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Action Competence for Environmental Sustainability : A study of Junior High School Students in Public and Private Schools in Batu City, Indonesia

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Abstract: This study aims to describe the level, differences between public and private schools, gender differences, the influence of fathers' and mothers' education on action competence for environmental sustainability in junior high school students in Batu City. This study uses a quantitative approach with a descriptive analysis research type. The population in the study was 4,036 junior high school students spread across public and private schools in Batu City. To determine the number of samples using the Slovin formula, so that the number of samples obtained was 1,291 students. Data collection was carried out using an instrument in the form of a questionnaire in the form of a Google form. Respondent characteristic data were analyzed using frequency and percentage. Comparison of two groups of students, namely school status and gender, was analyzed using the Mann-Whitney Test, while comparisons of more than two groups, namely father's and mother's education, were analyzed using the Kruskal-Wallis Test. The results of the study showed that; (1) The level of competency in actions for environmental sustainability in junior high school students in Batu City is in the good category with a high average score, (2) between public and private schools there is a difference in action competence for environmental sustainability in junior high school students in Batu City, (3) there is no difference in gender of students in action competence for environmental sustainability in junior high school students in Batu City, and (4) there is no difference in education of fathers and mothers in action competence for environmental sustainability in junior high school students in Batu City.

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Introduction

Environmental problems have become a pressing global issue, especially due to irresponsible human activities in exploiting natural resources (Sharma, 2024). Environmental problems are caused by changes in the natural environment that disrupt its function and structure, and this is further exacerbated by human activities and uneven socio-economic development (Duchaeva & Magomadov, 2023). Environmental problems can occur due to population growth, economic development, and exploitation of resources (Semenova, 2020). The impacts caused by environmental problems are quite diverse, such as the conversion of land into tourist attractions which can damage the environment, including in Batu City, East Java.

The rapid growth of tourism in Batu City has led to a decline in green open spaces, which contributes to environmental problems (Lestari *et al*., 2023). In addition, the increase in the number of tourists causes an increase in waste and pollution, which is often not optimally handled (Widiatmono *et al*., 2016). The development of tourism and new investments should not have a negative impact on the environment, so that it can maximize

the positive impacts and minimize the negative impacts that will arise (Obot & Setyawan, 2017). In developing tourism, we should focus on sustainable development so that current and future needs can be met (Yanuarita, 2019).

Sustainable development has the potential to address various environmental issues by integrating innovative approaches and encouraging responsible practices (Bao et al., 2020). Sustainable development initiated by the United Nations (UN) as an effort to address the complexity of environmental issues (Lyytimäki et al., 2020). Sustainable development aims to address global challenges, including poverty, health, education, and economic growth, which require effective governance (Hassan Sain et al., 2024). Sustainable development is oriented towards the welfare of society which aims to improve the quality of life of people around the world, both for the present and future generations (Fonseca et al., 2020).

The complexity of the SDGs and the importance of understanding the interrelationships between these dimensions make the SDGs a major issue. The importance of a special approach to learning called education for sustainable development (Egana, 2020; Kioupi & Voulvouluis, 2019). The application of education can be considered as a tool to support sustainable development (Filho et al., 2018). Education is one of the ways to achieve SDGs, by improving knowledge, skills, values, attitudes, critical thinking, competence, systemic thinking, responsibility and shaping future generations for the transformational changes needed in the world (Žalėnienė & Pereira, 2021). Sustainability education aims to develop the right future in taking responsible actions in solving sustainability problems (Chen & Liu, 2020).

One approach to understanding learning in sustainability education is through the development of action competencies (Sinakou et al., 2019). Action competencies aim to shape a generation that has a high awareness of the importance of sustainability and the ability through real actions that are beneficial for the future. The application of action competencies is essential to moving towards a more sustainable future (Silveira & Munford, 2020; Wardani et al., 2018). The focus of action competencies must be conscious actions in order to contribute to the realization of the environment and desires in the future (Biström & Lundström, 2021). Action competency describes the ability to critically assess alternative solutions in action to achieve sustainable future targets (Sass et al., 2020).

Learners must have competencies, one of which is action competency (Olsson et al., 2020). Action competency is the knowledge and understanding obtained so that individuals can analyze and evaluate in deciding to act (Bergen & Santo, 2018; Sass et al., 2020). The concept of sustainable action competency is very important in teaching individuals, especially learners to be actively involved in environmentally sustainable practices (Torsdottir, 2024). Learners must have the competence to consider various dimensions, namely, environmental, economic, and social, of sustainability issues and possible solutions (Olsson et al., 2022). Learners will later become leaders in society, so they are considered as people who have understanding, concern, and caring behavior towards the environment (Zeng et al., 2020). Action competency is an important role for learners to be involved in real efforts to achieve environmental sustainability in the future.

