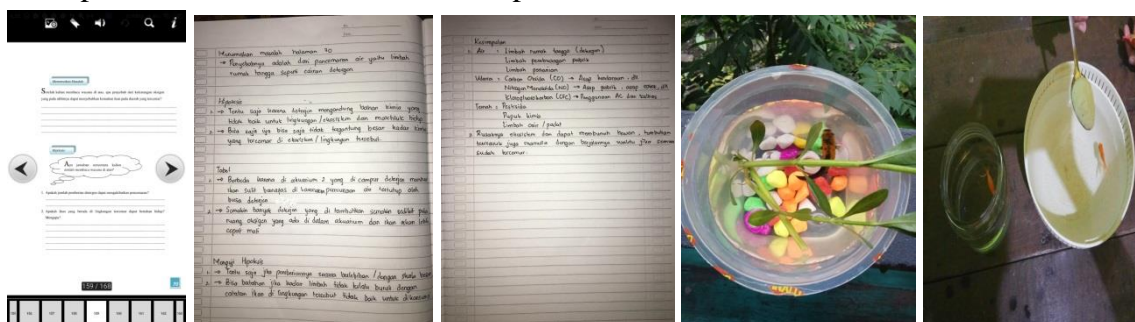


Figure 1. Documentation of the Use of Inquiry-Based Science Practicum Module by Students

Third, the teacher provides feedback through discussions using the

zoom application. Students are asked to present their findings to their friends,

while the teacher and other friends respond to what the presenter students say. Students are enthusiastic about carrying out this stage. Students make presentations well, and several other students ask questions, as implements learning in class. According to Juhanda (2017), students' communication skills shown during discussion activities are very important to be developed in science learning. This means that here students have carried out the learning process referred to in science. The obstacle faced is that not all students can make presentations due to limited time so that student learning outcomes in the form of answers to questions and experiment documentation are collected in the form of photos.

Fourth, the teacher reinforces by providing explanations related to concepts obtained by students. The

teacher reinforces the components of the environment as well as the causes and impacts of pollution, including answering the problems presented at the beginning of the lesson using modules.

Fifth, the teacher distributes student character questionnaires via google form to find out the character values that have been built by students by learning to use inquiry-based science practicum modules. The aspects of student character that are tried to be built through the science practicum module based on inquiry consist of honesty, hard work, thoroughness and carefulness, creativity, and caring for the environment.

The character of students in the honest aspects that were successfully built can be seen in Table 2. Based on Table 2 it is known that as many as 62.50% or 10 students have honest characters with good categories.

Table 2. Student Character Aspects of Honest using Inquiry-Based Science Practicum Module

Interval Class	Frequency	Percentage (%)	Category
$X > 30$	5	31.25	Very Good
$22.5 < X \leq 30$	10	62.50	Good
$7 < X \leq 22.5$	1	6.25	Pretty Good
$X \leq 15$	0	0.00	Not Good

Students who are said to be honest based on the questionnaire are students who write down the results of the experiment according to their observations, write down answers to questions based on the results of their thoughts, and present the findings based on the experiments that have been carried out. This student character can be seen when filling in the question column or making a presentation using a zoom.

Students can write down the results of the experiments they did on the observation table and convey the results of the experiment through class presentations. This is in line with Suardana & Juniartina (2020) which state that through inquiry students can think actively and reflectively which is based on a thought process toward definitive conclusions and helps them understand material based on their experiences so that they also can

analyze personal experiences in explaining the material learned.

The aspect of the character that is assessed next is the aspect of hard work. The character of students in the aspects of

hard work that was successfully built can be seen in Table 3. Based on Table 3 it is known that as many as 50.00% or 8 students have a good hard work character.

