Journal of Positive School Psychology
2022, Vol. 6, No. 5, 6381 – 6387

An Analysis of Students' Problem-Solving Skills in Reproductive System

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Abstract

Education in the 21st century aims to build up students' intelligence skills in learning to solve their daily problems. This study aims to investigate students' problem-solving skills in the reproductive system and investigate the factors that affect it. This study uses the descriptive method and involves 36 students. The data were collected through 30 multiple choices and 34 questionnaires to find out the descriptive statistic and analyze the factors that affected students' problem-solving skills and the data. The data analysis shows that the average of students' problem-solving skills is 44,70%, and it is classified in the category of being. Based on the questionnaire's research, some supporting and inhibiting factors affect students' problem-solving skills. The supportive factors derived from the internal and external factors were self-confidence (80,56%) and the teacher as the trustee of the students (75%). The imbibition factors derived from internal and external factors were learning concentrations (65,28%) and the school's curriculum (60,42%). Students' problem-solving skills are classified in the category of being. There are some supporting and inhibiting factors from internal and external factors.

Keywords: Analysis, Problem Solving, Reproduction System

Introduction

At the end of a learning process, students will get learning outcomes in capabilities or abilities. One of these abilities includes the ability to solve problems that are included in the intermediate level Education Unit Graduate Competency Standards (SKL-SP) formulated by the National Education Standards Agency (BSNP) (Sanjaya, 2008). A student is said to have good problem-solving skills when he can understand problems, define problems, formulate or plan problem-solving solutions, apply problem-solving strategies or solutions, and evaluate the results of problem-solving that has been done (Sukmasari & Rosana, 2017). The existence of problem-solving abilities possessed by students can provide direct learning experiences because they use their abilities in constructing, understanding, and applying the concepts they have learned (Sumiantari et al., 2019). Therefore, it is crucial for students, especially middle-level graduates, to have learning outcomes in the form of problem-solving skills because these abilities help them construct, understand, and use the concepts of the subject matter studied to make the learning process meaningful.

Internal factors and external factors can influence problem-solving ability due to learning. Internal factors include intelligence, interest, motivation to learn, concentration, self-confidence, and study habits. In comparison, external factors include teachers as coaches for student learning, students' social environment at school, and the school curriculum (Dimyati & Mudjiono, 2013). Another external factor is parenting from parents (Hedyanti et al., 2016). In the learning process, these factors must be considered so that students have learning outcomes in the form of good problem-solving abilities. Although problem-solving skills are essential skills for students, especially for middle school graduates, the facts on the ground show that students' problem-solving skills in Indonesia are still low. This is following the results of the PISA (Program for International Students Assessment) in 2012, which showed that Indonesia was ranked 64th out of 65 participating countries with an average score of 375, and the average score on the international

scale was 500 (Islamiyati et al., 2016). In line with research on problem-solving abilities, it shows that the problem-solving skills of private high school students in Indonesia on environmental pollution materials are classified as lacking and influenced by several factors, such as the lack of student understanding of the material provided, lack of problem-solving learning, and their learning motivation (Ningrum, 2015).

In Natural Sciences (IPA), especially biology, there are materials closely related to everyday life problems. One of these materials is the material of the reproductive system. This material is fascinating among teenagers, exceptionally high school students because the reproductive organs begin to develop or mature (Nafila et al., 2016). Adolescents must know the function of their sexual organs and dangerous venereal diseases through education, especially in schools, through the learning material on the reproductive system (Fauziah, 2018). The existence of learning material on the reproductive system in schools so that students can understand the function of reproductive organs and know dangerous diseases that can attack the reproductive system, provide information on how to maintain the health of reproductive organs, as well as reproductive rights in adolescents.

This study aims to determine how big students' problem-solving ability on the material of the reproductive system is. This study has not been widely carried out because materials about environmental pollution are used to measure students' problem-solving ability. The results of this study are expected to provide more in-depth information about students' problem-solving skills, especially on the material of the reproductive system.

Method

This study was conducted at a private high school in Jakarta, Indonesia. The method used in this study is descriptive. A total of 36 students who were determined by the purposive sampling technique were involved in this study. The instruments used are tests and questionnaires. The test instrument was used to measure students' problem-solving abilities, which consisted of 30 multiple choice questions that had been tested. The questionnaire instrument was used to determine the factors influencing students' problem-solving skills. The test instrument is in the form of multiple-choice questions based on Polya's problem-solving ability indicators, namely understanding the problem, making plans, implementing plans, and reviewing (Polya, 2004). In contrast, the non-test instrument uses a questionnaire (questionnaire). Descriptive statistics carried out data analysis.

