Profile of Strategic Competence Education for Sustainable Development Based on Gender in Nature Schools

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Abstract: *To advance sustainable development, competencies cannot be taught, but students must develop through experience and reflection to acquire action. One of the important competencies to be applied in education is strategic competence. The purpose of this research to determine the strategic competencies of male and female students at nature school. The method used was descriptive quantitative, the research subjects were Fathia Islamic Junior High School students with a total of 42 students. The questionnaire was used to measure strategic competence as many as 15 questions with positive and negative statements consisting of 5 sub-indicators to achieve strategic competence. The results of the study obtained an average of the calculation of the profile strategic competency of the percentage of ESD obtained from male and female students of 82.84% and 85.10% both in the Excellent category. The highest sub-indicator in male students was able to solve problems by 84.13% while female students the highest sub-indicator was able to provide sustainable innovation by 88.54%. This study shows that strategic competence in male and female students is in the excellent category.*

Keywords: *Nature school, Strategic competence, ESD*

1. INTRODUCTION

Sustainable development has become an important component in preparing the global community to face the challenges arising from environmental changes occurring around the world (Purnamasari et al., 2022). The goal of sustainable development is to improve the quality of life of people around the world, both from current and future generations, without exploiting the use of natural resources that exceed the earth's carrying capacity. The goal of sustainable development encompasses global challenges that are critical to the survival of humanity (Purnamasari & Hanifah, 2021; UNESCO, 2017). Thus, the word "sustainable" refers to the idea that a better human life during natural limitations by maintaining a balance in three dimensions of life: environmental, social, and economic (Klarin, 2018; Novidsa et al., 2020; Purnamasari & Hanifah, 2021).

To achieve sustainable development goals, we need to make a deep transformation in the way we think and act. They must become sustainability change agents to achieve individual SDG goals. According to UNESCO (2017), sustainable development requires empowering knowledge, skills, principles and attitudes. According to UNESCO (2017), education is responsible for meeting the challenges and disruptions of the 21st century and promoting the right values and skills that will bring about sustainable and inclusive growth and peaceful coexistence. Education is one of the efforts in realizing the SDGs. Education is a great hope for designing a better future and addressing the environmental crisis (Purnamasari Shinta & Hanifah Nurrul, 2021) .

ESD is a new innovation that has many opportunities to be used and developed in Indonesia (Hariyono et al., 2018). ESD can be incorporated into the curriculum in all types of education, from primary to secondary education, and can also be transdisciplinary and interdisciplinary (Purnamasari et al., 2022; Sund & Gericke, 2020; UNESCO, 2020). Science can help students understand the richness of nature, so that after learning it, students can actively participate in environmental conservation (Eilks, 2015). The UN General Assembly adopted a new global framework that guides humanity towards sustainable development on September 25, 2015. The core of this grand agenda is to realize the 17 sustainable development goals (SDGs). To create a more sustainable world and engage with sustainability-related issues as outlined in the SDGs, everyone must be able to become an agent of that sustainability change. They need knowledge, skills, values, and attitudes that can guide them to actively participate in sustainable development. Therefore, supportive education is needed to achieve sustainable development, known as Education for Sustainable Development (ESD).

Wilujeng et al (2019) showed that science can increase students' awareness and change their perception of the environment. It is expected that science will have the potential to have a positive impact on the preservation of nature and the environment in the future. ESD can be considered as an innovation in science learning because it creates a new approach to science education and learning. This approach can bring a new culture and direction to the world of education, both in terms of content and learning methods (Dannenberg & Grapentin, 2016).

ESD not only supports the integration of sustainable development and SDGs into education and learning, but also ensures that education and learning are integrated into every activity that supports sustainable development and SDGs (Purnamasari et al., 2022; Purnamasari & Hanifah, 2021). In addition, ESD is considered as a solution to the challenging problems faced by the current generation and the next generation (Novidsa et al., 2020; Purnamsari & Hanifah, 2021).

Education for Sustainable Development (ESD)-based learning is still in the development stage and is not widely spread across all levels of education in Indonesia. Schools have incorporated ESD into their curricula, but this practice has not been fully utilized, especially in areas that lack adequate resource support or sufficient awareness of the importance of ESD in education. The education curriculum in Indonesia is still limited in terms of sustainability implementation. The principles of ESD have not yet been fully integrated into the teaching methods of many teachers (Salam Angga & Hamdun Ghullam, 2022)

ESD should enhance people's capabilities and their commitment to building a sustainable society. This cannot be achieved through short training. People must learn to understand their complex world and could act, cooperate and communicate if they are to bring about positive change (UNESCO, 2015). Competencies are specific traits that a person needs to act and organize themselves in a variety of complex situations and contexts (UNESCO, 2017). Competencies cannot be taught, but students must develop them themselves. They are acquired through experience and reflection, and they are acquired in action (UNESCO, 2015, 2017)