Previous studies that have been conducted related to action competence for sustainability, namely action competence for sustainability (Maraat et al., 2023; Oinonen et al., 2024; Rahardjanto et al., 2024), ESD in developing action competence (Sass et al., 2020; Olsson et al., 2022; Torsdottir, 2024b) and action competence for sustainability in students (Olsson et al., 2022; Sass et al., 2023; (Banos-González et al., 2024; Torsdottir, 2024a). Previous studies have shown that action competence for sustainability is one of the important

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elements in sustainability education. Based on this study, it shows that research that focuses on students has been carried out, but in terms of sustainability action competence or does not describe sustainability action competence and its implications for the environment for students.

The literature review shows that studies on action competence for environmental sustainability among junior high school students are still relatively limited, especially in the Indonesian context. Most previous studies have focused more on environmental knowledge or ecological attitudes, but not many have comprehensively examined the dimensions of action competence, such as action knowledge, self-influence beliefs, willingness to act, and personal spiritual practices. This study contributes to filling this gap by providing a more comprehensive understanding of how various factors, including school status, gender, and parental educational background, can influence students' levels of action competence. Thus, this study broadens the horizons in the field of environmental education and provides an empirical basis for developing more effective learning strategies at the junior high school level.

Related to this, this study aims to determine the competency of environmental sustainability actions in junior high school students in Batu City. This study has benefits in examining the competency of environmental sustainability actions in students, so that it can instill environmental sustainability awareness to become responsible and wise individuals. Therefore, research on environmental sustainability action competencies in students occupies a significant position to improve environmental quality. This study is reviewed from the aspects of school, gender, father's education and mother's education.

Research Method

This research method uses a quantitative approach with a descriptive analysis research type. This research was conducted in November-April 2025. The population in this study was 4,036 students registered in junior high schools in Batu City from 6 schools, with details of 3 public schools and 3 private schools. The sampling technique in this study used purposive sampling, with the number of samples calculated using the Slovin formula with a 5% error tolerance of 1,291 students. The research sample from each school is presented in table 1.

Table 1. Samples Based on Schools

Subject					
No	**School**	**Number of Students**			**Total**
		Class VII	**Class VIII**	**Class IX**	
1	SMP Negeri 1 Batu	94	94	94	282
2	SMP Negeri 2 Batu	94	94	94	282
3	MTs Negeri Batu	95	95	95	285
4	SMP Muhammadiyah 2 Batu	23	23	23	70
5	SMP Muhammadiyah 8 Batu	80	80	80	240
6	SMP Islam Batu	44	44	44	132
Total					**1.291**

The data collection instrument used in this study was the action competence for sustainability instrument based on spirituality (ACSIS) which consists of several dimensions, namely knowledge of possible actions, belief in one's own influence, willingness to act, and personal spirituality (Husamah et al., 2024). This questionnaire consists of 22 statement items using a 1-5 point Likert scale. Data collection was carried out using an instrument in

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the form of a questionnaire in the form of a Google Form. Validity testing was carried out on 634 prospective science teachers in Indonesia. The results of the action competence instrument for sustainability based on spirituality (ACSIS) stated that this instrument had been tested for validity and the results were valid. By showing that the mean value of the questionnaire items was between 3.26 and 4.44, with a standard deviation of 0.96 to 1.27. The Pearson Product Moment correlation coefficient ranged from 0.385 to 0.931, with a significance of 0.000 <0.01 (Husamah et al., 2024). Validity testing was conducted on 634 prospective science teachers in Indonesia. The results of the action competency instrument for spirituality-based sustainability (ACSIS) stated that this instrument had been tested for reliability and the results were reliable (Husamah et al., 2024).

The questionnaire data was downloaded in comma separate value (csv) format and checked and labeled by the author using Microsoft Excel before the analysis was carried out. After the data labeling was completed, the data were analyzed using SPSS software. Respondent characteristics data were analyzed using frequencies and percentages. Comparisons of two groups of students, namely school status and gender, were analyzed using the Mann-Whitney Test, while comparisons of more than two groups, namely Father's and Mother's Education, were analyzed using the Kruskal-Wallis Test. If the Mann-Whitney test results show a significant value between students from public and private schools, as well as between male and female students, then there is a difference in action competence for environmental sustainability based on gender. If the Kruskal-Wallis test shows that father's and mother's education has an effect, then the level of education of the father and mother can affect the action competence for environmental sustainability in students.

