

Study of Science Process Skills in Lesson Plan by Prospective Biology Teachers Based on *Merdeka* Curriculum

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ABSTRACT

The purpose of learning planning is to ensure that instruction is organised and carried out in a way that achieves the aims of the curriculum. Before settling on the *Merdeka* Curriculum, the Indonesian school system went through at least eleven curricula. An essential skill for any educator is the ability to craft lessons that meet the requirements of the curriculum at any given time. This study uses a quantitative descriptive method using data from learning plan documents made by prospective biology teachers and analyzed by researchers based on the emergence of science process skills. The analysis process also uses the National Education Standard document on *Merdeka* Curriculum. The results of this study are: 1) lesson plans made based on the curriculum before K13 and the *Merdeka* Curriculum had around 8-15 pages, while the lesson plans based on the revised 2013 curriculum and the *Merdeka* curriculum were 1-1.5 pages. The material and evaluation of learning in the lesson plans for the revised K13 and the *Merdeka* Curriculum are provided using links or barcodes. 2) the discovery of process skills indicators in the form of basic process abilities and the ability to integrate processes into learning objectives. 3) lecture methods, online learning resources, and multiple choice questions are the most widely used in lesson plans. In the lesson plans analyzed, there has not been an explicit finding of product or project-based learning activities characteristic of the *Merdeka* Curriculum's learning process.

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1. INTRODUCTION

The teacher's curriculum can be used as a reference while developing lessons to help facilitate the implementation of learning. Planning for learning is done so that instruction may proceed smoothly, efficiently, and in line with syllabi goals. Based on PP number 19 of 2005, chapter 20 that "learning plans made by teachers can include syllabus and learning implementation plans that contain at least learning objectives, teaching materials, teaching methods, learning resources and assessment or evaluation of learning outcomes". The preparation of lesson plans (RPP) is an important thing for teachers in carrying out the learning process (Ernawati, 2017).

The education curriculum in Indonesia has undergone several changes since Indonesia's independence. There have been at least 11 curriculum changes in Indonesia which were marked in the year the curriculum was issued, including the 1947 curriculum, 1952 curriculum, 1964 curriculum, 1968 curriculum, 1975 curriculum, 1984 curriculum, 1994 curriculum, 2004 curriculum, 2006 curriculum, and the Merdeka curriculum. The last two curricula implemented in education in Indonesia are the 2013 curriculum and the Merdeka curriculum. Based on the results of research (Aeni, Chandra, & Muspuroh, 2013; Ernawati & Safitri, 2018), it is known that teachers have difficulty in making lesson plans based on the 2013 curriculum. Another study conducted in 2017 reported that the lesson plans made by teachers based on the 2013 curriculum were in a good category ((Hamonangan & Sudarma, 2017). In the implementation of the 2013 curriculum, which was the last curriculum used before the Merdeka curriculum, it has been revised in its implementation. Currently, the government has implemented the Independent Curriculum for several pilot schools and universities, which have been implemented since the 2022/2023 school year. The lesson plans for prospective biology teachers analyzed in this study were analyzed based on the national education standards contained in the Merdeka Curriculum. This is done in an effort to determine the ability of students as prospective teachers to prepare lesson plans in accordance with the curriculum set by the government.

One of the goals of the 2013 curriculum is to form graduates with character. This goal can be seen in the formulation of competencies in the 2013 curriculum, which has four core competencies that students must acquire, including core competencies for spiritual attitudes (KI-1), core competencies for social attitudes (KI-2), core competencies for knowledge (KI-1) 3), and core competencies (KI-4). In 2020 the 2013 Curriculum was revised, including in-school learning planning. One of the major changes in lesson planning in the 2013 curriculum revision is the term "one sheet lesson plan". Meanwhile, in the Merdeka curriculum, there are changes to the four minimum national education standards, namely graduate competency standards, content standards, process standards and assessment standards. Competency standards of graduates have the achievement of forming a profile of Pancasila students with at least competencies in the form of faith and piety to God, mutual cooperation, creativity, critical thinking, independence, noble character, and global diversity. In the content, process and assessment standards, there is a change in learning to be more independent by accommodating the concept of differentiation in learning and by providing learning activities with a project-based approach. This research is related to the analysis of prospective biology teacher students' ability to prepare lesson plans, which are then analyzed based on the content of the National Education Standards in the Merdeka curriculum.

