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The Influence Of The Contextual Learning Model And Ecoliteration On Learning Outcomes In The Natural And Social Sciences

Yolanda Adelia Utami*
* Master In Basic Education, Postgraduate Program, Universitas Terbuka, Indonesia
yolandaadeliaut@gmail.com

Maman Rumanta**
** Master In Basic Education, Postgraduate Program, Universitas Terbuka, Indonesia
mamanr@ecampus.ut.ac.id

Ahmad Yani***
***Master In Basic Education, Postgraduate Program, Universitas Terbuka, Indonesia
ahmad.official@ecampus.ut.ac.id

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ABSTRACT
Education plays an important role in shaping the character and ability of the younger generation to face the challenges of the Times. The era of globalization, not only focuses on mastering science, but also on developing critical thinking skills and adaptability to change. The purpose of the study was to analyze and evaluate the influence of contextual learning models with ecoliteration on student learning outcomes in natural and social sciences subjects. The research method used experiments with Pre-experimental one group Pretest Posttest Design. The sample was 32 students of Grade 5 Elementary School Pulogebang 11. Data analysis using quantitative and qualitative approaches. Quantitative analysis using SPSS software version 23 and T-test (t-test). Qualitative analysis using interviews and observations. The results showed a significant increase between the pretest and posttest scores, with an average pretest of 60.81 and posttest of 84.69 with an average difference of 23.88. A significance value of 0.000, indicating a positive effect of the intervention. Hasıl interviews with teachers and students showed high student involvement, with many active and enthusiastic participants. Observations also confirm that the majority of students are actively involved in learning. In conclusion, effective learning models can create an interactive and engaging learning environment. Further research is expected to develop a more flexible learning model so that meaningful, sustainable, and adaptive learning objectives are achieved in science and social studies subjects.
Keywords: *contextual learning; ecoliteracy; learning outcomes ; natural and social sciences*

ABSTRAK
Pendidikan memegang peranan penting dalam membentuk karakter dan kemampuan generasi muda untuk menghadapi tantangan zaman. Era globalisasi, tidak hanya berfokus pada penguasaan ilmu pengetahuan, tetapi juga pada pengembangan keterampilan berpikir kritis dan kemampuan beradaptasi terhadap perubahan. Tujuan penelitian untuk menganalisis dan mengevaluasi pengaruh model pembelajaran kontekstual dengan ekoliterasi terhadap hasil belajar siswa dalam mata pelajaran Ilmu Pengetahuan Alam dan Sosial. Metode penelitian menggunakan eksperimen dengan Pre-Eksperimental One Group Pretest Posttest Design. Sampel penelitian berjumlah 32 siswa kelas 5 Sekolah Dasar Pulogebang 11. Analisis data menggunakan pendekatan kuantitatif dan kualitatif. Analisis kuantitatif menggunakan perangkat lunak SPSS versi 23 dan Uji t (t-test). Analisis kualitatfi

menggunakan wawancara dan observasi. Hasil menunjukkan peningkatan signifikan antara nilai pretest dan posttest, dengan rata-rata pretest 60,81 dan posttest 84,69 dengan rata-rata perbedaan sebesar 23,88. Nilai signifikansi 0,000, menunjukkan efek positif dari intervensi. Hasıl Wawancara dengan guru dan siswa menunjukkan keterlibatan siswa yang tinggi, dengan banyak peserta aktif dan antusias. Observasi juga mengonfirmasi bahwa mayoritas siswa terlibat aktif dalam pembelajaran. Kesimpulannya, model pembelajaran efektif dapat menciptakan lingkungan belajar yang interaktif dan menarik. Penelitian lebih lanjut diharapkan dapat mengembangkan model pembelajaran yang lebih fleksibel agar tujuan pembelajaran bermakna, berkelanjutan, dan adaptif tercapai dalam mata pelajaran IPA dan IPS.
Kata Kunci: pembelajaran kontekstual ; ekoliterasi ; hasil belajar ; ilmu pengetahuan alam dan sosial

INTRODUCTION

Education plays an important role in shaping the character and skills of the younger generation and preparing them to meet the challenges of the times. Education in the era of globalisation focuses not only on mastering science, but also on developing critical thinking skills and adaptability to change (Mukhlisin et al., 2023; Satria, 2022). The contextual learning approach emphasises the importance of relating subject matter to students' life experiences so that they can understand and apply knowledge in real-life situations (Asmah & Rahaju, 2022; Damayanti & Kartini, 2022). Meanwhile, with increasing global awareness of environmental issues, ecoliteracy as an understanding of human relationships with the environment has also become an integral part of education. Ecoliteracy not only teaches students about the importance of the environment, but also motivates them to take sustainable actions (Indrasari & Wulandari, 2023; Sari & Wulandari, 2023). Therefore, combining contextual learning models with ecoliteration is expected to improve students' understanding of natural and social sciences and encourage students to play an active role in protecting the environment.

