INSIGHT: Innovation and Studies in Science, Education, and Technology
Vol. 1, No. 2, May 2026, 195-202
https://journal.bacaanmedia.id/index.php/insight/index

Pubslihed by Bacaan Media

Utilizing Website-Based EcoLearn Learning Media to Enhance Students' Critical Thinking Skills

Nofriansyah Nofriansyah[1], Sugeng Riyadi[2], Adinda Vimarsya[3], Ajmal Hadi Maulana[4], Pijar Ajie Pamungkas[5]

[1,45]Universitas Pendidikan Indonesia, Bandung, Indonesia
[2]Universitas Negeri Yogyakarta, Yogyakarta, Indonesia
[3]SMK Terpadu Taqwa, Belitang, Indonesia
Email: [1]nofriansyah10@upi.edu, [2]sugengriyadi.2024@student.uny.ac.id , [3]Adindavimarsya@gmail.com, [4]Ajmalhadi2793@upi.edu, [5]pijar@upi.edu

Submitted	: 20-04-2026	Accepted	: 13-05-2026
Revision	: 07-05-2026	Published	: 20-05-2026

ABSTRACT:

This study looks at how well EcoLearn, a web-based learning tool, helps 11th-grade economics students at SMA N 3 Cilacap develop their critical thinking abilities. 72 students were split into experimental and control groups for the study, which used a quasi-experimental design with a pre-test and post-test control group. While the control group got traditional training, the experimental group used EcoLearn, which incorporates interactive case studies, economic simulations, and group discussion forums. Tests of critical thinking abilities were used to gather data, and independent sample t-tests were used for analysis. The findings show that students who used EcoLearn had considerably better critical thinking abilities (M=82.45, SD=6.23) than the control group (M=74.18, SD=7.89), with t(70)=4.87, p<0.001. According to the study, technology-enhanced learning environments especially those that include interactive elements and real-world economic scenarios effectively foster analytical reasoning, evidence evaluation, and problem-solving skills. These results advance our knowledge of how digital learning environments might be thoughtfully created to support higher-order thinking abilities in the teaching of economics.

Keywords: Critical Thinking Skills; Economics Education; Technology-Enhanced Learning; Web-Based Learning Media; Website-Based Platform

ABSTRAK:

Penelitian ini mengkaji efektivitas EcoLearn, sebuah media pembelajaran berbasis website, dalam meningkatkan kemampuan berpikir kritis siswa kelas 11 mata pelajaran ekonomi di SMA N 3 Cilacap. Menggunakan desain kuasi-eksperimental dengan kelompok kontrol pre-test dan post-test, penelitian melibatkan 72 siswa yang dibagi menjadi kelompok eksperimen dan kontrol. Kelompok eksperimen menggunakan EcoLearn yang mengintegrasikan studi kasus interaktif, simulasi ekonomi, dan forum diskusi kolaboratif, sedangkan kelompok kontrol menerima pembelajaran konvensional. Data dikumpulkan melalui tes kemampuan berpikir kritis dan dianalisis menggunakan uji independent sample t-test. Hasil menunjukkan bahwa siswa yang menggunakan EcoLearn menunjukkan kemampuan berpikir kritis yang secara signifikan lebih tinggi (M=82,45, SD=6,23) dibandingkan kelompok kontrol (M= 74,18, SD= 7,89), dengan t (70)= 4,87, p<0,001. Penelitian ini

mengungkapkan bahwa lingkungan pembelajaran yang ditingkatkan teknologi, khususnya yang menggabungkan skenario ekonomi dunia nyata dan fitur interaktif, secara efektif mendorong penalaran analitis, evaluasi bukti, dan kemampuan pemecahan masalah. Temuan ini berkontribusi pada pemahaman tentang bagaimana platform pembelajaran digital dapat dirancang secara strategis untuk menumbuhkan keterampilan berpikir tingkat tinggi dalam pendidikan ekonomi.

