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## Teacher Perceptions of the Use of Socioscientific Issues in Science Learning in Middle Schools of Tanjung Sakti District PUMI and Tanjung Sakti District PUMU

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**Abstract.** Currently, there are already many countries that have revised their science curricula to be sure effective science learning environments. Blessing in this revision, socioscientific issues are integrated into the curriculum. Their presence has brought about the need to know what socioscientific environmental problems exist. The research conducted aims to describe the perceptions of junior high school science teachers regarding the use of socioscientific issues in science learning at SMP Tanjung Sakti PUMI and Tanjung Sakti PUMU districts. In this descriptive quantitative study, data were collected using 15 items of statements with a questionnaire in the form of a Likert scale. The research subjects were seventeen science teachers from Tanjung Sakti Public Middle School 1 PUMI, Tanjung Sakti Public Middle School 2 PUMI, Tanjung Sakti Public Middle School 3 PUMI, Tanjung Sakti Public Middle School 4 PUMI, Tanjung Sakti Public Middle School 1 PUMU, Tanjung Sakti Middle School 2 PUMU, Middle School Mumammadiyah Batu Rancing, SMP PUMI Xaverius Tanjung Sakti. The study results show that science teachers have very positive perceptions or agree to use socioscientific issues in science learning. This study shows that science teachers' perceptions about socioscientific issues are well received, and the use of socioscientific issues is very impressive in the science learning process.

**Keyword :** Perception, Science Teacher, Socioscientific Issues

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## Introduction

Socioscientific issues (SSI) is an approach to the learning process that requires students to play a more active role (Siska *et al.*, 2020). The SSI approach is almost the same as the problem-based learning approach, namely, the learning process is carried out by introducing contextual problems (Anagün & Özden, 2010). A learning approach using SSI can help develop students' critical thinking about an issue or problem that is being faced in the real world. In recent years, many studies have shown that incorporating SSI content in learning is very effective in contributing to the growth of scientifically literate individuals. Therefore, SSI subjects must be included in appropriate science education programs (İpek & Olgun, 2020).

By including matters related to SSI in science education, science will get more places in learning and find opportunities to evaluate the ethical and moral relations of science in society (Akbulut *et al.*, 2020). For an effective SSI teaching process, it is important for science teachers to know and be aware of what SSI is and how it relates to science education goals (Öztürk & Erabdan, 2019). Teachers, as the main element in the implementation of education, must have a good understanding and skills to apply learning

that can develop students' abilities in learning. In teaching SSI, teachers have a big responsibility, and science teachers are expected to have skills in this field.

Science educators suggest the inclusion of SSI in science classes to educate responsible citizens who understand scientific evidence and scientific knowledge as a product of human endeavor and moral and ethical values relating to other people and the environment (Bilican, 2018). In teaching and learning activities, SSI encourages students to participate in discussion and debate by providing a framework for understanding scientific content and the nature of science and helping develop higher-order thinking skills (HOTS), such as critical thinking and argumentation (Espeja and Lagarón, 2015). By including the right SSI content by the teacher in learning, it is hoped that learning will have a positive value for students. SSI in various countries varies greatly depending on geographical conditions, an area's characteristics, and the country's level of development. In general, Asian countries raise issues related to environmental pollution. Specifically, for Indonesians, it tends to be related to school subjects such as environmental pollution, heat and the reproductive system (Genisa *et al.*, 2020).

SSI plays an important role in learning science, so teachers must have a positive perception of SSI. Ahmad *et al.* (2021) state that perceptions will have an impact on student learning outcomes directly, but these perceptions can also affect teacher motivation and performance, which of course, will be able to have an impact on student learning. Research results from Öztürk and Erabdan (2019), who conducted research on science teachers' perceptions of SSI and how to teach it. His study analyzes science teachers' perceptions of SSI and how they teach it. His research found that most science teachers had never heard of the SSI concept before. It can be seen that teachers who do not know about SSI generally define it as a scientific problem that is of concern to the community and it is difficult to provide examples. In this study, it was also found that most teachers did not know which subject areas were included in the SSI science curriculum. Sibic and Topcu (2020) have also researched pre-service teachers' views of SSI and SSI-based instruction. In this study, it was found that some pre-service teachers were aware of SSI problems, and some others did not know. Some of them did not know the issues in the science education curriculum and how to deal with them during lessons.