To advance sustainable development, key competencies are considered important (UNESCO, 2017), namely system thinking competencies, anticipatory competencies, normative competencies, strategic competencies, collaboration competencies, critical thinking competencies, self-awareness competencies, and integrated problem-solving competencies. Of these eight abilities, it is important for students to apply them. Strategic competence is particularly important for learning on the topic of climate change. The ability to collaborate to create and implement transformative governance strategies, interventions, and transitions for sustainability is known as strategic competence (Wiek et al., 2011). Strategic competence in planning and implementation means the ability to assess the resources required for an action and their availability from a sustainability point of view; the ability to build networks of cooperation; and to calculate side effects and unforeseen impacts and

consider their probability during the planning process (Wiek et al., 2011)

Students who can think strategically can create and test systemic interventions, transformational actions and transition strategies towards sustainability by considering far-reaching effects and unintended consequences. They could create plans that leverage assets, mobilize resources, and coordinate stakeholders and other issues that impede the achievement of expected outcomes. In addition, students learn about the importance of strategic thinking in solving sustainability problems. Strategic thinking includes creating and implementing plans, interventions, and actions to mitigate sustainability problems and achieve a vision of sustainability. Finally, students could place work tasks in a way that supports the sustainability transition (Wiek et al., 2015).

In this regard, research should be conducted on the profile of strategic ESD competencies based on gender in natural schools. This will be used as a benchmark for ESD implementation that is supported by the school curriculum and can be used in science learning in schools.

2. RESEARCH METHOD

In this study the method used was descriptive quantitative. The subjects in the study were seventh grade students of SMP Islam Fathia Kota Sukabumi with a total of 42 people consisting of VII A/B classes. The instrument is a questionnaire that has 15 statements using a Likert scale with four alternative answer choices strongly agree, agree, disagree, and strongly disagree developed from strategic competency indicators with the topic of climate change divided into positive statements and negative statements that can produce strategic competency profile data. The following are strategic competencies according to (UNESCO, 2017) and the author develops sub-indicators to achieve strategic competency indicators in students in table 1.

Table 1. Strategic Competence

Indicator	No	Sub-indicator
the ability to collectively develop and undertake	1	Able to work together in groups
	2	Able to analyze the situation

Indicator	No	Sub-indicator
more sustainable, innovative actions at the local level and beyond.	3	Able to solve problems
	4	Able to manage time
	5	Able to provide innovation in sustainability

The technique used to collect research data was to administer a strategic competence questionnaire to students. Then, this data was analyzed to select which parts to research, or the process of identifying students' results from their statements in the form of percentages in table 2.

Table 2. Likert Scale Categories

Pecentage	Category
80 – 100%	Excellent
61 – 80%	Good
41 – 60%	Good enough
21 – 40%	Less good
0 – 21%	Very unfavorable

(Sugiyono, 2018)

3. RESULTS AND DISCUSSION

Measurement of the profile strategic competency in Education for sustainable development is the result of research on the topic of climate change in tree planting activities in Sukabumi city forest. The results are shown as follows.

Table 3. Strategic Competence of Male Students

Indicator	Sub-indicator	Male student	
		Percentage	Category
the ability to collectively develop and undertake more sustainable, innovative actions at the local level and beyond.	Able to work together in groups	81.01%	Excellent
	Able to analyze the situation	83.65%	Excellent
	Able to solve problems	84.13%	Excellent
	Able to manage time	83.33%	Excellent
	Able to provide innovation in sustainability	82.05%	Excellent
Average		**82.84%**	**Excellent**

Table 4. Strategic Competence of female Students

Indicator	Sub-indicator	Male student	
		Percentage	Category
the ability to collectively develop and undertake more sustainable, innovative actions at the local level and beyond.	Able to work together in groups	82.81%	Excellent
	Able to analyze the situation	85.42%	Excellent
	Able to solve problems	82.81%	Excellent
	Able to manage time	85.94%	Excellent
	Able to provide innovation in sustainability	88.54%	Excellent
Average		**85.10%**	**Excellent**

Based on the average of the calculation of the ESD strategic competency profile, the percentage obtained from male students is 82.84% and students are 85.10% both in the excellent category. The explanation of the strategic competency profile based on sub-indicators is as below:

a. Able to work together in groups

Based on tables 3 and 4 comparing strategic competence with the sub indicator of being able to work together in groups, the percentage obtained by male students is 81.01% and female students are 82.81%, both of which are in the Excellent category. According to gender role socialization theory, female students tend to be raised with values that emphasize obedience, hard work, and attention to duty, which are more aligned with the role of a good student. In contrast, male gender roles tend to emphasize resistance to authority and school rules, which often results in a less serious attitude towards education (Chen et al., 2023; Workman & Heyder, 2020). Male students often face social pressure to exhibit less serious or "careless" behavior in academic contexts to increase popularity among peers, which can hinder effective cooperation (Workman & Heyder, 2020). Teamwork is essential in Education for Sustainable Development (ESD)-based learning. Teamwork not only enriches students' learning experience but also enhances skills relevant to sustainable development, such as communication, problem solving and conflict management.