Several researchers have carried out research on learning tools related to the independent curriculum including the analysis of the independent curriculum related to the meaning and concept that makes teachers and students independent in learning (Manalu, Sitohang, Heriwati, & Turnip, 2022; Marisa, 2021). In another part of the study, the independent curriculum was able to encourage various parties in schools, including principals, teachers, students, and education supervisors, to work together in realizing driving schools as pioneer schools in implementing the *Merdeka* curriculum (Ineu, Teni, Yadi, Asep, & Prihantini, 2022; Restu Rahayu, Rita Rosita, Yuyu Sri Rahayuningsih, Asep Herry Hernawan, 2022). The Merdeka curriculum focuses on outcomes or what is known as outcome-based education so that in managing the learning process, it focuses on achieving concrete learning outcomes supported by the use of project-based learning approaches, assignments, practices, e-learning, and

mentoring (Suryaman, 2020). So far, no research related to the Merdeka curriculum and its analysis with science process skills in lesson plans has been conducted.

The Biology Education study program has the aim of producing professional educators. One of the competencies that must be possessed by a professional teacher is to be able to develop a learning plan in accordance with the mandate of the applicable curriculum. In addition, it can also implement the learning plan that has been prepared. Biology learning is one of the science clusters that should be conveyed to students using scientific methods in accordance with the discovery activities carried out by scientists in finding facts in the form of science. In the analysis of this biology learning plan, it is identified the process skills that will be trained through the biology learning process to students. This research was conducted to determine the competence of prospective biology teachers in preparing lesson plans in accordance with the applicable curriculum. The results of the research can be used as policy information in improving the learning process of a prospective educator.

2. METHODS

This research uses a quantitative descriptive analysis method. The research sample analyzed was a lesson plan document made by Biology Education study program students who attended lectures on curriculum studies and biology textbooks with a total of 29 students and 23 students in the teaching biology in English course in the odd semester of 2021. The learning plan documents made by students were analyzed by researchers based on the emergence of aspects of science process skills and based on the Merdeka curriculum. In these two courses, students in groups analyze the curriculum, syllabus and lesson plans in accordance with the curriculum set by the government. Furthermore, students in groups develop a biological lesson plan that accommodates the process skills of students in it. Lecturers who teach courses act as researchers to analyze the results of lesson plans made by prospective biology teacher students, which are then aligned with the standard process in the Merdeka curriculum. The research data were collected using the assignment method to prospective biology teacher students. While the research instrument uses an assessment rubric created by the lecturer to analyze the emergence of process skills aspects and compare them with the National Education Standards (SNP) in the Merdeka curriculum.

3. FINDINGS AND DISCUSSION

The analysis of the biology lesson plan made by prospective teachers includes the following sections are learning objectives based on bloom's taxonomy cognitive domain and science process skills, learning methods, learning media and learning evaluations. The following is a description of the research data.

3.1 Learning Objectives

The learning objectives in the lesson plans made by prospective biology teachers are presented into two pieces of information, namely the identification of learning objectives based on the cognitive level of Bloom's taxonomy and the identification of learning objectives that contain science process skills in it.

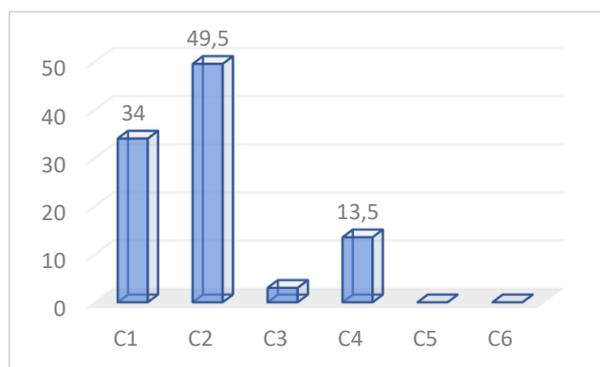


Figure 1. Results of Analysis of Learning Objectives Based on Bloom Cognitive Domain

Based on the results of the study, it is known that all RPP analyzed have the aim of achieving cognitive competence in the categories of remembering, understanding, applying, and analyzing. In the learning objectives made, there are no competencies in the categories of evaluating (C5) and creating (C6), which are the learning objectives. In general, the lesson plan measures the cognitive ability of students in remembering (C1), which is 34%. Learning plan. Students' ability to understand the subject matter (C2) is stated in the lesson plan with a percentage of 49%. While the ability to apply subject matter into daily activities (C3) is stated as much as 3% in the lesson plan. The ability of students to analyze biology material is stated as much as 13.5% in the lesson plans made by prospective biology teachers. In the details of the lesson plans, it was found that prospective teachers only wrote material and student activities, such as students being asked to listen to learning videos about inheritance and showing videos about protein synthesis. So that the learning objectives do not have the competencies to be measured.