Several research articles have been conducted by several experts related to the perceptions of science teachers towards SSI who are abroad. In contrast, the same research regarding science teachers' perceptions towards the use of SSI in Indonesia is still limited. The teacher's perception of the use of SSI in science learning is very important because it will affect the effectiveness of the learning process and the results of the learning itself. Therefore the researchers also conducted research to find out teachers' perceptions of the use of SSI in science learning, which aims to describe science teachers' perceptions of the use of SSI in science learning at SMP Tanjung Sakti PUMI District and Tanjung Sakti PUMU District

## Method

This research is descriptive research using a quantitative approach. The subjects in this study were 17 science teachers in 8 junior high schools in Tanjung Sakti PUMI District and Tanjung Sakti PUMU District. In this study, data collection techniques were carried out by using a questionnaire or questionnaire that had been prepared according to the indicators of the study in the form of a Likert scale with five alternative answers, namely strongly agree, agree, doubt, disagree, and strongly disagree. Then the questionnaire in the form of a Likert scale was then distributed to the respondents who had been determined to find out the description of the respondent's perceptions of the use of SSI in learning science. Data management techniques in this study include editing, coding, data tabulation, data reduction, data presentation, data verification, and concluding data. The data analysis technique was carried out using a descriptive percentage method, namely by grouping the results of the data obtained from the respondents' answers into the Likert scale criterion intervals. The data analysis technique used in this research is descriptive quantitative data analysis to describe teacher perceptions which will be presented in percentage form with the help of Microsoft excel software.

## Results and Discussion

The results of this study obtained the distribution of a Likert scale questionnaire in the form of a checklist that used instruments made by researchers and was used to describe the perceptions of science teachers towards the use of socioscientific issues in science learning in junior high schools. The test questions were in the form of a questionnaire in the form of a Likert scale with entries in the form of a checklist consisting of 5 alternative answers, namely strongly agree, agree, doubt, disagree, strongly disagree, totaling 15 statement items presented to 17 junior high school science teachers spread across 8 junior high schools in PUMI's Tanjung Sakti sub-district and PUMU's Tanjung Sakti sub-district. In the 15 items, there were two questions that were eliminated because they did not meet the standard of question validity. The level of reliability of the questions, with a score of 0.92, was at a very reliable stage. These 13 questions were processed using Microsoft Excel and presented in the data in the following Table 1.

**Table 1.** The use of SSI in learning can help achieve the goals of learning

| No | Statement         | f  | %   |
|----|-------------------|----|-----|
| 1  | Strongly agree    | 5  | 29  |
| 2  | Agree             | 12 | 71  |
| 3  | Uncertain         | 0  | 0   |
| 4  | Disagree          | 0  | 0   |
| 5  | Strongly disagree | 0  | 0   |
|    | Total             | 17 | 100 |

From the results of the responses of 17 respondents to the statement (1) The use of SSI in learning can help achieve the objectives of learning, namely those who filled out strongly agreed as many as five teachers or 29% of respondents, and those who filled out agreed as many as 12 teachers or 71% of respondents because many agreed that incorporating SSI in learning would be effective in assisting teachers in achieving learning objectives. Patterns in learning require learning concepts that prioritize the ability to bring up an idea or solution in solving problems that are being faced in the environment. Patterns in learning correctly are needed to be applied in achieving the goals of learning, one of which is problem-based learning in society or socioscientific issues-based learning (Winarni et al., 2021). In this statement, most teachers strongly agree or provide positive responses that SSI in learning can help achieve learning goals.

**Table 2.** The use of SSI in learning can result in more active and learner-centered learning

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly agree    | 8  | 47  |
| 2.  | Agree             | 9  | 53  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In statement (2), the use of SSI in learning can produce active and student-centered learning. Those who filled in strongly agreed with as many as eight teachers, or 47% of respondents, and those who filled in agreed with as many as nine teachers, or 53% of respondents. SSI is one of the existing approaches in learning that requires students to play an active role in learning, because in learning using SSI, existing problems must be developed by students by developing from various aspects, both from moral, economic, scientific aspects, and others (Siska et al., 2020). based on these responses, it can be concluded that SSI in learning can make learning more active and student-centered.