Kata Kunci: Kemampuan Berpikir Kritis; Media Pembelajaran Berbasis Website; Pendidikan Ekonomi; Platform Berbasis Web; Pembelajaran Teknologi

INTODUCTION

21st-century education, critical thinking abilities are crucial. This is especially true for economics classes, where students must analyze intricate economic phenomena, assess policies, and reach logical conclusions based on facts and empirical evidence (Dumitru et al., 2023; Cheng & Wan, 2017; Fajari, 2020; Sarigoz, 2023; Nofriansyah et al., 2023). However, there are still few possibilities for students to acquire higher-order thinking abilities because economics education in Indonesia is still mostly teacher-centered, with lecture-based instruction and idea memorization predominating (Hermana et al., 2025;Salsabila & Kholiq, 2021; Meirani et al., 2026). The scarcity of cutting-edge educational resources that can support sophisticated cognitive functions like analysis, assessment, and synthesis in the context of economics education exacerbates this problem even more.

According to earlier research, integrating technology into the classroom helps foster the growth of critical thinking abilities by creating interactive, collaborative, and contextual learning settings (Maksum et al., 2023; Alharbi et al., 2022; Puig et al., 2020). Accessibility, adaptability, and the capacity to incorporate a variety of multimedia learning resources that can be customized to meet specific learning requirements are all benefits of website-based learning platforms (Hamad et al., 2026; Pang, 2022; Sari & Setiawan, 2018).

However, there is still a lot of unanswered questions about how particular website-based learning media designs might successfully support the growth of critical thinking abilities in the context of senior high school economics education.According to preliminary observations made at SMA N 3 Cilacap, eleventh-grade students had trouble evaluating conflicting economic arguments, understanding complex economic issues, and making connections between economic theory and actual social occurrences. According to the findings of diagnostic tests, just 38% of students were able to solve contextual economic problems with sufficient critical thinking. These results emphasize how urgent it is to create and use educational materials that can methodically teach students how to improve their critical thinking abilities by interacting with real and pertinent economic content.

The purpose of this study is to evaluate how well the EcoLearn website-based learning resources help 11th grade economics students at SMA N 3 Cilacap develop their critical thinking abilities. The creation of a learning platform that particularly incorporates three key elements is what makes this study novel: (1) interactive economic case studies created using contextual learning principles; (2) economic simulations that let students try out different policy scenarios; and (3) cooperative discussion forums that encourage debate and critical assessment of various economic viewpoints.

By offering a technology-based learning model that economics teachers can modify to enhance the quality of instruction, this study is anticipated to make a theoretical and practical contribution to the literature on educational technology in the context of critical thinking development.

RESEARCH METHOD

This study used a quasi-experimental pre-test and post-test control group design with a quantitative methodology. A total of 216 students from six classes in the 11th grade at SMA N 3 Cilacap during the 2025–2026 school year made up the study population. Using cluster random sampling, two classes were chosen at random to be the experimental group (n = 36) and the control group (n = 36), for a total sample size of 72 students. While the control group received traditional training through lectures, class discussions, and textbook-based tasks, the experimental group received instruction via the web-based EcoLearn platform. Constructivist learning theory and the tenets of Technology Pedagogy Content Knowledge (TPACK) form the foundation of the EcoLearn platform. This platform incorporates three key features: first, interactive economic case study modules that use a problem-based learning approach to present current economic issues like inflation, unemployment, and international trade; second, economic simulations that let students manipulate economic variables and see how they affect macroeconomic indicators; and third, interactive economic simulations that let students examine and evaluate economic variables and see how they affect macroeconomic indicators. Third, critical reasoning and assessment of various economic viewpoints were made easier by a cooperative discussion forum. With four hours of instruction per week, the learning implementation took place over the course of eight weeks. A critical thinking skills test based on Facione's (2020) framework which comprises six dimensions: interpretation, analysis, evaluation, inference, explanation, and self-regulation was employed as the data collection tool. The exam of 25 descriptive questions that were evaluated by three experts in economics education. It was tested for construct validity and reliability, with a KMO value of 0.847 and a Cronbach's Alpha coefficient of 0.892, respectively. An analytical rubric with a scale of 1-4 for each critical thinking facet was used to evaluate each student's response. A pre-test prior to the learning implementation and a post-test following eight weeks of instruction were used to gather data. Using SPSS software version 26.0, data analysis included descriptive statistics to characterize the critical thinking skills profile and an independent sample t-test to investigate variations in critical thinking abilities between the experimental and control groups. The homogeneity of variance test using Levene's test and the normality test using Kolmogorov-Smirnov are the necessary tests for analysis.

