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Aligning pedagogy with attitudes: Exploring the impact of teaching methods on population and environmental literacy in social science education

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Abstract: Considering high and low student attitudes, this study examines the differences in the effectiveness of problem-solving and conventional teaching methods on students' knowledge of population and environmental issues. The study involved 80 twelfth-grade students, divided into high- and low-attitude groups. The experimental material covered ecological problems such as the impact of waste on flooding in Bekasi, as well as government initiatives like the Clean River Project. The findings revealed that: (1) the conventional method was more effective than the problem-solving method; (2) the conventional method was more suitable for students with high attitudes; (3) the problem-solving method was more effective for students with low attitudes; and (4) there was an interaction between teaching methods and student attitudes on knowledge outcomes, with the conventional method being more effective for high-attitude students and the problem-solving method being more effective for low-attitude students. The implication of this study is the importance of applying teaching methods that align with students' attitudes. The problem-solving method is more effective for students with low attitudes because it encourages a more profound understanding of the material. Meanwhile, for students with high attitudes, the conventional method is more appropriate as it facilitates direct comprehension from the teacher.

Keywords: **teaching; problem-solving; conventional; knowledge.**

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Introduction

The environment plays a crucial role in human life as a living space and a provider of basic needs. Human interaction with the environment significantly impacts nature, both positively and negatively. Therefore, raising awareness about preserving the environment, including the social environment, is essential for the sustainability of human life. The degradation of both natural and social environments has been significant, particularly in the past 70 years, due to human activities (Sztumski, 2015). While the negative impacts on the natural environment are well recognized, the degradation of social, cultural, and spiritual environments is less acknowledged but equally critical (Azam, 2024; Sztumski, 2015).

The social environment itself is shaped by interactions within society, shaping human behaviour as social beings. The interconnection between individuals and society influences lifestyles, making cleanliness and environmental sustainability a shared responsibility. The Adiwiyata Program, launched by the Indonesian government in 2006, aims to increase students' environmental awareness. However, students' environmental awareness remains relatively low, as evidenced by the ongoing habit of littering despite the availability of proper facilities (Nurwidodo et al., 2020; Pambudi et al., 2020)

According to Kollmuss & Agyeman (2002), many environmental issues remain unresolved despite their significant impact on human life. Environmental degradation, such as floods, landslides, and water pollution, continues to rise. The 2017 Environmental Quality Index (EQI) report from the Ministry of Environment and Forestry noted that 30% of the water in Indonesia, especially in major cities, is polluted. Air quality has also declined due to shrinking green spaces and pollution from vehicles and industries.

One approach to mitigating environmental degradation is adopting the "go green" concept. Conscious human actions toward the environment aim to minimise the negative impact of daily activities. Sugiarto & Gabriella (2020) emphasise that environmental awareness can be reflected through behaviour and actions, especially when individuals are free from external pressure. To ensure environmental sustainability, people need insights and knowledge related to population and environmental education (Pendidikan Kependudukan dan Lingkungan Hidup/PKLH, in Bahasa).

In the context of environmental education, PKLH aims to enhance awareness, attitudes, and behaviours that reflect responsibility toward nature. This educational philosophy aligns with the thoughts of Rousseau and Pestalozzi, who believed education should involve direct experiences and the surrounding environment as learning resources (Nur, 2019). Citizens can take an active role in environmental preservation by acting as stewards rather than exploiters of nature (Yagatich et al., 2018).

Regarding population education, the basic knowledge taught to students includes demographic issues such as population size, distribution, and density. From 2015 to 2050, developing nations are expected to be home to 97% of the world's population growth (Walker, 2016). High birth rates and low death rates are what make this increase happen so quickly(Klingholz, 2018; Odimegwu, 2019).

The environment significantly influences human behaviour and life by encompassing different aspects that determine individual and social dynamics (Collins et al., 2011). The social milieu inside educational institutions, such as schools, is crucial in influencing student results. Recent studies indicate that the availability of educational resources, including infrastructure, money, and a supportive atmosphere, is crucial for academic performance (Hanushek & Woessmann, 2017). Schools serve as essential learning centres that significantly influence students' social and environmental conduct.