A review of the literature shows that the use of contextual learning models can improve student motivation and learning outcomes (Riskyka & Syafitri, 2022; Wiranata & Sujana, 2021). Research by Sipangkar (Sipangkar, 2022) found that students who were taught using a contextual approach showed a significant improvement in their understanding of science concepts compared to students who were taught using conventional methods. Furthermore, research by Putri (Putri & Rezania, 2024) confirms that integrating ecoliteration into the curriculum not only increases students' environmental awareness, but also strengthens their critical thinking skills. Learning experiences that are relevant to everyday life can facilitate a deeper learning process (Firmansyah et al., 2024; Maimunah & Fahrimal, 2023). However, although there are many studies that look at contextual learning and ecoliteration separately, there is still a lack of research into the interaction of these two approaches in an educational context.

Several theories underpin the effectiveness of contextualised learning models. The theory of constructivism, popularised by Jean Piaget and Lev Vygotsky, states that students construct knowledge through experience and social interaction (Barca et al., 2022). Contextual learning allows students to be actively involved in the learning process so that they can connect new information with existing knowledge. The concept of problem-based learning (PBL) also plays an important role in improving learning outcomes (Lim, 2023). The PBL approach encourages students to solve real-life problems, which not only improves understanding of concepts, but

also analytical and critical skills. Research by Zheng (Zheng et al., 2023) showed that the integration of PBL models in science education can significantly improve student learning outcomes. Ecoliteration provides a learning process with students to understand environmental issues holistically, including the impact of human activities on ecosystems. By combining contextual learning and ecoliteration, students are not only taught scientific and social concepts, but also trained to be agents of change in society. This opens up opportunities for a deeper understanding of the relationship between science and environmental issues.

Although many studies have been conducted on contextual learning models and ecoliteration separately (Asmah & Rahaju, 2022; Maulana et al., 2021; Muna, 2020; Rabbianty et al., 2022), there are still significant gaps in the literature examining the impact of a combination of the two on student learning outcomes. Most studies focus on one approach without considering the Integrative benefits of both methods. Thus, this study aims to fill this gap by exploring the influence of contextual learning models integrated with ecoliteration in the context of teaching science and social studies.

Education has an important role in shaping the character and skills of the younger generation and preparing them to face the challenges of the globalization era. Not only focused on mastering science, education in this era also emphasizes the development of critical thinking skills and adaptation to change. Contextual learning models effectively connect subject matter with students ' life experiences, thereby increasing motivation and learning outcomes. Students taught with this approach demonstrate a better understanding of concepts than conventional methods. Awareness of environmental issues makes ecoliteration an important part of modern education. This approach not only increases environmental awareness, but also encourages sustainable actions, such as waste reduction and active participation in environmental activities.

The integration of ecoliteration into the curriculum also provides relevant context for the subject matter and enhances students ' understanding of human relationships with ecosystems. The combination of contextual and ecoliterated learning allows students to understand the natural and Social Sciences in depth while playing an active role as agents of change in society. This study aims to explore the impact of the integration of these two approaches to the learning outcomes of Science and social studies, emphasizing the importance of connecting learning experiences with environmental issues. The results are expected to provide practical contributions for teachers in designing learning methods that are more relevant, effective, and useful, and encourage the development of education policies that are responsive to environmental challenges.

The novelty of this study lies in the development of a learning model that links students ' learning experiences with environmental issues directly, as well as measuring their impact on their understanding of the subject matter (Wiryanto et al., 2024). By understanding the interaction between these two approaches, it is hoped that this research can make a meaningful contribution to the world of education and the development of a more effective and relevant curriculum.