RESULT AND DISCUSSION

The results of the prerequisite analysis test showed that the pre-test and post-test data for both groups were normally distributed ($p>0.05$) and had homogeneous variance ($p=0.187$). The descriptive analysis in Table 1 shows that both groups had relatively equal initial abilities during the pre-test, but there were significant differences in the post-test after the learning implementation.

Table 1. Descriptive Statistics of Critical Thinking Ability

Group	Tes	N	Mean	SD	Range
Exsperiment	Pre-test	36	67.42	8.15	50-82
Exsperiment	Post-test	36	82.45	6.23	70-95
Control	Pre-test	36	66.85	7.92	52-80
Control	Post-test	36	74.18	7.89	58-88

The results of the independent sample t-test in Table 2 show that there is a significant difference between the critical thinking abilities of the experimental and control groups after the implementation of the learning. The t(70) value = 4.87 with p <0.001 (p = 0.000) indicates that the use of website-based EcoLearn learning media has a statistically significant effect on improving students' critical thinking abilities. The effect size (Cohen's d = 1.15) indicates a large effect category, indicating that the difference between the two groups is not only statistically significant but also has substantial practical significance.

Table 2. Independent Sample T-Test Results

Variabel	t	df	p-value	Cohen's d
Critical Thinking Skill	4.87	70	0.000***	1.15

*Noted:: ***p<0,001*

The experimental group consistently improved in all six Facione dimensions, according to an analysis of critical thinking abilities by dimension. The evaluation (M=84.72, SD=5.89) and analysis (M=83.45, SD=6.12) dimensions demonstrated the greatest improvement, suggesting that EcoLearn's interactive case study and economic simulation features successfully supported students' growth in their capacity to evaluate the reliability of information and determine causal relationships between economic variables. The self-regulation measure (M=79.38, SD=7.24) shown the least but still substantial improvement, suggesting that the platform's integrated self-assessment feature helped students to be more introspective about their own thought processes.

These results are consistent with a study which showed that students' cognitive involvement in the learning process can be improved through technology-based learning that incorporates interactive information (Fitria & Ayani, 2025; Rizky et al., 2026). Students can experiment with different policy scenarios and directly observe their consequences using the EcoLearn platform, which offers economic simulations (Nofriansyah et al., 2026). This helps students develop hypothetico-deductive reasoning skills, which are an essential part of critical thinking (Magarelli, 2024; Nofriansyah et al., 2025; Firdaus et al., 2026). Additionally, students can participate in argumentation and counterargumentation through the platform's collaborative discussion forums, which Cheng and Wan (2022) contend is an important mechanism in the development of critical assessment skills.

There are a number of educational factors that account for EcoLearn's excellence in developing critical thinking abilities (Nofriansyah et al., 2026). Students can make connections between theoretical concepts and real-world economic phenomena through the presentation of actual

and contextual economic instances (Rahayu et al., 2025). This makes learning more relevant and encourages students to think deeply. Second, the platform's interactive features, which let students change variables and see instant feedback, foster a learning environment that supports the experiment-reflection cycle, which is crucial for gaining a thorough conceptual understanding (Sari et al., 2018). Third, collaborative elements that support peer learning and cognitive scaffolding through group discussions motivate students to embrace different viewpoints and externalize their thought processes two essential elements of higher-order thinking skills (Supriatna et al., 2025).

Students in the experimental group showed greater active participation and engagement in class discussions, according to observations made during the learning implementation. Students accessed the EcoLearn platform an average of 4.3 times per week with an average session duration of 42 minutes, according to an analysis of activity logs inside the platform, demonstrating a high degree of engagement with the course material. During the study period, each student made an average of 8.7 entries in the discussion forums, with 67% of those posts exhibiting traits of critical reasoning, such as offering proof, assessing assertions, and formulating counterarguments. The quantitative evidence that website-based learning materials can successfully promote active cognitive engagement which is crucial for the development of critical thinking abilities is corroborated by these qualitative findings.