Teaching methods serve as tools to achieve educational goals. According to contemporary educational research, traditional methods such as teacher-led lectures

have limited impact on students' cognitive learning, especially compared to more interactive and student-centred approaches (Wang et al., 2024). According to Sumarmo (1994), problem-solving approaches are more effective in developing students' positive attitudes toward problems, promoting active participation, and motivating analytical thinking (Jaleniauskienė & Jucevičienė, 2018). Problem-solving is also an effective way to develop higher-order thinking skills (Setiawan & Harta, 2014). Issues related to population and the environment can serve as learning topics that encourage students to think critically and creatively. Problem-based teaching enables students to process information and construct knowledge independently.

When educators properly deliver population and environmental education, they provide knowledge and cultivate ecological awareness. This awareness integrates into students' daily lives and empowers them to become active agents of environmental stewardship and future sustainability. So, this study significantly contributes to social science education by revealing the relationship between teaching methods and students' attitudes toward population and environmental literacy. The findings reinforce the understanding that appropriate pedagogical approaches and positive student attitudes are critical factors in fostering social awareness and ecological responsibility among learners. In the context of social studies education, population and environmental literacy are an integral component of developing critical and participatory civic insight. Therefore, the results of this research not only broaden the theoretical foundation regarding the impact of instructional strategies on social competence but also offer practical implications for educators in designing lessons relevant to global and local issues faced by today's society.

Method

The researchers implemented an experimental design (2 x 2 factorial) and conducted the study at SMA Negeri 5 Tambun, Bekasi, West Java Province, over four months in 2024. The study subjects were comprised of 80 students and divided into two groups: 40 students with low attitudes and 40 with high attitudes. The research team collected data on students' knowledge of population and environmental issues through an objective test instrument consisting of multiple-choice items, with correct (True) answers scored one and incorrect (False) answers as 0. After verifying the assumptions of normality and homogeneity across subject groups, the data were analysed using two-way ANOVA. The Lilliefors test, applied at a significance level of $\alpha = 0.05$, confirmed that all groups followed a normal distribution. Similarly, the homogeneity test at $\alpha = 0.05$ indicated that the variances among the groups were homogeneous. To further investigate the effect of the interaction between the independent variables on students' knowledge, a post hoc Tukey test was conducted.

Finding and Discussion

Based on the analysis of variance (ANOVA) at a significance level of $\alpha = 0.05$, the calculated F-value ($F_{calculated}$) was 4.498, which exceeded the critical F-value (F_{table}) of 2.73. This result indicates that the null hypothesis (H_0) was rejected, meaning there was a significant difference in population and environmental knowledge between students taught using the problem-solving method and those taught using the conventional method.

The ANOVA results also revealed a significant interaction between teaching method and student attitude with population and environmental knowledge. At the same significance level ($\alpha = 0.05$), the $F_{calculated}$ was 67.611, exceeding the F_{table} value of 4.05. This suggests that the combination of teaching methods and student attitude significantly affected students' knowledge improvement.

A post-hoc Tukey test was conducted to determine more specific group differences. For students with high attitudes, the Tukey test showed a $Q_{calculated}$ value of 6.1023, which was greater than the Q_{table} value of 3.73. This indicates a significant difference in population and environmental knowledge between

students taught using the conventional method and those taught using the problem-solving method, particularly among students with high attitudes.

Regarding average scores, students with high attitudes taught using the problem-solving method had a mean score of 7.0445. This was lower than the mean score of 7.7365 for those taught using the conventional method. These results indicate that the conventional method led to higher knowledge outcomes for students with high attitudes.

Among students with low attitudes, the Tukey test yielded a Q_{calculated} value of 10.339, which also exceeded the Q_{table} value of 3.73. This means there was a significant difference in knowledge between students taught using the problem-solving method and those taught using the conventional method. In this case, the null hypothesis (H_0) was again rejected, with the problem-solving method demonstrating superior effectiveness.

Looking at the average scores, students with low attitudes who received the problem-solving method had a mean knowledge score of 8.3460, compared to 7.1735 for those taught conventionally. Thus, the problem-solving method proved to be more effective in enhancing the knowledge of students with low attitudes regarding population and environmental issues.