On the other hand, learning objectives are analyzed based on indicators of science process skills in it. In this case, Science process skills can include basic and integration process skills. The following is the data from the analysis of the content of the science process skills in the learning objectives.

Table 1. Science Process Skills Indicators Found in Learning Objectives

No.	Biological Material	Science Process Skills Indicators Found
1.	Classification of living things	Classify living things based on their characteristics. Differentiate each kingdom
2.	Genetics and heredity	Identify inheritance traits Comparing the chromosomes in males and females
3.	Fungy	Students understand Classifying fungi in groups.
4.	Human Skeleton	Identify the structure of the human skeleton.
5.	Digestive System	Differentiate between the digestive system of food in humans and certain animals. Identify disorders that occur in the digestive system of food
6.	The Respiratory System	Comparing the types of organs that make up the respiratory system in humans Distinguish between different volumes of breathing air List examples of disorders and diseases of the respiratory system that are commonly encountered in everyday life

The results of the analysis of the objectives contained in the lesson plan show several learning objectives that accommodate the development of students' process skills. Some of the verbs in the identified learning objectives can train science process skills, namely classifying, differentiating, comparing, identifying, and searching for data. Science process skills can be categorized into basic process skills and integration process skills, which include the ability to classify, identify, with verbs to distinguish, compare, and search for data (Turiman, Omar, Daud, & Osman, 2012). The results of this study are in line with (Sayekti & Kinasih, 2018), which states that the science learning plan made by the teacher includes the development of science process skills although it is limited to the ability to observe and communicate. The results of the research (Hamadi, 2018) stated that the teachers had sufficient ability to design science process skills for science lessons. Biology learning is more likely to provide opportunities for students to develop science process skills freely (Airlanda & Sudarisman, 2011). The results of other studies reveal that learning biology with a science process skills approach can improve students' ability to solve problems (Supiyati, Hidayati, Rosidi, & Wulandari, 2019).

3.2 Learning Methods

In the lesson plans made by prospective teachers, they use quite a variety of methods, some of which are literature study, discussion and question and answer, assignments, lectures, experiments, observations, cooperative learning, and discovery learning. The following is the composition of the use of the learning method.

