



EARLY CONDITIONS OF PHYSICS LEARNING REVIEWED FROM TEACHER PEDAGOGIC COMPETENCIES IN SMP NEGERI 11 MERAUKE (RI-PNG BORDER AREA)

Syamsul Bahri, Richard S. Waremra, Andi Reski, Helga C.A. Silubun

Department of Physics Education, Faculty of Teacher Training and Education,
Musamus University, Merauke, Indonesia

Abraham L. Rettob

Department of Chemical Education, Faculty of Teacher Training and Education,
Musamus University, Merauke, Indonesia

ABSTRACT

This research is a descriptive study that aims to find out and describe the initial conditions of learning physics in the Merauke State Middle School 11 (SMP Negeri 11 Merauke) Sota District (RI-PNG border area) with the research subjects being teachers and students. The process of data collection is done by using questionnaires, namely 1) questionnaire sheets of teacher perceptions of students in physics learning in terms of teacher pedagogical competencies and 2) questionnaire sheets of students' responses to physics learning. The steps in the questionnaire analysis are 1) giving a score; 2) processing scores; and 3) calculate the percentage of total responses using the formula. The results of the study show that the teacher has the best ability on aspects of communication skills. Meanwhile, the ability to use information and communication technology (TIK) in physics learning is the lowest ability possessed by the teacher. The lowest ability in this aspect is the ability to use social media in physics learning. The teacher's pedagogical ability, especially the ability to use TIK in learning is an ability that must be owned and continuously improved so as to produce a generation that is ready to face the era of industrial revolution 4.0 (I4.0). Therefore, all stakeholders are expected to pay attention to the improvement of the competencies of science teachers (physics), especially in the field of TIK. This increase in competence can be done through the provision of training or workshops by competent parties in the field of TIK, especially Education technology.

Key words: Physics Learning, Pedagogic Competence, TIK, Industrial Revolution 4.0

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1. INTRODUCTION

The world is now entering an era of technological development that requires humans to continue to improve their quality of life. If speaking globally, then improving the quality of human resources is needed to deal with trade and international competition (Ruhana, 2012).

Education is one of the efforts to improve the quality of human resources and national development goals in the field of education is an effort to educate the nation's life by improving the quality of Indonesian people. A qualified Indonesian human being is a man of faith, devotion and noble character and mastering science, technology, and art in realizing an advanced, just, prosperous and civilized society based on Pancasila and the 1945 Constitution (Kemdikbud, 2016). Therefore, administering education is the duty and responsibility of education providers, especially in the process of implementing learning, both in the classroom and outside the classroom (Bahri, Arafah, & Arsyad, 2017).

The purpose of learning can only be achieved if all components of learning are met. The components of learning are goals, learning models, and evaluations. These three components are a unit that cannot be separated (Trianto, 2007). Therefore, good learning is learning that has clear objectives and appropriate learning models, and conducts proper evaluations.

The border area is an area that is in the foremost and outermost areas that are directly adjacent to other countries, both limited by land and water. The border line is a vertical plane through the surface of the ground, the underground layer, and air. This line limits the activities that take place in its scope (Tangkilisan, 2013). The stretch around the border line is a border area.

Merauke is one of the leading and outermost areas (borders) (Bappenas, 2014). Merauke is directly adjacent to Papua New Guinea in the East. In general, the learning conditions in the Sota area (RI-PNG Border) are still relatively low. This is caused by various factors, such as the readiness of students to learn, teachers, teaching materials, learning media, and the surrounding environment.

The factors mentioned above are the reason for researchers to examine more deeply to provide a solution. This research will be devoted to the development of the quality of physics learning in the Sota area (RI-PNG Border). Because of the many factors that influence the quality of learning, this research is an initial study that will provide an overview of the initial conditions of physics learning in the Sota area. The expected picture from this initial research is teacher learning behavior, behavior and learning impact of students, learning material, quality of learning media and the climate of learning in the classroom.