The present study highlights the significance of instructional methods and student attitudes in shaping learning outcomes related to population and environmental education. The findings from the ANOVA test demonstrated that students taught using the problem-solving method performed significantly differently from those taught through conventional instruction, confirming that teaching approaches play a crucial role in cognitive development. More notably, the study found a significant interaction between teaching method and student attitude, indicating that the effectiveness of a teaching strategy is not universal but contingent upon learners' dispositions.

Post-hoc analysis revealed that students with high attitudes achieved better outcomes under the conventional method than under the problem-solving approach. In contrast, students with low attitudes benefited more from the problem-solving method, showing higher mean scores than their peers in the conventional group. These contrasting results reflect the nuanced relationship between learner characteristics and pedagogical approaches.

This interplay between instructional strategy and student disposition can be understood through several theoretical perspectives. From a constructivist standpoint (Piaget, 1952; Vygotsky & Cole, 1978). The problem-solving method offers learners the opportunity to actively engage with content, encouraging the construction of knowledge through exploration and contextual application. Such engagement may be especially beneficial for students who display lower initial motivation or interest, as it offers opportunities for meaningful learning and increases cognitive involvement.

Conversely, students with strong attitudes toward the subject may already possess the self-regulation and goal orientation necessary to benefit from more traditional, teacher-led instruction. The expectancy-value theory (Eccles & Wigfield, 2002) supports this interpretation, suggesting that students who place a high value on academic success and perceive themselves as capable tend to persist and perform well, regardless of the instructional format. As such, structured and direct teaching may resonate with these learners, enabling them to process information efficiently.

These findings also lend support to the framework of differentiated instruction (Tomlinson, 2001), which advocates for tailoring teaching strategies to meet learners' diverse needs. The significant interaction found in this study reinforces the call for flexible instructional models that accommodate students' motivational profiles, rather than relying on a single method as universally effective.

Empirical evidence from earlier studies aligns with these conclusions. Darling-Hammond et al. (2020) observe that conventional teaching methods often provide better knowledge acquisition due to their clear structure and predictability. However, Setiawan & Harta (2014) reported that students with lower motivation may struggle to

focus in teacher-led settings but engage more readily in active problem-solving contexts. Bustami (2019) similarly emphasised that students with low interest often experience disengagement in conventional classrooms, leading to poor retention and understanding (Glaesser et al., 2024; Robertson & Padesky, 2020).

Taken together, the results suggest that a differentiated approach to instruction—one that considers students' attitudes, motivation levels, and readiness—is essential in promoting more effective learning in environmental and population education. Rather than privileging one method over another, educators are encouraged to adopt flexible strategies that respond to the dynamic needs of learners.

Conclusion

The study results indicate a difference in population and environmental knowledge between student groups taught using the conventional method and those taught using the problem-solving method. This difference suggests that the instructional approach influences students' understanding of population and environmental issues. The effectiveness of the teaching method is also affected by student attitudes. Among students with high attitudes, the conventional method proved more effective in enhancing knowledge. In contrast, the problem-solving method yielded better outcomes for students with low attitudes. These findings highlight the importance of selecting instructional methods that align with students' characteristics to achieve optimal learning outcomes.

References

Azam, N. (2024). The role of education in environmental protection. *Iranian Journal of Plant Physiology*, *14*(1), 4891–4894.

Collins, S. L., Carpenter, S. R., Swinton, S. M., Orenstein, D. E., Childers, D. L., Gragson, T. L., Grimm, N. B., Morgan, G. J., Harlan, S. L., Kaye, J. P., Smith, M. D., & Whitmer, A. C. (2011). An integrated conceptual framework for long-term social-ecological research. *Frontiers in Ecology and the Environment*, *9*(6), 351–357. https://doi.org/10.1890/100068

Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, *24*(2), 97–140. https://doi.org/10.1080/10888691.2018.1537791

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*(1), 109–132. https://doi.org/10.1146/annurev.psych.53.100901.135153