Results

Student problem-solving ability

The research data from the written test instrument was used to determine the students' problem-solving abilities obtained by testing 30 multiple-choice questions on the material of the reproductive system. The percentage of indicators from the written test can be seen in Figure 1.

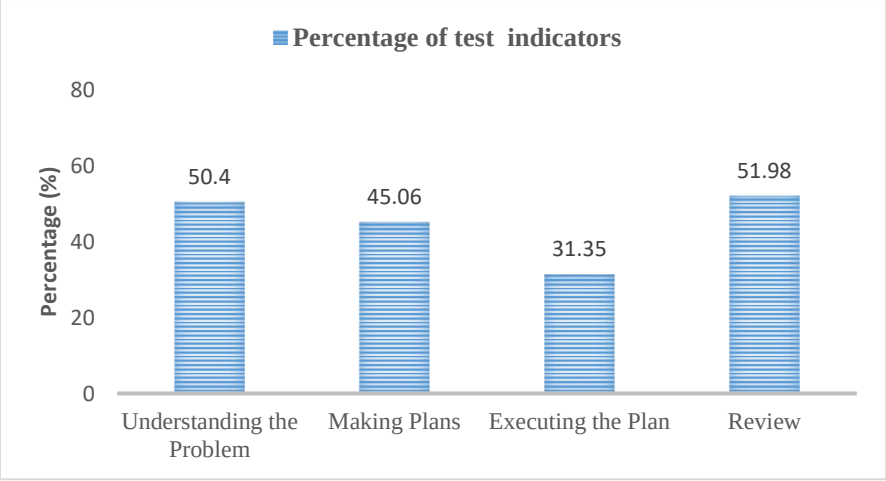

Figure 1. Percentage diagram of problem-solving ability indicators

The chart above shows that the highest percentage of students' problem-solving abilities is found in the review indicator (51.98%), then the understanding problem indicator (50.4%), the planning indicator (45.06%), and the lowest percentage is in the implementing hand (31.35%).

Factors that affect students' problem-solving abilities

Another instrument used in this research is a non-test instrument, namely a questionnaire as data to determine the factors that influence students' problem-solving abilities. The statement items contained in the questionnaire refer to internal factors and external factors that affect problem-solving skills. Internal factors consist of intelligence, interest, motivation to learn, concentration, self-confidence, and study habits. At the same time, external factors consist of teachers as coaches of student learning, students' social environment at school, school curriculum, and parenting patterns. The average percentage of internal factors that affect students' problem-solving abilities is shown in Figure 2.

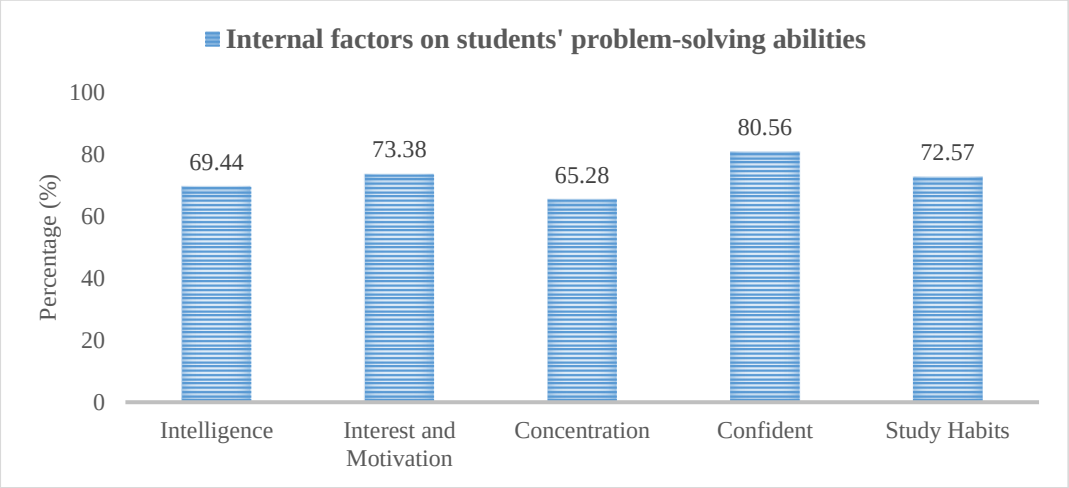

Figure 2. Graph of the Average Percentage of Internal Factors that affect students' problem-solving abilities

Figure 2 shows the average percentage of the different factors. Self-confidence has the highest average rate (80.56%), and the lowest average percentage is found in learning concentration (65.28%). The average percentage of external factors that affect students' problem-solving abilities is shown in Figure 3.