Table 3. Student Character Aspects of Hard Work using Inquiry-Based Science Practicum Module

Interval Class	Frequency	Percentage (%)	Category
$X > 19.5$	7	43.75	Very Good
$15 < X \leq 19.5$	8	50.00	Good
$10.5 < X \leq 15$	1	6.25	Pretty Good
$X \leq 10.5$	0	0.00	Not Good

From the results of the questionnaire, it is known that students who have worked hard are students who do all tasks well and finish them on time. Ratna, et al. (2017) states that hard work is behavior that shows serious effort (fighting to the death) in completing various tasks, problems, jobs, etc. as well as possible. The character of the hard work aspect shown by the students is by what was conveyed by Ratna, et al. (2017). It is proven by collecting documentation of answers to questions in

the module, documentation when students do a practicum, and students collecting assignments to the teacher according to the specified time.

Furthermore, the character of the meticulous and meticulous aspects can be seen in Table 4. Based on Table 4 it is known that as many as 43.75% or 7 students have a meticulous and thorough character with the very good category, and as many as 43.75% or 7 students have a careful and careful character. thorough with the good category.

Table 4. Student Character Aspects of Thorough and Thorough using Inquiry-Based Science Practicum Module

Interval Class	Frequency	Percentage (%)	Category
$X > 19.5$	7	43.75	Very Good
$15 < X \leq 19.5$	7	43.75	Good
$10.5 < X \leq 15$	2	12.50	Pretty Good
$X \leq 10.5$	0	0.00	Not Good

From the results of the response questionnaire, students who have a careful and conscientious character are students who write down their observations correctly, and students who check their answers again.

Student character in the creative aspect can be seen in Table 5. Based on

Table 5 it is known that as many as 43.75% or 9 students have a very good category of creative character. From the response questionnaire, students who have creative characters are students who use simple tools and materials for experiments and come up with ideas to find concepts.

Table 5. Student Character Creative Aspects using Inquiry-Based Science Practicum Module

Interval Class	Frequency	Percentage (%)	Category
$X > 19.5$	9	56.25	Very Good
$15 < X \leq 19.5$	7	43.75	Good
$10.5 < X \leq 15$	0	0.00	Pretty Good
$X \leq 10.5$	0	0.00	Not Good

The results of the documentation show that students have used simple tools for practicum by replacing the aquarium with other containers such as basins, buckets, and jars. Creative student characters like this will make students better interpret the concept. In line with Kurniasih & Rahayu (2017), the results of learning experiences

will be more embedded in the mind and this condition requires students to think more creatively. The next character aspect is the aspect of environmental care which can be seen in Table 6. Based on Table 6, it is known that 50.00% or as many as 8 students have good environmental care characters.

Table 6. Student Character Aspects of Environmental Care using Inquiry-Based Science Practicum Module

Interval Class	Frequency	Percentage (%)	Category
$X > 19.5$	7	43.75	Very Good
$15 < X \leq 19.5$	8	50.00	Good
$10.5 < X \leq 15$	1	6.25	Pretty Good
$X \leq 10.5$	0	0.00	Not Good

From the student questionnaire, it is known that students who care about the

environment are students who know the problems that are happening and seek

solutions to problems that are happening. It is evident from the ability of students to answer questions in the section to answer hypotheses related to problems and solutions in the surrounding environment. Students know the environmental problems that often occur, namely the problem of water pollution which causes damage to the water ecosystem, one of which is fish, and knows the consequences if one component of the ecosystem is missing. According to Kurniasih & Rahayu (2017), through inquiry students are allowed to have real and active learning experiences and are trained on how to solve problems while making decisions. In this study, students have had a good learning experience because they have been able to make decisions about a given problem.

Students' values about environmentally sensitive personality attitudes are an important factor in character education because in the living environment students must protect natural resources (Derlina & Sriyanti, 2016).

The largest percentage of gains in each assessed aspect can be seen in Table 7. Based on Table 7 which presents the character aspects with the largest percentage, it is known that the average character of students consisting of honesty, hard work, thoroughness and careful and caring for the environment is in a good category even two other aspects, namely meticulous and careful and creative, are in very good categories. To find out the overall character graph of students can be seen in Figure 2.