Glaesser, D., Holl, C., Malinka, J., McCullagh, L., Meissner, L., Harth, N. S., Machunsky, M., & Mitte, K. (2024). Examining the association between social context and disengagement: Individual and classroom factors in two samples of at-risk students. *Social Psychology of Education*, *27*(1), 115–150. https://doi.org/10.1007/s11218-023-09829-4

Hanushek, E. A., & Woessmann, L. (2017). School resources and student achievement: a review of cross-country economic research. In *Methodology of Educational Measurement and Assessment*. https://doi.org/10.1007/978-3-319-43473-5_8

Jaleniauskienė, E., & Jucevičienė, P. (2018). Educational system for the development of collaborative Ill-structured problem-solving skills. *Pedagogika*, *132*(4), 5–22. https://doi.org/10.15823/p.2018.132.1

Klingholz, R. (2018). Population growth - Education is the answer | Bevölkerungswachstum: Bildung ist die Lösung: 7,5 Milliarden und kein Ende? *Biologie in Unserer Zeit*, *48*(1), 36–44. https://doi.org/10.1002/biuz.201810638

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260. https://doi.org/10.1080/13504620220145401

Nur, S. (2019). Pendekatan joyful sebagai model pembelajaran pendidikan kependudukan dan lingkungan hidup. *Ekspose: Jurnal Penelitian Hukum Dan Pendidikan*, *16*(2), 376. https://doi.org/10.30863/ekspose.v16i2.98

Nurwidodo, N., Amin, M., Ibrohim, I., & Sueb, S. (2020). The Role of Eco-School Program (Adiwiyata) towards Environmental Literacy of High School Students. *European Journal of Educational Research*, *volume-9-2020*(volume-9-issue-3-july-2020), 1089–1103. https://doi.org/10.12973/eu-jer.9.3.1089

Odimegwu, C. O. (2019). Introduction. In *Family Demography and Post 2015 Development Agenda in Africa*. https://doi.org/10.1007/978-3-030-14887-4_1

Pambudi, Y. S., Harahap, A., Mahbub, M., Sabarudin, S., & Parji, P. (2020). An analysis on the effect of school policy towards teachers' participation in cleanliness program at schools receiving adiwiyata award in surakarta city, Indonesia. *International Journal of Advanced Science and Technology*, *29*(5), 409–416.

Piaget, J. (1952). *The origins of intelligence in children*. International Universities Press. https://books.google.co.id/books?id=H7MkAQAAMAAJ

Robertson, D. A., & Padesky, C. J. (2020). Keeping Students Interested: Interest-Based Instruction as a Tool to Engage. *Reading Teacher*, *73*(5), 575–586. https://doi.org/10.1002/trtr.1880

Setiawan, R. H., & Harta, I. (2014). Pengaruh pendekatan open-ended dan pendekatan kontekstual terhadap kemampuan pemecahan masalah dan sikap siswa terhadap matematika. *Jurnal Riset Pendidikan Matematika*, *1*(2), 241–257. https://scholarhub.uny.ac.id/jrpm/vol1/iss2/9/

Sugiarto, A., & Gabriella, D. A. (2020). Kesadaran dan perilaku ramah lingkungan mahasiswa di kampus. *Jurnal Ilmu Sosial Dan Humaniora*, *9*(2), 260. https://doi.org/10.23887/jish-undiksha.v9i2.21061

Sztumski, W. (2015). Social sozophilosophy and the care for sutainability of some areas of the social reality. *Problemy Ekorozwoju*, *10*(2), 15–29.

Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms*. Ascd.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: development of higher psychological processes*. Harvard University Press. https://books.google.co.id/books?id=RxjjUefze_oC

Walker, R. J. (2016). Population growth and its implications for global security. *American Journal of Economics and Sociology*, *75*(4), 980–1004. https://doi.org/10.1111/ajes.12161

Wang, Y., Qin, M., Hu, Y., & Huang, G. (2024). A practical study of STEAM instructional activities directed toward students' problem-solving skill. *ACM*

International Conference Proceeding Series, 160–169. https://doi.org/10.1145/3670013.3670024

Yagatich, W., Galli Robertson, A. M., & Fisher, D. R. (2018). How local environmental stewardship diversifies democracy. *Local Environment*, *23*(4), 431–447. https://doi.org/10.1080/13549839.2018.1428187