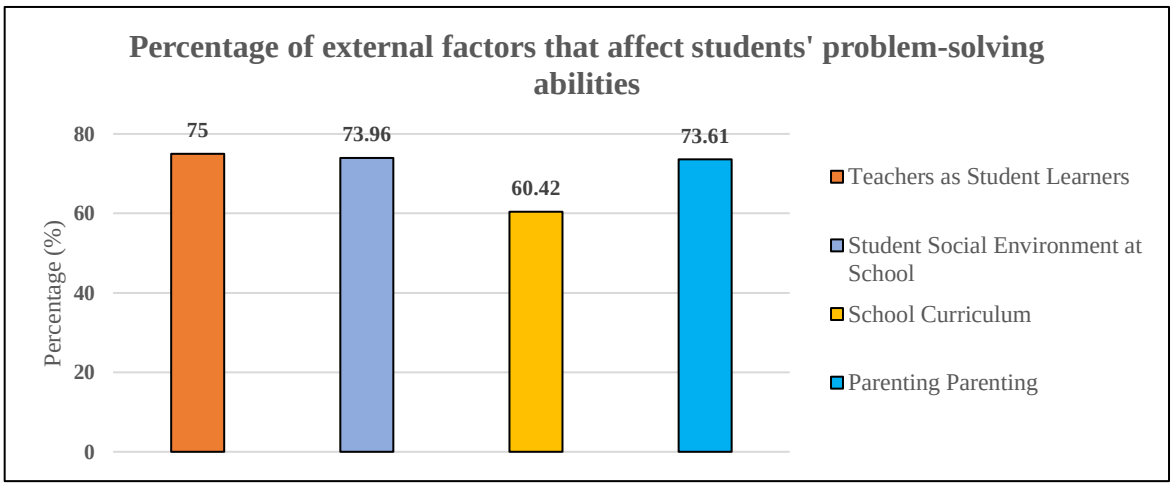

Figure 3. Diagram of the average percentage of external factors that affect students' problem-solving abilities

Figure 3 shows that the highest average percentage comes from teachers as student coaches (75%), and the lowest average rate is found in the school curriculum (60.42%).

In addition, based on the results of the calculation of the percentage of questionnaire items originating from external factors, namely the teacher as a coach for student learning, several factors affect problem-solving abilities, namely the teacher uses a problem-based learning model, and the teacher relates the subject matter to problems that are relevant to everyday life. -the day is shown in Figure 4.

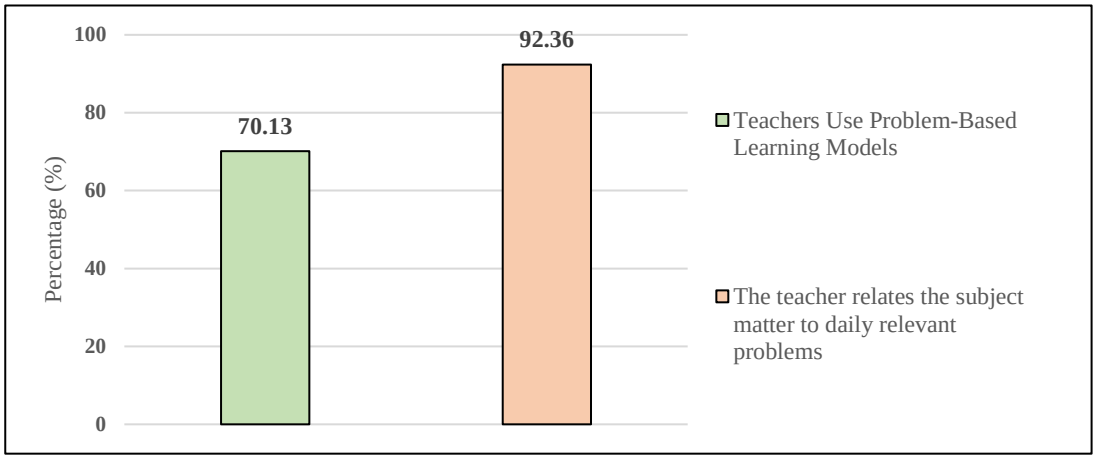

Figure 4. Diagram of the percentage of questionnaire items from external factors, namely teachers as coaches of student learning