Table 7. Student Character using Inquiry-Based Science Practicum Module

Aspects of Character	Percentage (%)	Category
Honesty	62.50	Good
Hard Work	50.00	Good
Thoroughness and Carefulness	43.75	Very Good
	43.75	Good
Creativity	56.25	Very Good
Environmental Care	50.00	Good

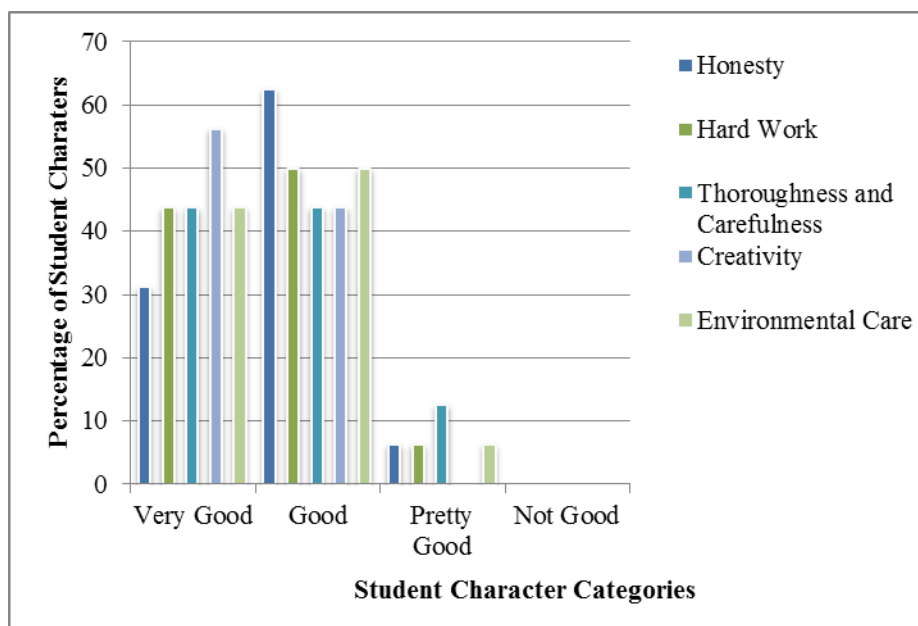


Figure 2. Student Character Graph using Inquiry-Based Science Practicum Module

Based on Figure 2, it can be seen that the character of students in using the Inquiry-Based Science Practicum Module has a very good and good average. Student character questionnaire data were also obtained from interviews with science teachers who taught at the school. In this case, not all students confirmed their character questionnaire. There are 8 confirmed students. Confirmation is done by matching the answers to the results of the student character questionnaire with the statements delivered by the teacher. Based on these results, it is known that there is an agreement between the statements of students and teachers.

An inquiry-based science practicum module that is packaged in an application that can be installed on a smartphone makes it easier for students to learn. Moreover, in a situation where the Covid 19 pandemic requires online learning, this module can support the learning being carried out. The use of this module emphasizes the cultivation of character, especially honesty, hard work, conscientiousness, quiz, creativity, and care for the environment. This is in line

with Putra (2017), namely that character education is integrated into learning, especially the science field of study, which provides meaning in the learning process in developing student character values through their potential through scientific thinking. Based on the research that has been done, it is known that the use of inquiry-based science practicum modules can build student character. This is in line with Chumdari, et al. (2018) which states that inquiry-based integrated thematic learning has a more significant and positive contribution to character education for primary school students compared to thematic learning models.

CONCLUSION

Overall, based on the results of the analysis, it can be concluded that the use of inquiry-based science practicum modules can be used to build student character. Student character is good. The highest percentage of gain was in the honest aspect which was classified as good with a percentage of 62.50%, the hard work aspect was classified as good with a percentage of 50.00%, the meticulous and careful aspects were classified as very good with a percentage of 43.75% and also classified as good with a percentage of 43.75% the creative

aspect is classified as very good with a percentage of 56.25% and the environmental aspect is good with a percentage of 50.00%.

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