b. Able to analyze the situation

Based on tables 3 and 4 comparing strategic competence with the sub indicator of being able to analyze the situation, the percentage obtained by male students is 83.65% and female students are 85.42% both in the Excellent category. Women are more likely to take a situational perspective that helps them better understand and analyze situations from various points of view. This ability is important in situation analysis because it allows them to consider the impact of their decisions (Wolgast et al., 2020). According to research, situation analysis helps students better understand and address sustainability challenges. This ability enables students to evaluate information, make informed decisions, and develop innovative solutions to environmental, social, and economic problems (Kioupi & Voulvoulis, 2019).

c. Able to solve problems

Based on tables 3 and 4 comparing strategic competence with the sub indicator of being able to solve problems, the percentage obtained by male students is 84.13% and female students are 82.81% both in the Excellent category. Men tend to use a more direct and objective approach in solving problems. They often focus on the intellectual and abstract aspects of the problem, while women tend to pay attention to concrete, practical and emotional aspects. This difference can make men superior in situations that require quick and logic-based solutions (Sinaga et al., 2023). Problem-solving skills teach students to analyze various options and consequences before deciding. This is particularly important in ESD, where decisions must consider their impact on the environment and society (Riess et al., 2022).

d. Able to manage time
Based on tables 3 and 4 comparing strategic competence with the sub indicator of being able to manage time, the percentage obtained by male students is 83.33% and female students are 85.94%, both of which are in the Excellent category. There are several things that affect students in managing time according to Liu et al., (2021) Self-regulation skills Research shows that women often have better self-regulation skills, including in terms of planning, goal setting, and organizing information. These abilities contribute to more effective time management. Emotional Involvement, Women are often more emotionally involved in their tasks, which makes them more careful in time management and task completion. They tend to be more conscientious and avoid distractions that can affect time efficiency. Adjustment of Learning Environment This includes adjustment of mood and physical environment, which helps them manage time better during learning sessions. In the context of ESD, time management skills are not only beneficial for academics, but also for developing sustainable life skills. Students learn to plan and use resources efficiently, which is a key principle in sustainable development (Kintu et al., 2017).

e. Able to provide innovation in sustainability
Based on tables 3 and 4 comparing strategic competencies with the sub indicator of being able to provide innovation in sustainability, the percentage obtained by male students is 82.05% and female students are 88.54% both in the Excellent category. Female students often show a higher ability to provide innovative solutions for sustainability and address climate change due to several interconnected factors. Higher engagement in collaborative efforts, Women tend to engage more deeply in community and collaborative efforts that are critical to sustainable practices. This includes participation in mutual aid groups where they can share information and strategies to address common challenges. This sense of community and shared responsibility can lead to innovative approaches to sustainability (Nuhu & Matsui, 2022).

According to research conducted by Arwan (2022), education based on climate change is related to sustainable development because the problems associated with the impacts of climate change cannot be solved in a short time. Not only the natural environment sector is affected, but every sector is experiencing many difficulties, which threatens the stability of life. This is where education becomes the foundation and control to improve human ability to deal with the problems that arise because of climate change. It takes a plan to tackle climate change, and children should be educated early on about the good things they can do to help their environment.

Based on the results of the strategic competency profile research on male and female students seen from the results of each sub indicator with a very excellent category, meaning that students can already apply strategic competencies in everyday life this is based on the sub indicators that have been achieved by students. This impacts the implementation of ESD in supporting the SDGs, namely the change in students' attitudes and behaviors to become more caring and responsible towards the environment and society, fostering collaboration and communication among students, and students who participate in ESD-based learning have the potential to become agents of change in the future, as they can inspire others to join in the efforts to achieve the SDGs.

4. CONCLUSION

The conclusion obtained on strategic competence in ESD is that the average percentage obtained by male students is 82.84% and female students is 85.10% with an Excellent category. The sub indicator that has a high percentage in male students is being able to solve problems with a percentage of 84.13% while female students sub indicator that has the highest percentage is being able to provide innovation in sustainability with a percentage of 88.54%. Students must have the ability to work together, communicate, and act to produce positive changes (UNESCO, 2015). The

strategic competency profile of both male and female students is Excellent.

5. ACKNOWLEDGEMENTS

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