



Analysis of Students' Creative Thinking Skills in E-Portfolio-Based Economics Instruction

Mona Yelly Simamora^{1*}, Sarwi², Arief Yulianto³, Noening Andrijati⁴, Indriana Eko Amaidi⁵, Prima Lestari Situmorang⁶

^{1,2,3,4,5} Universitas of Semarang, Indonesia

⁶ Musamus University, Merauke, Indonesia

Corresponden author: monayelly5@gmail.com

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ABSTRACT

This study aims to analyze students' creative thinking skills in e-portfolio-based economics learning. Measurements were conducted using Torrance's creativity indicators, namely fluency, flexibility, originality, and elaboration. This quantitative descriptive study involved 30 grade X1 students at Jayapura State Senior High School who had studied material on banking and non-bank financial services institutions and the use of one class to maintain uniformity of learning treatment. Data collection techniques included observation and documentation. The instrument used in this study consisted of a creativity assessment rubric using a Likert scale of 1-4 with 16 creative thinking indicator items. The results of the study with the level of creative thinking ability in e-portfolio-based economics learning concluded that it had an average of 47.53 with a standard deviation of 2.83. The results of the project product assessment showed that the quality of the student group's product was in the good category with an average score of 81.25. Based on the results of the study, it was concluded that e-portfolio-based economics learning was able to encourage students to explore and develop creativity. This research is expected to provide an empirical basis for improving student creativity in accordance with the demands of the independent curriculum.

Introduction

Education today faces a dynamic landscape of change that is not only knowledge-oriented but also demands the development of various competencies relevant to the needs of the Society 5.0 era. In this context, education is geared toward fostering creativity, critical thinking, collaboration, communication, and digital literacy as essential competencies. In line with this, the implementation of the Merdeka Curriculum emphasizes deep learning that provides space for students to learn in a contextual, exploratory, and meaningful manner

according to their needs and characteristics (Mendikdasmen, 2025). In the Merdeka Curriculum, students must possess the graduate profile dimensions of faith, independence, citizenship, critical reasoning, creativity, collaboration, health, and communication. Ministry of Education and Culture Regulation No. 1 of 2026 states that the assessment of the learning process is conducted during the learning process and the implementation of learning (Permendikdasmen, 2026). Thus, current learning needs to be developed and exploratory so that the competencies required in the current curriculum can be achieved.

Creative thinking skills are not only about the ability to generate ideas, but also include the ability to develop, modify, and implement those ideas in relevant contexts. However, in practice, learning in schools still tends to be oriented toward rote memorization and the conventional delivery of material, thus failing to provide students with sufficient opportunities to develop their creativity optimally (Ahiri et al., 2025). Project-based learning (PBL) is considered effective in developing creative thinking skills (Mubarok et al., 2025). Creative thinking is defined as an individual's ability to generate ideas, solutions, or products that are novel, valuable, and relevant to the problems at hand. Guilford, as cited by Xu, states that creativity is related to divergent thinking (Xu et al., 2025). Meanwhile, Suherman states that creativity is not only result-oriented but also involves a thinking process that includes the exploration and elaboration of ideas (Suherman & Vidákovich, 2022). Based on the experts' views, it can be concluded that creative thinking skills are cognitive abilities that enable individuals to generate new, diverse, and valuable ideas in solving flexible and contextual problems. Thus, creative thinking needs to be honed and developed as part of holistic deep learning.

Conceptually, creative thinking skills consist of several indicators, as developed by E. Paul Torrance through the Torrance Test of Creative Thinking (TTCT), namely fluency, flexibility, originality, and elaboration (López Martínez et al., 2024). (1) The fluency dimension refers to the ability to generate a variety of ideas or alternative solutions fluently and relevantly. (2) Flexibility reflects the ability to shift perspectives or use diverse approaches in solving problems; (3) originality relates to the uniqueness and novelty of the ideas generated; and (4) elaboration indicates the ability to develop ideas in a detailed, systematic, and in-depth manner (Karunarathne & Calma, 2024). These four dimensions represent interrelated higher-order thinking processes in generating creative solutions. Thus, these indicators serve as the basis for developing assessment instruments to measure student creativity.

Measuring creative thinking skills requires supportive learning and assessment. Inappropriate assessments can hinder the development of students' creativity because they fail to fully accommodate the creative thinking process (Afifah & Zhara, 2024). Therefore, a form of assessment is needed that evaluates not only the final outcome but also the students' thinking process (Putri & Alberida, 2022). In this regard, e-portfolio-based project assessment serves as a relevant alternative. E-portfolio-based project assessment is specifically designed to measure creative thinking skills in the context of high school economics learning. This approach allows for the contextual documentation of both the learning process and the learning products, resulting in a holistic, reliable assessment of

creativity that aligns with the demands of a learning framework encompassing the use of interactive and contextual learning technologies.