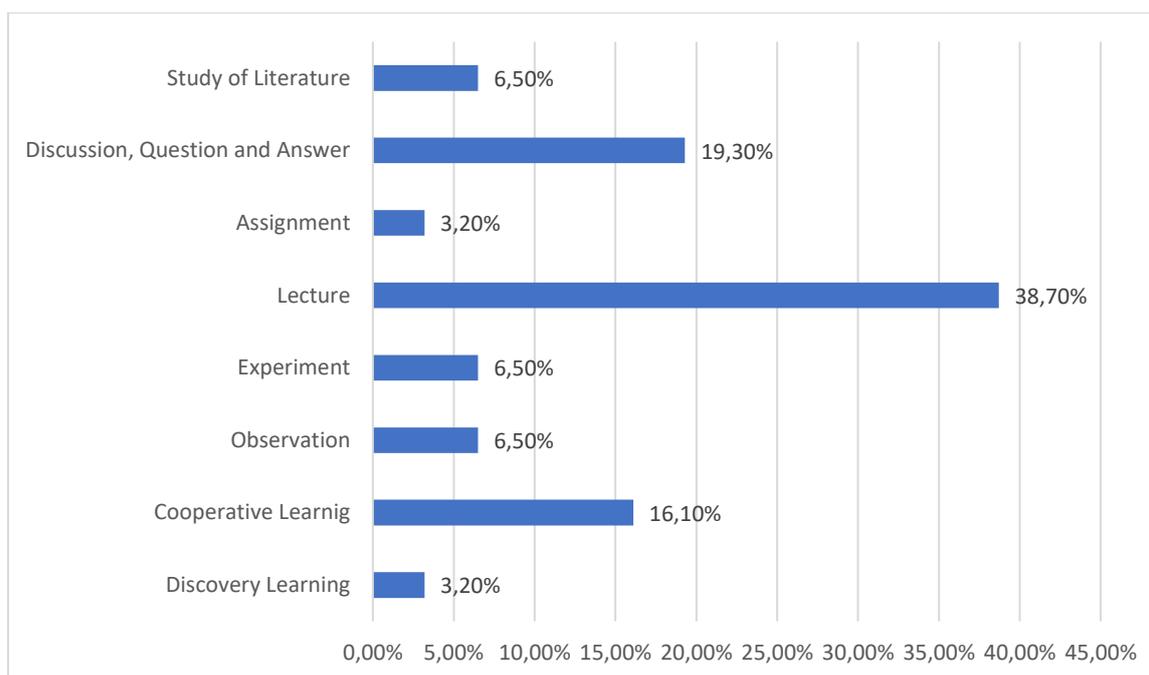


Figure 2. Use of Learning Methods

The most widely used learning method by prospective teacher students is the lecture method, with a percentage of 38.7%. The method of discussion, question and answer is the second most widely used method by prospective biology teacher students, with a percentage of 19.3%. The cooperative learning method is used in as much as 16.1% of the lesson plan. In the cooperative learning method, students actually use several variations of methods such as jigsaw, group investigation, and STAD (Student Team Achievement Division). In the next section, the use of literature study methods, experiments, and observations occupies the third highest position, which is 6.5%. While assignments and discovery learning have a percentage of 3.2%. According to the results of the research (Suciati & Astuti, 2019) that the ability of prospective biology teacher students to make lesson plans is in the good category, but there are parts that need to be improved, one of which is the selection of learning methods. The experimental method is one of the appropriate learning methods to be used in the development of students' process skills (Agustina, Saputra, Anif, Rayana, & Probowati, 2021; Falahudin, Fauzi, & Purnamasari, 2016). On the other hand, the discovery learning method is stated to be able to improve students' science process skills (Tyas, Wilujeng, & Suyanta, 2020). In the National Education standard, the standard part of the Independent Curriculum process, it is stated that project-based learning with outputs in the form of products resulting from concrete activities and the skills, knowledge, and attitudes of students are the characteristics of the Independent Curriculum. In addition, the existence of a graduate competency standard in the form of a Pancasila Student profile character is an attitude that must be trained in learning activities.

3.3 Learning Resources

Some of the learning resources used in the biology lesson plan are categorized into two parts: online and offline. Some offline learning resources include biology textbooks for students, and student worksheets made by teachers. Online learning resources come from the use of the internet, for example, websites, electronic school books, online news, and articles in journals obtained online. The following is data on the results of using learning resources in the biology lesson plan.

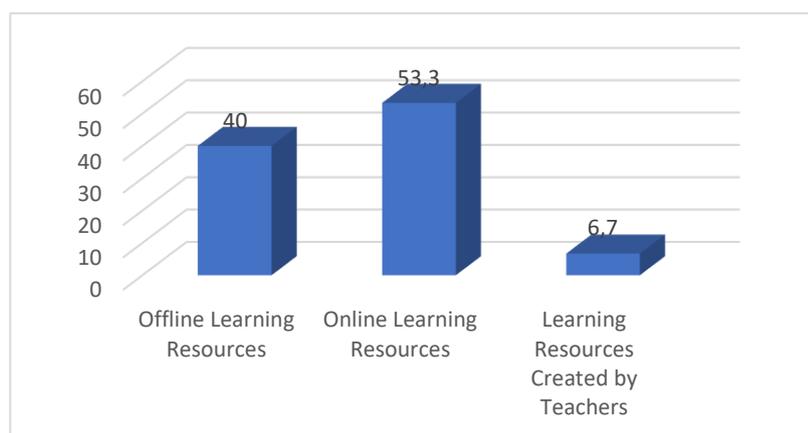


Figure 3. Use of Learning Resources

Based on the research data, it is known that online learning resources have the largest role used in the biology learning process listed in the lesson plan, with a percentage of 53.3%. While offline learning resources are 40%. On the other hand, there is a lesson plan that states using learning resources made by prospective biology teachers with a percentage of 6.7%. Learning resources obtained online are the most widely used learning resources in lesson plans. This can happen because through the online search process can provide more varied material, and faster. Through online searches, biological material can be obtained from scientific articles, teaching materials in the form of power points, online news, and writings on websites and learning blogs. This is in line with research (Gani, Zaimah, & Wulandari, 2020) which states that internet facilities provide various kinds of biology learning resources. Furthermore, learning resources made by teachers have their own advantages because they are in accordance with the characteristics of the material, students and learning objectives. This is in line with the results of research (Sriyati, Ivana, & Pryandoko, 2021) which states that the use of biology learning tools based on local wisdom can significantly improve students' science process skills. In some learning textbooks, it is sufficient to facilitate science process skills, especially in terms of observing/observing activities, but in other skills, such as submitting, it is still not well facilitated (Ramadhani, Akmam, & Yenni, 2019).