2. METHODOLOGY

The type of research used in this study is descriptive research. The research location is Sota District (RI-PNG Border Area). The study population was all students of SMP Negeri 11 Merauke. The sample used was 30 students who were selected using stratified random sampling and 2 physics science teachers. The reason for choosing SMP Negeri 11 Merauke as the subject of research is because this school is near the border and also has diverse student characteristics.

The research instruments used in this study were teacher questionnaire responses in physics learning in the classroom as well as questionnaires on students' perceptions of teachers in physics learning.

Data analysis techniques in this study used descriptive statistical analysis techniques. Instrument assessment / questionnaire perceptions and responses of respondents were analyzed by the following steps.

1. Give a score, namely the statement used in the rating scale used to find out the respondent's response is the Likert scale. The guidelines for giving a Likert scale score are given as follows.

Table 1. Guidelines for Giving Likert Scale Scores (Riduwan, 2011)

Alternative Answers	Score of each answer	
	Positive Statement	Negative Statement
Strongly agree (SS)	5	1
Agree (S)	4	2
Simply Agree (CS)	3	3
Disagree (TS)	2	4
Strongly Disagree (STS)	1	5

2. Processing the questionnaire scores of respondents' responses is done by following the following stages. Calculating the ideal score (maximum score) of each item / statement with steps:

- a) Calculate the total score obtained by each item;
- b) Calculate the percentage of the total score per item with the formula:

$$P = \frac{\sum x}{\sum x_i} \times 100\%$$

Where:

- P = percentage score
- $\sum x$ = total score for each item
- $\sum x_i$ = ideal number of scores (highest score)

- c) calculate the percentage of total responses by formula:

$$P_{\text{total}} = \frac{\sum P}{n}$$

Where:

- P_{total} = Percentage of total response
- $\sum P$ = The percentage of total score
- n = number of items/statements

3) Determine the response criteria of all items with interpretation criteria as follows: (0% - 20%: very bad; 21% - 40%: not good; 41% - 60%: good enough; 61% - 80%: good; 81% - 100%: very good).

3. RESULTS AND DISCUSSION

The response of teachers and students to the initial conditions of physics learning in SMP Negeri 11 Merauke can be seen through a questionnaire consisting of 10 aspects outlined in 40 indicators. The response of teachers and students to the initial conditions of physics learning in terms of pedagogical competencies shows that the teacher's communication skills with students in the learning process are good. Meanwhile, the use of information and communication technology (TIK) in the learning process is still relatively low.

The response of teachers and students to the conditions of physics learning if viewed from the indicators outlined in the aspects of teacher pedagogical competence shows that the indicators of the ability of teachers to communicate with students are very good. Communication referred to here is communication to prepare the psychological condition of students before taking physics learning. Meanwhile, the ability of teachers to use social media in physics learning is still low. Social media referred to here are like facebook, whatsapp, telegram, and other similar social media. In fact, current learning must follow the millennial generation's taste for learning.

The initial conditions of physics learning are a condition that is currently happening in SMP Negeri 11 Merauke. The conditions of learning physics in the school are reviewed based on the pedagogical competencies of the teaching teacher. It is very important to know to provide appropriate action by stakeholders, especially in physics learning in the RI-PNG border area. The selection of teacher pedagogic competencies as a point of view is based on the characteristics of 21st century learning which demands an increase in teacher competence. Teacher competency improvement is expected to be able to produce competent graduates to enter the era of industrial revolution 4.0 (I4.0). Although this term is still new, especially in the world of education, this term has existed in the education literature, especially for vocational education known as "technical education 4.0" or engineer 4.0 (Ramirez-Mendoza, RA Morales-Menendez, Iqbal, & Parra -Saldivar, 2018).