The purpose of this study is to analyze and evaluate the effect of contextual learning models combined with ecoliterasi on student learning outcomes in the subjects of Natural Sciences and Social Sciences. This research is expected to provide new insights into more effective and innovative learning strategies, as well as encourage the development of education

policies that are more responsive to the environmental challenges faced by today's young generation. By achieving this goal, it is hoped that the results of the study can provide practical implications for teachers and educators in designing teaching methods that are more relevant and beneficial to students.

METHODS

Type and Design

This study uses experimental methods with pre-experimental design because there are 3 stages, namely pre-test, treatment and post-test (Andriani et al., 2017; Darwin et al., 2021). The research design used is a group pretest posttest design. This research was conducted at Grade 5 Elementary School Pulogebang 11. The sample was selected using purposive sampling technique, the total number of samples used in this study was 32 students.

Data and Data Sources

Research Data was collected from two main sources, namely quantitative data and qualitative data (Syahrizal & Jailani, 2023). Quantitative data was collected through questionnaires measuring students' understanding and attitudes before and after the intervention. These data provide a numerical picture of the impact of the learning model used. Qualitative data was obtained from semi-structured interviews with students and teachers and observations made during the learning process. This data is used to provide an in-depth understanding of students' and teachers' experiences and views of the learning methods used.

Data collection technique

The data collection techniques in this study consist of several methods. The first questionnaire is used to collect quantitative data from the students. This questionnaire contains multiple choice questions and a Likert scale to measure students' attitudes and understanding before and after learning. The pre-intervention questionnaire consists of 20 questions designed to measure students' initial understanding and attitudes. The questions use a Likert scale from 1 to 5 (1 = strongly disagree, 5 = strongly agree).

Table 1. Ecoliteration Questionnaire For Students

No.	Question
1	I understand that trees play an important role in maintaining the oxygen balance in the air.
2	I understand the importance of recycling to reduce waste.
3	I think it is important to turn off taps when not in use to save water.
4	I believe that everyone has a responsibility to put rubbish in its place.
5	I believe that planting trees can help reduce global warming.
6	I think that reducing the use of plastic is very important to protect the environment.
7	I usually use cloth bags or shopping bags myself when I go shopping to reduce plastic.
8	I always switch off lights and electronic equipment when not in use.
9	I try to use enough water to reduce waste.
10	I try to choose environmentally friendly products when shopping.
11	I avoid using motor vehicles when not necessary to reduce air pollution.
12	I believe that putting rubbish in the right place helps to keep the environment clean.
13	I believe that excessive felling of trees can lead to flooding.

14	I am aware that air pollution affects human health.
15	I believe that small changes in lifestyle can have a big impact on the environment.
16	I am interested in participating in tree planting activities in my neighbourhood.
17	I want to learn more about ways to protect the environment.
18	I want to get involved in a recycling campaign or programme in my neighbourhood.
19	I am willing to invite friends or family to help keep the environment clean.
20	I think climate change is a serious problem that needs to be tackled together.

The instruments have been validated by experts in the field, ensuring that the measures used are not only reliable but also valid for the intended research purposes. The Cronbach's alpha value of 0.82 (greater than 0.7) indicates that the instrument is reliable and consistent in measurement. Third Data interviews were conducted with several students and teachers to obtain in-depth qualitative data. These interviews are semi-structured to allow for more flexible data mining regarding their experiences and opinions during the learning process. Data from four observations made to record student interaction and involvement in the learning process. This observation provides data on classroom dynamics and the application of the concept of ecoliteration in discussions and student learning activities.

Data analysis

The data collected will be analysed using both quantitative and qualitative approaches. Quantitative analysis will be carried out using statistical software such as SPSS to calculate descriptive statistics such as means, medians and standard deviations as well as inferential statistics for t-tests comparing learning outcomes between pre-test and post-test. Qualitative analysis from interviews and observations Data will be analysed using thematic analysis techniques to identify major patterns, themes or categories that emerge from the experiences of students and teachers. This approach provides additional context to the quantitative data and helps to understand students' emotional responses and perceptions of learning models.

RESULTS AND DISCUSSION

The data obtained showed significant results between pretest and posttest in 32 respondents. The mean score before the intervention was 60.81 with a standard deviation of 4.84, while the mean score after the intervention was 84.69 with a standard deviation of 4.30, resulting in an increase in the mean difference of 23.88 and a standard deviation of 1.66. The increase in this value shows the positive effect of the learning model applied, where all respondents experienced an increase, with the highest difference being 27 and the lowest 18. This finding confirms that the application of contextual and ecoliterated learning models can significantly improve students' learning outcomes, making it an effective recommendation for learning processes in science and social science subjects.