However, there are a number of limitations to this study that should be taken into account. First, it's possible that the eight-week implementation period won't be enough to see how employing website-based learning materials affects critical thinking abilities in the long run. To evaluate the learning impact's sustainability, longitudinal study is required. Second, it is important to exercise caution when extrapolating the results to larger contexts because this study was carried out in a single school with comparatively uniform student characteristics. Third, even if the study instrument has been validated, a written test may not adequately represent the intricacy of the cognitive processes involved in critical thinking in real-world situations

CONCLUSION

This study offers actual proof that using the web-based EcoLearn learning resources greatly enhances the critical thinking abilities of SMA N 3 Cilacap's eleventh-grade economics students. With a substantial effect size (Cohen's d=1.15), the experimental group utilizing EcoLearn showed statistically significantly better critical thinking abilities (M=82.45, SD=6.23) than the control group (M=74.18, SD=7.89). All critical thinking dimensions saw improvements, but the evaluation and analysis dimension had the biggest change. This suggests that the platform's interactive and simulative aspects successfully support the development of higher-order reasoning abilities. The study's conclusions have significant theoretical and practical ramifications. By proving that web-based learning media design that incorporates constructivism, contextualization, interaction, and collaboration may successfully promote the development of critical thinking abilities, this study theoretically adds to the literature on educational technology. Practically speaking, these results support the necessity for curriculum designers and economics instructors to incorporate digital learning tools into their lesson plans, highlighting the value of elements like interactive case studies, collaborative discussion boards, and simulations that encourage active cognitive engagement. It is

advised that longitudinal studies be carried out in the future to investigate the long-term impacts of using web-based learning resources on students' academic performance and critical thinking abilities. To evaluate the findings' generalizability, the study could be extended to more varied school settings. In-depth qualitative research is also required to investigate the cognitive and metacognitive processes that underlie how students interact with digital learning materials to build critical thinking abilities. In order to deliver tailored feedback that adjusts to each student's unique learning needs, future development of the EcoLearn platform might incorporate learning analytics and artificial intelligence technology.

REFERENCES

Alharbi, S. M., Elfeky, A. I., & Ahmed, E. S. (2022). The effect of e-collaborative learning environment on development of critical thinking and higher order thinking skills. *Journal of Positive School Psychology*, *6*(6), 6848-6854.

Cheng, M. H. M., & Wan, Z. H. (2017). Exploring the effects of classroom learning environment on critical thinking skills and disposition: A study of Hong Kong 12th graders in Liberal Studies. *Thinking Skills and Creativity*, *24*, 152-163.

Dumitru, D., Minciu, M., Mihaila, R. A., Livinti, R., & Paduraru, M. E. (2023). Experimental programs of critical thinking enhancement: a worked-based, blended learning higher education curriculum for economics. *Education Sciences*, *13*(10), 1031.

Fajari, L. E. W. (2020, February). Enhancement of Students Critical Thinking Skills Through Problem-Based Learning Multimedia. In *3rd International Conference on Learning Innovation and Quality Education (ICLIQE 2019)* (pp. 976-987). Atlantis Press.

Fitria, Y., & Ayani, N. I. (2025). Varieties Of Science Learning Assessment In 21st Century Learning: A Systematic Literature Review. *Jurnal PAJAR (Pendidikan Dan Pengajaran)*, *9*(6), 775-786.

Facione, P. A. (2020). *Critical thinking: What it is and why it counts*. Measured Reasons LLC.

Hamad, F., Al Harrasi, N., Al-Housni, H., & Fakhouri, H. (2026). Exploring the role of active learning in developing student competencies for a knowledge-based economy. *Cogent Education*, *13*(1), 2644689.

Hermana, M., Danawan, A., & Hidayat, A. (2025). Design of Website-Based Learning Media to Enhance Critical Thinking Skills in Static Fluid Concepts. *Jurnal Penelitian Pembelajaran Fisika*, *16*(3), 261-271.

Maksum, A., Widiana, I. W., & Marini, A. (2021). Path Analysis of Self-Regulation, Social Skills, Critical Thinking and Problem-Solving Ability on Social Studies Learning Outcomes. *International Journal of Instruction*, *14*(3), 613-628.