**Table 3.** The use of SSI in learning can make the learning process in the classroom more enjoyable

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | strongly agree    | 8  | 47  |
| 2.  | Agree             | 9  | 53  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Jumlah            | 17 | 100 |

In statement (3), SSI in learning can make the learning process in the classroom more enjoyable, namely, those who filled in strongly agreed with as many as eight teachers, or 47% of respondents, and those who filled in agreed with nine teachers or 53%. Based on the responses from these respondents it can be concluded that the teacher

agrees or gives a positive response that SSI can make the atmosphere in the classroom more enjoyable. For learning activities to run as optimally as possible, the teacher is expected to have the abilities expected of students and, of course, master the learning material that will be taught because student success will depend on the model taught by the teacher (Fihani, 2021). So that optimal learning activities will create a pleasant atmosphere in the classroom.

**Table 4.** The use of SSI in learning can help students work on practice questions correctly

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1   | Strongly agree    | 4  | 24  |
| 2   | Agree             | 13 | 76  |
| 3   | Uncertain         | 0  | 0   |
| 4   | Disagree          | 0  | 0   |
| 5   | Strongly Disagree | 0  | 0   |
|     | Jumlah            | 17 | 100 |

In statement (4) The use of SSI in learning can assist students in working on practice questions correctly, namely those who filled in strongly agreed with as many as four teachers, or 24% of respondents, and those who filled out agreed with 13 teachers or 76% of respondents. In this response, the teacher gave a response that strongly agreed or was very positive about using SSI to help students to work on practice questions correctly because one of the benefits of using SSI is to improve students' critical thinking skills, which allows students to answer various questions based on facts existing facts. Critical thinking skills can provide proper direction to students in thinking and working, as well as assist students in determining the relationship between something and another more precisely (Andryani et al. 2016).

**Table 5.** The use of SSI in learning can facilitate teachers in designing and implementing science learning

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly agree    | 6  | 35  |
| 2.  | Agree             | 11 | 65  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In Statement (5), the use of SSI in learning can make it easier for teachers to design and implement science learning, namely those who fill in strongly agree, as many as six teachers or 35% of respondents, and those who fill in agree as many as 11 teachers or 65% of respondents. SSI is a strategy in learning that has the goal of stimulating moral, ethical, and intellectual development, as well as the relationship between science and everyday life (Purwanti & Nurohman, 2013). SSI contexts can be found in global contexts as well as issues that exist in local communities, so it will make it easier for teachers to identify material that can be related to SSI in learning. It can be concluded that in this

statement, the teacher gives a positive response or agrees that SSI can facilitate teachers in designing and implementing learning.

**Table 6.** The use of SSI in learning will be able to increase students' interest in learning science

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly agree    | 7  | 41  |
| 2.  | Agree             | 10 | 59  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In statement (6), the use of SSI in learning will increase students' interest in learning science, namely those who filled in strongly agreed with as many as seven teachers, or 41% of respondents, and those who filled in agreed with ten teachers or 59% of respondents. One of the learning contexts that are in great demand today is the context that discusses socioscientific issues. SSI-based science learning is stated as a strong strategy to encourage students' interest in learning science and developing students' scientific literacy (Presley et al., 2013). Based on the respondent's response to the statement, it can be concluded that the teacher agrees that the use of SSI in learning can increase students' interest in learning science.

**Table 7.** The use of SSI in learning can improve students high-level creative thinking skills

| No. | Statement         | N  | %   |
|-----|-------------------|----|-----|
| 1.  | strongly agree    | 4  | 24  |
| 2.  | Agree             | 10 | 58  |
| 3.  | Uncertain         | 3  | 18  |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In statement (7), the use of SSI in learning can improve students' high-level creative thinking skills, namely those who filled out strongly agreed, as many as four teachers or 24% of respondents, and those who chose to agree were ten teachers or 59% of respondents and those who filled in were unsure as many as three teachers or 18% of respondents. There are many benefits to be gained by incorporating SSI into science learning. Several studies related to SSI in several topics were carried out to develop scientific knowledge/concepts, high-level thinking skills, reasoning, and students' ability to argue and make decisions (Rahayu, 2019). Higher order thinking skills (HOTS), such as critical thinking skills and problem solving, are needed to analyze socioscientific problems up to the problem-solving stage. Based on these responses, it can be concluded that many teachers gave positive responses or agreed that SSI could improve students' higher-order thinking skills.