The results of the paired samples test in Table 2 confirm the previous findings about the positive influence of contextualised and ecoliterated learning models on students' learning outcomes. The results of the data analysis Mean difference of -23.8750 which shows that the post-intervention score is higher than the pre-intervention score. The standard deviation of 1.6607 and the standard error mean of 0.2936 indicate consistency in the increase experienced by the respondents. The 95% confidence interval shows a range between -24.4738 and -23.2762,

confirming that the increase in score is significant and not by chance. With a t-value of -81.324 and degrees of freedom (df) of 31, as well as a very small (2-tailed) significance value (0.000), it can be concluded that there is a significant difference between the pre- and post-intervention scores. This finding is consistent with the previously described mean difference of 23.88, indicating the effectiveness of the Applied Learning intervention. Overall, the results of this test support the conclusion that the application of contextualised and ecoliterated learning models significantly improves students' learning outcomes in science and social science subjects, and is therefore recommended for dissemination in educational practice.

Table 2. Pretest and Posttest results

Sample	Pretest	Postest	Difference
1	55	80	25
2	60	85	25
3	50	75	25
4	65	90	25
5	70	88	18
6	58	84	26
7	62	87	25
8	56	82	26
9	64	89	25
10	59	83	24
11	61	86	25
12	57	81	24
13	63	85	22
14	66	91	25
15	68	90	22
16	54	78	24
17	62	86	24
18	60	84	24
19	55	79	24
20	58	82	24
21	59	81	22
22	65	88	23
23	67	89	22
24	63	87	24
25	66	90	24
26	64	86	22
27	55	80	25
28	62	85	23
29	54	77	23
30	68	91	23
31	61	88	27
32	59	83	24
Minimum	50	75	18
Maximum	70	91	27
Mean	60.8125	84.6875	23.8750
Std. Dev.	4.83560	4.29882	1.66074

Table 3. Test Results Of Paired Samples

Statistics	Value
Mean Difference	-23.8750
Standar Deviasi	1.6607
Standar Error Mean	0.2936
95% Confidence Interval	
Lower	-24.4738
Upper	-23.2762
t-value	-81.324
df (degree of freedom)	31
Signifikansi (2-tailed)	0.000

The results of the interviews with the students in Table 8 give a positive response to the interactive learning model and to the inclusion of discussion, which makes learning feel alive and interesting. Learning experiences with a contextual and ecoliterated approach are considered very enjoyable because they allow students to see a direct connection between the material and everyday life. Respondents felt that they understood the material better because they were able to relate the information to personal experiences, which made it easier to remember. However, they suggest that learning should be enhanced by more practical work in the field, as theory alone is not enough. Finally, they emphasise the importance of learning about the environment, as understanding the impact of our actions on the earth is key to preserving the environment and improving the quality of life.

The results of the interviews with teachers show that respondents rated the use of contextualised and ecoliterated learning models in the classroom as very good, as students showed a high level of activity and enthusiasm and felt that the material taught was relevant to their lives. However, the main challenge they face is time management, where it is sometimes difficult to complete all the material within the time allotted, especially when there is a lot of discussion. The students' response to this method is very positive; they are actively involved and show a high level of interest. The changes observed in students' understanding were quite significant, where they were able not only to answer questions but also to relate the concepts learnt to everyday experiences. For the future development of learning, the interviewees recommend that this approach should be continued with more collaboration with external parties, such as the community and the environment, so that students can learn in a more direct and practical way.

The observation table in the student engagement criteria gives a clear picture of participation and engagement during the learning process. A total of 22 students (68.75%) showed active participation, indicating that the majority of students contributed to class discussions and activities. In addition, 16 students (50%) were able to relate the material well, while 12 students (37.5%) showed moderate ability and 4 students (12.5%) showed low ability in this regard. In terms of interest in learning, 24 students (75%) showed high interest, reflecting the success of the approach used, while 6 students (18.75%) showed moderate interest and 2 students (6.25%) showed low interest. Finally, 18 students (56.25%) actively contributed to the learning activities, 10 students (31.25%) had a moderate contribution and 4 students (12.5%) had a low contribution. Overall, this table shows that most students have a high level of engagement, with a predominance of active and enthusiastic participants, which

confirms the effectiveness of the Applied Learning model in creating an interactive and engaging learning environment.