3.4 Learning Evaluation

In the learning evaluation section, prospective biology teacher students use assessment techniques in the form of tests and non-tests. Some of the assessments used are in the form of tests in the form of multiple-choice questions, oral knowledge tests, tests in the form of description questions, skills tests in the form of practical exams, and assignments. The following is the data obtained based on the study plan of the research sample.

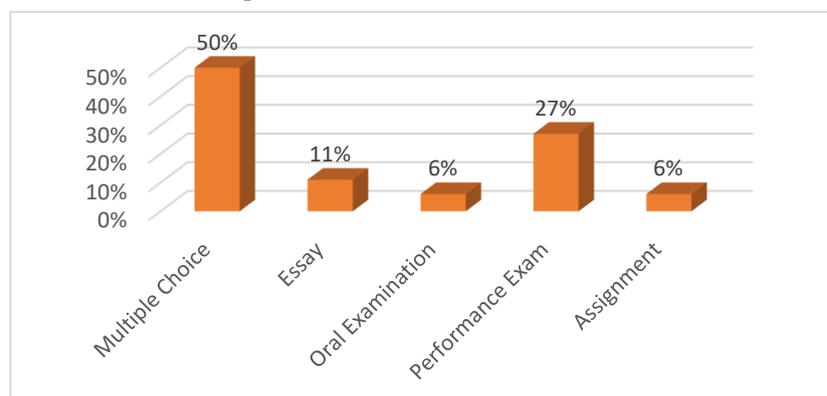


Figure 4. Evaluation of Learning in The Lesson Plan

Based on the research data, it is known that the type of evaluation question that is most widely used in biology learning plans is multiple choice, with a percentage of 50%. According to research from (Salamah & Mursal, 2017), multiple-choice questions can be used in science learning and assess students' science process skills. Performance practice exams to determine the skills of students were carried out as much as 27% in the biology lesson plan. While the written exam with the type of description questions is used as much as 11% in the biology lesson plan. The method of oral examination and assignment occupies the smallest percentage used in the biology lesson plan, which is 6%. In lesson plans that refer to the revised 2013 curriculum, students generally include evaluation questions using barcode scans and or links to evaluation questions. Some lesson plans use applications to evaluate, for example, Quiziz. In contrast to the RPP, which was made referring to the curriculum before the revised K13 and the Independent Curriculum, students included an evaluation attachment in the form of questions with answer keys. In the implementation of the independent curriculum evaluation, it has the characteristic of evaluating the performance of students in the form of skills, attitudes, and knowledge, as well as an assessment of the products. In the learning evaluation process, teachers should use various evaluation techniques that can accommodate all the competencies that exist in students. This is in line with the results of research (Auliya, Swistoro, & Putri, 2019) which states that the ability of teachers to make evaluations of lesson plans is in the very good category.

4. CONCLUSION

Based on the results of the analysis carried out, it was concluded that 1) lesson plans made based on the curriculum before K13 and the Merdeka Curriculum had around 8-15 pages, while the lesson plans based on the revised 2013 curriculum and the Merdeka curriculum were denser with 1-1.5 pages. This can happen because of differences in the style of writing the subject matter, and the evaluation of learning. In the lesson plans prior to the revised 2013 Curriculum and the Merdeka Curriculum, the material and evaluation of learning are written in full, while the lesson plans for the revised K13 and the Independent Curriculum are provided using links or barcodes. 2) the discovery of process skills indicators in the form of basic process abilities, and the ability to integrate processes in learning objectives. 3) lecture methods, online learning resources, and multiple choice questions are the most widely used in lesson plans. In the lesson plans analyzed, there has not been an explicit finding of product or project-based learning activities characteristic of the Merdeka Curriculum's learning process. The limitation of this study is that the learning plan documents made by prospective biology teachers are not based on the Merdeka Curriculum policy, but in their analysis activities, the researcher uses the reference to the National Education Standards on the Merdeka Curriculum.

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