Based on Figure 4, as many as 70.13% of students feel that the teacher uses a problem-based learning model, and as many as 92.36% of students think that the teacher relates the subject matter to problems relevant to everyday life. While the calculation of the percentage of questionnaire items originating from external factors, namely the school curriculum, is shown in Figure 5.

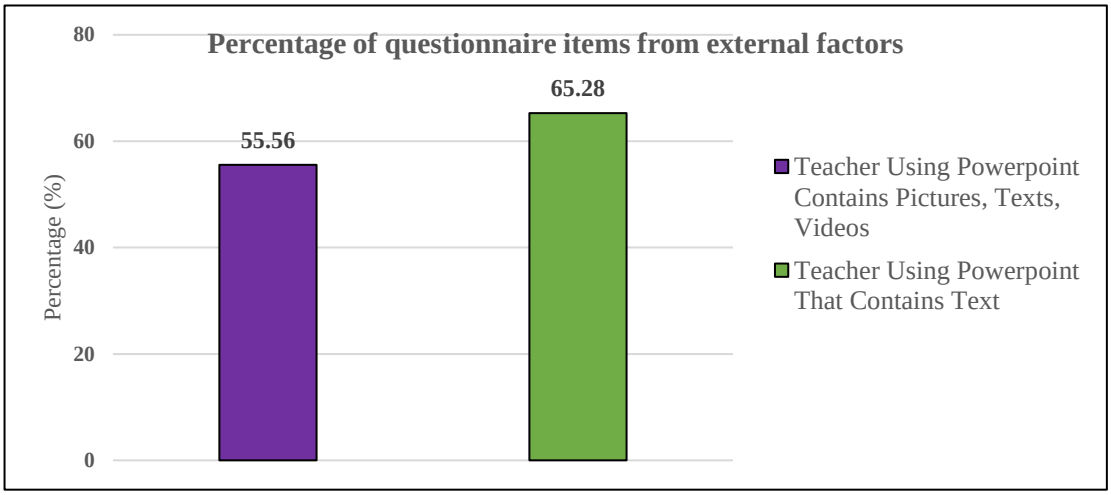

Figure 5. Percentage Diagram of Questionnaire Items from External Factors, namely School Curriculum

Based on Figure 5, it is known that 55.56% of students feel that teachers use PowerPoint learning media that contains text, images, and videos, and as many as 65.28% of students feel that teachers use PowerPoint learning media that contains more text.

Discussion

After analyzing the data, it was found that the problem-solving ability of high school students in Jakarta was included in the sufficient criteria with an average percentage of 44.70%. In addition, through the results of the questionnaire calculation, it is known that there are supporting factors and inhibiting factors that affect students' problem-solving abilities. The indicators of understanding the problem, compiling a resolution plan, and reviewing are indicators that fall into the sufficient criteria. This can be caused by the existence of supporting factors that come from internal factors and external factors. Supporting elements originating from internal factors are self-confidence, and supporting factors arising from external factors are teachers as coaches of student learning. At the same time, the indicators of implementing the plan are classified as lacking criteria. This can be caused by the inhibiting factors originating from internal factors, namely learning concentration, and inhibiting factors originating from external factors, namely the school curriculum.

The first supporting factor comes from internal factors: self-confidence, which has the highest average percentage of 80.56%. Someone who has self-confidence will have an optimistic attitude. The existence of self-confidence is fundamental because it makes students believe in their abilities and not easily give up on facing problems so that students can complete all their assignments well and obtain maximum learning outcomes (Nurhayati et al., 2017). The higher the students' self-confidence, the better their ability to solve problems (Rahayu et al., 2018). Therefore, high self-confidence is essential for students because it affects students in dealing with a problem. Conversely, when students are faced with a problem but do not have confidence in their abilities and have a pessimistic attitude, they will quickly give up.