The results of observing student engagement showed that the majority of students were actively involved in the learning process, with 68.75% of them actively participating, 50% being able to relate the material to their daily experiences, and 75% showing high interest. This finding is consistent with previous research by (Angreza & Purwanto, 2023; Siregar et al., 2024) which emphasises that learning strategies that increase student engagement, such as discussion and interaction, have a significant impact on learning outcomes. Thus, the application of contextual and ecoliterated learning models in this study not only succeeded in increasing student participation, but was also in line with the theory that relevant and interactive learning can optimise student understanding (Rachmawati et al., 2021).

However, the challenge in implementing this research is time management. Observations show that limited time can hinder the completion of the material as a whole. The findings of the study are consistent with effective collaborative learning and require more time for discussion and exploration (Rahardhian, 2023; Simamora et al., 2022). This time constraint may limit students' understanding, especially of more complicated material, so there is a risk that some important concepts are not well understood.

Meanwhile, the active contribution of the students, which reached 56.25%, showed that they were not only engaged in learning but also contributed positively to the class dynamics. This highlights the importance of a supportive learning environment where students feel comfortable to participate and share their opinions. Research by Dewi and Hiadayah (R. M. Dewi & Mailasari, 2020; Hidayah, 2023) shows that collaboration between students can foster engagement and help them develop important social skills. Therefore, it is important to maintain and strengthen this approach while constantly looking for ways to improve the effectiveness of teaching.

This study provides evidence that contextualised and ecoliterated learning models not only increase student engagement and interest, but also improve their understanding of the material being taught. The observation that students are able to relate learned concepts to personal experiences suggests that they are developing critical and reflective thinking skills. Further research is needed to explore different strategies that can improve collaboration between students and maximise learning time without sacrificing depth of understanding.

Another study conducted by Dewi (T. P. Dewi, 2021; Nofziarni et al., 2019; Puspita, 2021) found in its meta-analysis that teaching strategies that increase student engagement, such as group discussions and problem-based learning, have significant positive effects on learning outcomes. Collaborative active learning methods not only improve student engagement, but also academic outcomes (Majdi, 2023). These findings suggest that students who are actively involved in the learning process are able to relate the concepts taught to their own learning experiences, thereby deepening their understanding. In the context of science and social studies learning, ecoliterated contextual learning models not only increase student engagement, but also strengthen students' understanding of the environmental and social material taught. In science learning, students can learn the relationship between the concept of ecosystem and sustainability with their daily lives. Meanwhile, in social studies learning, students can understand social and environmental issues in a contextualised way that helps them in society and the importance of preserving the environment.

However, it should be noted that although the results of this study show success in increasing student engagement, there are limitations that need to be considered. One of the main limitations is the time needed to complete all the material, especially when there is a lot of discussion and interaction in the classroom. Time constraints can make it difficult to cover all the important topics, so there is a risk that students do not gain a thorough understanding of the material being taught.

This research confirms the importance of using contextual and relevant methods that can help students not only to understand academic material but also to develop critical and reflective skills that are important in everyday life. However, to have a wider impact, it is necessary to work with different stakeholders, such as society and the surrounding environment, to provide a more in-depth and practical learning experience.

CONCLUSION

Overall, this study supports the theory that active and contextualised learning, particularly through an ecoliteracy approach, can increase students' engagement while deepening their understanding of concepts in science and social studies subjects. In the context of science, ecoliteracy-based learning enables students to understand how scientific concepts such as ecosystems, life cycles and sustainability relate to their real-world experiences. Pupils can see how their daily actions affect the environment and sustainability and thus develop an awareness of their role in maintaining ecosystems. In social studies, the Ecoliterated model facilitates an understanding of the social, economic and cultural implications of environmental issues. Students can develop an insight into the importance of maintaining a balance between social needs and environmental sustainability, and how society and the environment influence each other. This approach helps students understand global and local issues such as climate change, pollution and food security in a perspective closer to their lives. In-depth active and collaborative learning requires sufficient time for both discussion and exploration of the material, which is often difficult to fit into a dense curriculum. Further research is expected to provide a more flexible and adaptable learning model that allows for the optimal application of ecoliteration in the curriculum, so that deep, sustainable and meaningful learning goals can be achieved in science and social studies classes.

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