**Table 8.** The use of SSI in learning will make it easier for teachers to attract students' interest in learning

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1   | strongly agree    | 7  | 41  |
| 2   | Agree             | 10 | 59  |
| 3   | Uncertain         | 0  | 0   |
| 4   | Disagree          | 0  | 0   |
| 5   | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In Statement (8), using SSI in learning will make it easier for teachers to attract students' interest in learning, namely those who filled out strongly agreed as many as seven teachers, or 41% of respondents. Those who filled it out agreed as many as ten teachers or 59 respondents. SSI-based learning makes learning effective in various aspects of daily human life with issues of pro and con science and social issues that exist in the community so that SSI learning will have students' curiosity about controversial issues in life (Siska et al., 2020). SSI is a learning process that provides meaningful learning situations for students so that they can apply their knowledge to the social atmosphere in class. SSI has a role in attracting students' interest in learning. Based on the response to the statement, it was found that SSI makes it easier for teachers to attract students' interest in learning.

**Table 9.** The use of SSI in learning makes it easier for teachers to interact with students

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly agree    | 5  | 29  |
| 2.  | Agree             | 12 | 71  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In Statement (9), the use of SSI in learning makes it easier for teachers to interact with students, namely those who filled out strongly agreed with as many as five teachers, or 29% of respondents, and those who filled out agreed as many as 12 teachers or 71% of respondents. With SSI in learning, it will make students and teachers involved in discussion activities and arguments to discuss the SSI topic being discussed. So it can be concluded from this statement that the teacher gave a positive response or strongly agreed that SSI in learning would make it easier for teachers to interact with students.

**Table 10.** The use of SSI in learning can make it easier for teachers to gather learning materials in the classroom

| No. | Statement      | f  | %  |
|-----|----------------|----|----|
| 1.  | Strongly agree | 6  | 35 |
| 2.  | Agree          | 11 | 65 |

|    |                   |    |     |
|----|-------------------|----|-----|
| 3. | Uncertain         | 0  | 0   |
| 4. | Disagree          | 0  | 0   |
| 5. | Strongly disagree | 0  | 0   |
|    | Total             | 17 | 100 |

In Statement (10), the use of SSI in learning can make it easier for teachers to collect learning materials in the classroom; namely, those who filled out strongly agreed with as many as six teachers or 35% of respondents, and those who chose to agree were 11 teachers or 65% of respondents. Based on the responses from the respondents, they showed a response that agreed or very good that SSI in learning can assist teachers in collecting learning materials. The SSI-based model is learning that carries controversial and dilemmatic, and unstructured science topics so that students can be directly involved in discussion, dialogue, and debate activities (Purwanti & Nurohman, 2013) so that educators can place SSI topics into appropriate material in the learning.

**Table 11.** The use of SSI in learning will make it easier for students to master the material in learning

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly agree    | 4  | 24  |
| 2.  | Agree             | 13 | 76  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In statement (11) The use of SSI in learning will make it easier for students to master the material in learning, namely those who filled out strongly agreed as many as 4 teachers or 24% of respondents and those who chose to agree were 13 teachers or 76% of respondents. SSI assists students in improving higher-order thinking skills and scientific literacy or scientific literacy so that it is easier for students to relate science to scientific issues in their surroundings and it will be easier for students to master the material in learning. So it can be concluded based on this statement that the teacher gave a positive response or agreed that using SSI in learning would help students master existing learning.

**Table 12.** The use of SSI in learning can create more effective and efficient learning

| No. | Statement         | f  | %   |
|-----|-------------------|----|-----|
| 1.  | Strongly Agree    | 5  | 29  |
| 2.  | Agree             | 12 | 71  |
| 3.  | Uncertain         | 0  | 0   |
| 4.  | Disagree          | 0  | 0   |
| 5.  | Strongly Disagree | 0  | 0   |
|     | Total             | 17 | 100 |

In statement (12) the use of SSI in learning can create learning that is more effective and efficient, namely those who fill in strongly agree as many as 5 teachers or 29% of respondents and those who fill in agree as many as 12 teachers or 71% of respondents. In this statement, the teacher gave a positive response or agreed that using SSI in learning would make learning more effective and efficient. Because in SSI learning students are required to be active in exploring information related to material by using high-level thinking skills and scientific argumentation.