Magarelli, R. (2024). *Critical analyses in science: Course impact on critical thinking skills and hypothetical-deductive reasoning*. Grand Canyon University.

Meirani, M., Nofriansyah, N., Badeni, B., Juarsa, O., Kristiawan, M., Risdianto, E., & Ugli, Y. K. B. (2026). Problem-Based Learning E-Modules to Improve Students' 21st-Century Skills: A Systematic Literature Review. Jurnal Pemberdayaan Masyarakat, 5(1), 1-10.

Nofriansyah, N., Ahman, E., Budiwati, N., Rahmadani, R., Supriatna, E., Hendriyani, C., Islamy, F.J., and Putrie, C.A.R. (2026). Development of a Web-Based Economics Learning System to Integrate Financial and Digital Literacy for Enhancing Critical Thinking Skills. *Journal of Engineering Science and Technology*, Special Issue on 3rd BPNIC2025, 21(2), 65–72.

Nofriansyah, N., Sutarni, N., Hufad, A., Vhalery, R., Rahayu, S., Meilia, M., Meirani, M., & Amri, A. (2025). Digital transformation of economics education: Development of the Ekonara application based on local culture. Journal of Engineering Science and Technology, Special Issue on ISCoE2024, 20(4), 174–181

Nofriansyah, N., Sutarni, N., Mardetini, E., & Riyadi, S. (2023). Analisis Gaya Belajar Mahasiswa Pada Mata Kuliah Kajian Pedagogik. Jurnal PROFIT: Pendidikan Ekonomi Dan Ilmu Ekonomi, 11(2), 135–143. https://doi.org/10.36706/jp.v11i2.23

Firdaus, A. Q., Nusantara, T., Rustanto Rahardi, H. S., Nofriansyah, N., Alfaris, R., & Efendi, N. A Web-Based Adaptive Learning System for Personalized Development of Higher-Order Thinking Skills Using Differentiated Instruction to Support Sustainable Development Goals (Sdgs). *Journal of Engineering Science and Technology*, Special Issue on 3rd BPNIC2025, Vol. 21, No. 2, pp. 9–16, 2026

Pang, Y. (2022). The role of web-based flipped learning in EFL learners' critical thinking and learner engagement. *Frontiers in Psychology*, *13*, 1008257.

Puig, B., Blanco Anaya, P., & Bargiela, I. M. (2020). A systematic review on e-learning environments for promoting critical thinking in higher education. *Handbook of research in educational communications and technology: Learning design*, 345-362.

Rahayu, S., Sutarni, N., Nofriansyah, N., & Soffiatun, S. (2025). The Effectiveness of The Arcs Learning Model in Improving Student Learning Outcomes in Economics. Research and Development Journal of Education, 11(1), 115-123. http://dx.doi.org/10.30998/rdje.v11i1.27273

Rizky, A. R., Susila, H. R., & Pebriantika, L. (2026). Depelovment of an Interactive E-module using the Problem Based Learning Approach for the Topic of Systems of Linear Equations in Two Variables. *Tekno-Pedagogi: Jurnal Teknologi Pendidikan*, *16*(2), 66-78.

Salsabila, S., & Kholiq, A. (2021). Development of physics edutainment website to improve students' critical thinking skills during the covid-19 pandemic. *Radiasi: Jurnal Berkala Pendidikan Fisika*, *14*(1), 11-22.

Sari, A., & Setiawan, A. (2018). The development of internet-based economic learning media using moodle approach. *International journal of active learning*, *3*(2), 100-109.

Sarigoz, O. (2023). Teaching the 21st Century Learning Skills with the Critical Thinking Technique Based on the Argumentation Method. *Educational Policy Analysis and Strategic Research*, *18*(1), 196-218.

Supriatna, E., Eeng Ahman, N., Rahayu, S., & Randini, D. (2025). Pengaruh Literasi Digital terhadap Minat Belajar Siswa Mata Pelajaran Ekonomi Kelas XI IPS SMA Negeri 4 Kota Sukabumi. Research and Development, 11(1), 444-454. http://dx.doi.org/10.30998/rdje.v11i1.28797