Results and Discussion

Level of Action Competence for Environmental Sustainability in Students

The results of descriptive statistical data on action competencies for environmental sustainability in junior high school students in Batu City can be seen in Table 2.

Table 2. Descriptive Statistics

	N	Mean	Standard Deviation
Action Competency Value	1291	95.28	9.755
Public School	849	95.67	9.990
Private School	442	94.53	9.250
Male	614	93.90	10.005
Female	677	96.53	9.354

Based on the results of the study, it shows that the results of the action competency for environmental sustainability in junior high school students in Batu City obtained an average value of 95.28%, which shows that this value is in the good category with a high average value. This shows that most students have a positive level of action competency and have a high awareness in taking real action for environmental sustainability. Action competency for environmental sustainability in students is influenced by various educational factors, especially through the implementation of education for sustainable development and student participation (Olsson et al., 2022). Education in schools plays an important role in shaping students' awareness, understanding, and behavior related to environmental issues. Increasing awareness of the importance of maintaining good environmental sustainability can be achieved by providing knowledge and character building through education (Zalfa et al., 2022).

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School programs such as maintaining a clean school environment and participating in environmental care activities can also significantly increase students' action competency (Silo & Mswela, 2016). The habit of maintaining cleanliness in the school environment plays an important role in shaping students' character towards environmental concern (Wulandari & Marhayani, 2020). Environmentally caring behavior in students is an effort that must be instilled through habits. Caring behavior and environmentally friendly attitudes cannot be realized by themselves, but require knowledge, guidance, and nurturing (Haryati et al., 2022). Schools play an important role as a place where education takes place and their function is to shape character, one of which is shaping environmentally caring behavior. Schools are educational institutions that can create good behavior, especially caring behavior towards the environment (Gani, 2022). Education also plays an important role in shaping the character and behavior of students (Nurfirdaus & Sutisna, 2021).

Responsible behavior towards the environment will go well by increasing knowledge about the environment (Habibie, 2020). Competence for action for environmental sustainability is also closely related to students' perceptions of the environment. Students' perceptions of existing environmental conditions will also differ according to their understanding and awareness (Simarmata et al., 2018). The right perception of the importance of preserving the environment and the impacts caused by human activities on the environment can encourage students to engage in more responsible actions. Individuals who have high environmental awareness are more likely to encourage someone to behave positively that supports environmental sustainability (Sihadi et al., 2017).

Comparison Based on School Status

Comparative testing based on school status was conducted using the Mann-Whitney Test presented in Table 3.

Table 3. Mann-Whitney Test Results Based on School

Statistical Test	
	Action Competency Value
Mann-Whitney U	174096.500
Wilcoxon W	271999.500
Z	-2.130
Asymp. Sig (2-tailed)	.033

Based on the results of the Mann-Whitney test, the probability value was 0.033 <0.05. This shows that there is a significant difference between public schools and private schools regarding the action competency for environmental sustainability in junior high school students in Batu City. The results of the study obtained data on the level of action competency for environmental sustainability in public schools which was slightly higher than in private schools. Public schools got an average score of 95.67%, while private schools got an average score of 94.63%. This difference shows that school status can affect the level of action competency of students. Action competency for sustainability in students is influenced by school experience, as well as through the active involvement of organizations in schools (Verhelst et al., 2022; Torsdottir, 2024).

Schools play an important role in fostering action competency through structured programs and educational strategies. School programs, especially those oriented towards sustainable environmental action, can significantly improve students' action competency (Stephens & Ballard, 2021). This condition can also be influenced by the integration of environmental education in the curriculum plays an important role in influencing students' competence to act (Baretto & Vilaca, 2016). The difference in improving environmental

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quality between public and private schools is in terms of policies, perceptions, and practices applied in the school environment. Public schools generally implement better environmental policies compared to private schools (Lu et al., 2023).

Education in public schools helps students develop a deep relationship with the environment, instilling the values and attitudes needed for sustainable practices (Oliveira & Franco, 2024). While private schools may lag behind in environmental policies, although private schools have better facilities, their focus is often directed at the academic curriculum, so that there is less emphasis on contextual sustainability education (Bayrakçi & Dinç, 2020). This shows that the differences between public and private schools can result in variations in the way environmental sustainability education is provided by students. Education for environmental sustainability is greatly influenced by the school's ability to build critical awareness and practical skills in students through innovative teaching (Kolleck, 2016).

Comparison Based on Gender

Comparative testing based on gender was conducted using the Mann-Whitney Test presented in Table 4.