**Table 13.** The use of SSI in learning can make it easier for students to remember and describe important facts more precisely

| No. | Statement         | f  | %  |
|-----|-------------------|----|----|
| 1   | Strongly agree    | 3  | 18 |
| 2   | Agree             | 11 | 64 |
| 3   | Uncertain         | 3  | 18 |
| 4   | Disagree          | 0  | 0  |
| 5   | Strongly Disagree | 0  | 0  |
|     | Total             | 17 | 10 |

In statement (13), the use of SSI in learning can make it easier for students to remember and describe important facts more precisely, namely those who filled in strongly agreed with as many as three teachers, or 18% of respondents, and those who filled in agreed 11 teachers or 64% of respondents and who chose to hesitate as many as three teachers or 18% of respondents. SSI creates students who are scientifically literate or scientifically literate and are required to think critically and think creatively which will make it easier to remember and describe important facts in learning. In this statement the teacher gave a positive response or agreed that using SSI in learning would help students remember and describe scientific facts.

This research aims to get an overview of the perceptions of science teachers in junior high schools regarding the use of socioscientific issues in learning science in junior high schools. In this study, there were 17 science teachers at eight junior high schools in PUMI Tanjung Sakti Regency and PUMU Tanjung Sakti Regency, namely Tanjung Sakti PUMI 1 Public Middle School, Tanjung Sakti PUMI Public Middle School 2, Tanjung Sakti PUMI Public Middle School, Tanjung Sakti PUMI Public Middle School 4, Tanjung Sakti Public Middle School 1 PUMU, Tanjung Sakti Public Middle School 2 PUMU, Mumammadiyah Batu Racing Middle School, Xaverius Tanjung Sakti Middle School PUMI. Science teachers, as respondents on average, have positive answer choices regarding the use of socioscientific issues in science learning in junior high schools. Based on the experience of teaching 17 teachers who were divided into two groups, namely teachers who had been teaching for a long time and teachers who were new to teaching, it was found that there was no difference in the perceptions of teachers from these groups. The average teacher's perception is at the level of agreeing or very positive with using SSI in learning science.

From the research data obtained on the responses of the science teacher, the highest score was 65 points, and the lowest score was 52 points, so the highest average score was five, and the lowest average point was 4. These results indicated that the

description shown by the science teacher was very good. Or very positive towards the use of socioscientific issues in science learning in junior high schools. The analysis that has been carried out shows that the teacher's view of socioscientific issues is very good, so the use of the SSI can be a means of achieving learning, facilitating students and teachers in the learning process, and increasing student interest and abilities in learning.

The advantage of using SSI in learning science is to encourage students to see science as a relevant science and provide opportunities for students to convey knowledge scientifically, and provide awareness to students about the complexities of SSI. Tideman, & Nielsen (2016) revealed that SSI benefits students. However, in the learning process, SSI has challenges in including it. The teacher is one of the obstacles to learning science in the SSI context in learning. In teaching SSI, teachers tend to convey superficially or short-lived which can be caused by 1) a lack of resources to carry out SSI-based teaching, including limited teaching materials and relatively short learning time: 2) concern by teachers in anticipating students' ideas capacity for context SSI teaching activities, teachers are worried that they do not have adequate knowledge about and will harm teachers and students, 3). lack of self-confidence by the teacher in handling discussions in class: 4). Assessment of learning outcomes.

SSI has very good benefits for students in developing their potential and facing various kinds of changes related to the development of science and technology. Therefore, school-age children need to be informed, directed to learn, and convinced that discussing socioscientific issues will make students aware of the influence of science and technology in life. Anagün & Özden (2010) added that with SSI, students could learn to convey problems in society actively. SSI is used in the classroom for the following purposes: 1) to provide a rich context for important explorations of science lessons, 2) to help students understand the relationship between science and their lives, and 3) to help increase students' motivation and interest in science lessons.

## **Conclusion**

Based on the analysis of data processing and discussion of the research obtained based on responses to a questionnaire that was given to science teachers regarding the use of socioscientific issues in science learning in junior high schools, it can be concluded that the views of science teachers towards the use of socioscientific issues in learning are in a very positive category or very good. This means that the results of this study show that socioscientific issues can be well received by teachers in learning, and socioscientific issues play an effective role in science learning in junior high schools.

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