The subsequent supporting factor comes from external factors: the teacher factor as a student coach with the highest average percentage of 75%. Based on the calculations on each item of the questionnaire that comes from the sub-variable of the teacher as the coach of student learning, the results obtained that as many as 70.13% of students think that in the learning process, teachers use problem-based learning models. As many as 92.36% of students believe that The teacher relates the subject matter to problems that are relevant to everyday life. First, as many as 70.13% of students believe that the teacher uses a problem-based learning model in the learning process. According to Arends, there are five stages in the problem-based learning model. Namely, students are introduced to problems, students are directed to study in groups, students investigate independently and in groups, namely by collecting data and conducting experiments, and students are directed to present the results of their discussions and analyze and evaluate the problem-solving process. which has been done. In the last stage, the teacher's role is to help students explore and assess their thinking processes in investigations and intellectual skills used in problem-solving (Sam & Qohar, 2015).

One of the problems used in the problem-based learning model aims to raise students' understanding of a problem because the first step in solving a problem, according to Polya, is that students must understand the problem first. In addition, the last step in implementing the problem-based learning model is to evaluate the problem-solving process that has been carried out. The use of problem-based learning models helps students in solving problems. This is following the results of this study, namely the indicators of understanding the problem and indicators of reviewing, which are included in the sufficient criteria.

Next, 92.36% of students think that the teacher relates the subject matter to problems that are relevant to everyday life. When the teacher refers to the teaching material in the real world, the teacher carries out learning with a contextual approach. Through a contextual process, students will be able to express new ideas, develop existing ideas, and analyze a problem from the situation experienced students (Nurani, 2014). The contextual learning approach carried out by the Biology teacher in Jakarta is related to the results of data analysis in this study. Namely, the indicator of compiling a completion plan has a percentage that belongs to the sufficient criteria. In making problem-solving solutions, students must first understand the problem being studied. To understand the problem, the teacher helps students by linking the subject matter with other issues that are relevant to everyday life that are related to the problem being studied so that it allows students to be able to come up with ideas or ideas that are useful in making problem-solving solutions.

The next factor is the factor that hinders students' problem-solving ability, which comes from internal factors, namely learning concentration, and external factors, namely

school curriculum. The first factor that can hamper students' problem-solving skills comes from learning concentration which has an average percentage of 65.28%. Concentration is defined as the ability of the mind to focus on one thing (Grewal, 2014). One of the factors related to the success of the learning process is that students have good problem-solving skills. Based on the study results, the indicators of implementing the plan have the lowest percentage and are classified as lacking criteria. The problem-solving stage is implementing the program, and students must focus on accuracy to carry out problem-solving steps (Khotimah and Masduki, 2016).

The next factor that can hinder students' problem-solving abilities and cause the indicators of implementing the plan to be classified into fewer criteria comes from external factors, namely the school curriculum with a percentage of 60.42%. In the 2013 curriculum, teachers are required to apply learning approaches such as the use of various learning media and learning resources (Darnius, 2016). Based on the calculations on each item of the questionnaire derived from the sub-variables of the school curriculum, as many as 65.28% of students thought that the PowerPoint learning media used by teachers contained more writing/text, which caused students to use not be sufficiently assisted in the learning process. In the context of learning, multimedia means the use of various media types in the delivery of material to receive messages or teaching materials optimally and optimally by students who have different learning modalities (Musfiqon, 2012; Shalikhah et al., 2017). Therefore, multimedia representations have the potential to produce deeper learning and understanding than presentations presented in one format, such as offering material only in words or pictures (Novitasari, 2016). Therefore, through the use of multimedia-type learning media, students will be more assisted in the learning process that helps them solve a problem. On the other hand, if there is no teacher's role, such as the absence of the use of learning media that can support the acceptance of the concept of the subject matter, then students will have difficulty solving a problem.

Conclusion

The findings in this study indicate that the problem-solving abilities of private high school students in Jakarta are classified as sufficient, with an average percentage of 44.70%. There are supporting and inhibiting factors that affect students' problem-solving abilities that come from internal and external factors. Supporting factors originating from internal and external factors are self-confidence and teachers as coaches of student learning with an average percentage of 80.56% and 75%, respectively. The inhibiting factors originating from internal and external factors are learning concentration and school curriculum, with an average rate of 65.28% and 60.42%, respectively.

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