Table 4. Mann-Whitney Test Results Based on Gender

Statistical Test	
	Action Competency Value
Mann-Whitney U	207091.500
Wilcoxon W	436594.500
Z	-.112
Asymp. Sig (2-tailed)	.911

Based on the results of the Mann-Whitney test, the probability value was 0.911 > 0.05. This shows that there is no significant difference between male and female gender in terms of action competency for environmental sustainability in junior high school students in Batu City. Thus, the gender aspect does not affect the level of action competency for environmental sustainability in students. The level of action competency for environmental sustainability among students may not be directly influenced by the gender aspect (Rahardjanto et al., 2024). This may be due to the involvement of students, which can be accessed by individuals regardless of their gender. In terms of learning opportunities and practical skills development, both male and female students have the same capacity to develop action competency for sustainability (Aldraiweesh & Alturki, 2023; Merayo & Ayuso, 2023).

Social, cultural, and value factors that change over time can also play a role in reducing gender differences in the development of action competency in educational institutions (Andersen & Smith, 2022). Therefore, focusing on learning experiences can be supportive for all learners, regardless of gender, and can encourage the development of action competencies for balanced environmental sustainability among learners.

Comparison Based on Father's and Mother's Education

The results of the father's and mother's education data can be seen in Table 5.

Table 5. Father's and Mother's Education

Education Level	Father's Education	Mother's Education
S1-S3	236	209
D1-D3	71	71
High School	613	624
Junior High School	253	268
Elementary School	115	113

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Not in School	3	6
Total	1291	1291

Comparative testing based on father's and mother's education was carried out using the Kruskal-Wallis Test which is presented in Tables 6 and 7.

Table 6. Results of the Kruskal-Wallis Test for Father's Education Aspects

Statistical Test	
	Action Competency Value
Kruskal-Wallis H	5.767
df	5
Asymp. Sig.	.330

Table 7. Results of the Kruskal-Wallis Test for maternal education aspects

Statistical Test	
	Action Competency Value
Kruskal-Wallis H	6.652
df	5
Asymp. Sig.	.248

The results of the study obtained from the Kruskal Wallis test obtained a probability value of father's education of 0.330 > 0.05, while the probability value of mother's education was 0.248 > 0.05. This shows that there is no significant difference in father's and mother's education towards the competence of actions for environmental sustainability in junior high school students in Batu City. Based on the results of the study, it shows that most of the father's and mother's education of students has a secondary education background (SMA), and only a small number have higher education (S1 and above) or have not attended school at all. This can show the socio-economic characteristics of student families in Batu City in general, the majority of whom are in the secondary education group. Parental education plays an important role in the formation of children's values, attitudes, and habits. Parental education is one of the most important factors in shaping human behavior (Herdiansyah et al., 2021). Parents have a very important role in instilling competence in students with an orientation towards sustainable development education (Suryatna, 2023). Parental education can significantly support awareness, responsibility, and engagement in sustainable practices (Esterhuizen et al., 2023).

Knowledgeable parents can better support their children's development, and can foster the skills needed to understand and address sustainability challenges in their lives. The relationship between parental education and action competence shows that parental education does not have a significant impact on children's action competence. Parental education may not directly affect action competence in parenting (Ljubeti, 2017). This may be due to the more dominant role of schools and social environments in shaping environmental awareness in children, compared to parental educational background.

The findings of this study imply the importance of the role of schools in improving students' environmental sustainability action competencies. Schools need to integrate environmental education into learning through contextual and action-based approaches, such as environmental conservation and waste management projects. Teachers also need to foster

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students' confidence in their ability to protect the environment in order to strengthen environmentally friendly behavior among junior high school students. Improving these competencies is important to form a young generation that not only understands environmental issues but is also able to take an active role in protecting them.

Conclusion

Based on the results of the study, it can be concluded that the action competency for environmental sustainability in junior high school students in Batu City is in the good category with a high average score. In terms of school status, it shows that there is a significant difference between public schools and private schools, students from public schools show a slightly higher average compared to students from private schools. In terms of gender and education of fathers and mothers, it shows that there is no significant difference in the action competency for environmental sustainability in junior high school students in Batu City. This shows that most students, both in public and private schools, have a positive level of action competency and have a high awareness in taking real action for environmental sustainability.

Recommendation

Based on the research results, it is recommended that schools continue to integrate environmental education into learning and school activities actively and sustainably. In addition, further research is recommended to explore other factors that influence action competence in more depth. Teachers are expected not only to deliver environmental material as a subject, but to integrate it into real actions in protecting the environment so that it can improve the competence of actions for environmental sustainability holistically. Teachers also need to foster students' confidence in their ability to protect the environment in order to strengthen environmentally friendly behavior among junior high school students.

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