The aspect of teacher pedagogical competence consists of 10 main aspects that are associated with physics learning. The aspect of communication skills is the aspect that is best possessed by the teacher. This aspect consists of the teacher's ability to communicate with students to prepare for their psychological condition in facing physics learning. In addition to the psychological preparation of students, the purpose of teacher communication in learning is to invite students to take part in learning, such as through question and answer or discussion. Teacher communication also aims to provoke students' responses to questions or explanations that have been given by the teacher or other students related to a particular topic. In addition, good communication aims to obtain more feedback from students related to the learning that has been delivered (DeCenzo, A., Robbins, & Susan L. Verhulst, 2017).

The most prominent indicator in the aspect of teacher communication is the teacher's ability to prepare psychologically students to face physics learning. Before entering the core of learning, the teacher first provides apperception. This apperception is in the form of mild questions about the material that will be discussed that day. After that, the teacher explains about the relationship between the previous material and the material to be studied. In addition, the teacher also always links between lessons to be learned with everyday life. These things make students learn to be motivated in physics learning because contextualization of learning can be done through learning media in the classroom. The learning media used here are part of the innovation of information and communication technology (TIK) where this is a small part of the current effects of globalization (Collins, Allan, & Halverson., 2018).

The teacher's ability to utilize TIK in learning is the lowest aspect of the teacher. This aspect is the most important aspect when compared to the other 9 aspects in the teacher's pedagogical competence. This is because the ability to use TIK is one of the characteristics of learning in the 21st century era that has entered the era of I4.0. This TIK ability is in the form of the ability to use computers, the internet and social media in physics learning. As a school in the border area, of course it must be a special concern for the government to improve its quality. One extension of government in education is through higher education institutions. One of the roles of institutions that can be taken is, for example, a source of online learning or e-learning as well as setting up platforms, software tools, or anything that might be used by institutions in making learning content. These components can be shared between institutions, regions, or even countries (Schoonenboom, Sligte, & Kliphuis, 2009).

Teachers have the lowest ability in using social media to carry out learning. Social media referred to here are social media such as Facebook, WhatsApp, Telegram, and other similar social media. There are many factors that influence the low use of social media. One of the obstacles is cellular networks that sometimes experience interference. Another factor is that students who are taught are still many who have not been able to use mobile phones as the main tool in learning if they want to use social media as a medium for learning physics. The use of smartphones in learning lately is something new as one part of media literacy, while media literacy itself at the beginning of its presence emphasizes media interpretation practices rather than the productive use of the media itself. But now, research studies have focused on developing a community of active users on the internet which then leads to the development of more productive orientations, including through the use of smartphones (Buckingham, 2015).

Regardless of the ability of students to use social media, a teacher must have this ability. This is very important because it follows the times and children's learning tastes in this disruption era. Rapid technological development requires teachers to continue to improve their ability to deal with it because it is ready or not, technology will continue to grow. One of the things that can be taken to improve the ability of teachers is through debriefing when they are in college.

Musamus University as one of the universities that provides teacher candidates has applied the use of TIK in various subjects. A study on the Department of Physics Education at Musamus University showed that the skill level of physics teacher candidates to use computers reached 76.4% (Bahri & Waremra, 2018). These results certainly show differences in skills between prospective teachers and teachers in schools where prospective teachers are more skilled than teachers.

4. CONCLUSIONS

The results of the study show that the teacher has the best ability on aspects of communication skills. If viewed further on the indicators of each aspect, the teacher has good communication skills to prepare psychology for students learning physics. Meanwhile, the ability to use TIK in physics learning is the lowest ability possessed by the teacher. The lowest ability in this aspect is the ability to use social media in physics learning.

Teacher's pedagogical ability, especially the ability to use TIK in learning is an ability that must be owned and continuously improved so as to be able to produce generations that are ready to face the era of I4.0. Therefore, all stakeholders are expected to pay attention to the improvement of the competencies of science teachers (physics), especially in the field of TIK. This increase in competency can be done through providing training or workshops by competent parties in the field of TIK especially educational technology.

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