Portfolios are a much-needed alternative form of project assessment. According to Sari, an e-portfolio is a collection of learning artifacts in digital format that continuously documents students' progress, achievements, and reflections (Sari et al., 2021). Furthermore, Eny states that e-portfolios are used as authentic assessment tools that allow educators to evaluate students' learning processes and outcomes through structured electronic documentation (Syatriana et al., 2025). Based on these views, an e-portfolio can be understood as an assessment tool used to evaluate learning achievements and performance, as well as a learning tool that supports the learning process through student reflection and self-development. Furthermore, the integration of technology into learning through e-portfolios enhances the effectiveness of learning and encourages students to be more active, independent, and creative in managing information and knowledge. Thus, e-portfolios serve not only as assessment tools but also as learning media capable of simultaneously developing various student competencies.

In the context of economics education, the development of creative thinking skills is of paramount importance. Economics education requires not only an understanding of concepts but also the ability to analyze economic problems and generate innovative solutions. Therefore, economics education must be supported by teaching and assessment strategies that encourage students to think creatively. Although various studies have shown that project-based learning and the use of e-portfolios have the potential to enhance student creativity, most of these studies still focus on developing learning models or testing the effectiveness of specific methods. Research that specifically analyzes students' levels of creative thinking skills in the context of e-portfolio-based economics education remains limited. Such research is crucial for providing an empirical understanding of students' creativity levels as a foundation for developing more effective learning approaches.

Thus, there is a limited body of research examining creative thinking skills in e-portfolio-based economics learning, a lack of studies describing the actual state of student creativity, and suboptimal integration between project assessment, e-portfolios, and the measurement of student creativity. This study is an important to conduct in order to provide an empirical picture of the level of students' creative thinking skills in e-portfolio-based economics learning. The results of this study are expected to serve as a basis for the development of more effective learning and assessment strategies to enhance student creativity.

More specifically, this study aims to analyze students' levels of creative thinking skills based on indicators of creativity, namely fluency, flexibility, originality, and elaboration. Using a quantitative descriptive approach, this study is expected to provide an objective and comprehensive overview of students' creativity.

Research Methods

The research method used in this study is quantitative descriptive research, an approach to objectively describe the condition of a variable based on numerical data obtained through research instruments (R. R. Sari et al., 2022). This analytical descriptive research method provides a factual picture of the phenomenon being studied (Purba, 2025).

This research was conducted in a Jayapura State Senior High School, involving 10th grade students, with 30 respondents. The sampling selection was based on students participating in e-portfolio-based economics learning and being able to complete the questionnaire independently. The instrument for measuring creative thinking skills used a Likert scale scoring rubric ranging from 1-4 with 16 indicator items.

Table 1. Creative Thinking Scoring Rubric

Dimension	Score 1	Score 2	Score 3	Score 4
Fluency	Generates 1 idea.	Generates 2 relevant ideas.	Generates 3 relevant ideas.	Generates 4 or more relevant ideas that appropriately address the problem.
Flexibility	Provides an inappropriate or ineffective solution.	Uses 2 alternative solutions.	Uses 3 alternative solutions.	Uses 4 or more different perspectives or approaches.
Originality	Ideas are derived directly from examples provided.	Ideas are still common and conventional.	Ideas are fairly unique with some modifications.	Ideas are highly unique, innovative, and distinct from those of other groups.
Elaboration	Explanations are unclear and lack detail.	Explanations are clear but not detailed.	Explanations are sufficiently detailed.	Explanations are highly detailed, comprehensive, systematic, and in-depth.

The creativity score is calculated by adding up the scores obtained by students divided by the number of rubric items. Creativity results with a maximum score of 64 and a minimum score of 16 are categorized as follows.

Table 2. Score Interpretation

Score	Category
53-64	Very Creative
41-52	Creative
29-40	Somewhat Creative
16-28	Not Creative

The data collection techniques used in this study were documentation and observation. The instruments used were a creative thinking assessment sheet and a project product assessment sheet. Observations were conducted to observe the e-portfolio-based economics learning process in the classroom. The rubric for measuring creative thinking skills was compiled based on the following indicators: Fluency (fluency of thinking), Flexibility (flexibility of thinking), Originality (uniqueness of ideas), and Elaboration (development of ideas).

Findings

E-portfolio-based project learning that measures creative thinking skills Learning is carried out based on learning objectives derived from learning outcomes according to BSKAP 2025 economic material phase E (Kemendikbudristek, 2025). The learning objectives in learning are to analyze bank and non-bank financial institutions. Students are divided into 6 groups with the project themes of general bank analysis, bank savings and credit products, bank and non-bank financial institution products, financial literacy and student financial investment. In the learning process, students demonstrate creative thinking skills through

developing ideas, presenting information in the form of infographics, compiling e-portfolio reports using Google Sites and communicating project results with presentations in front of the class. The following is an example of the project results of each group after carrying out e-portfolio-based project learning.



Figure 1. Group Project Results in the form of infographics

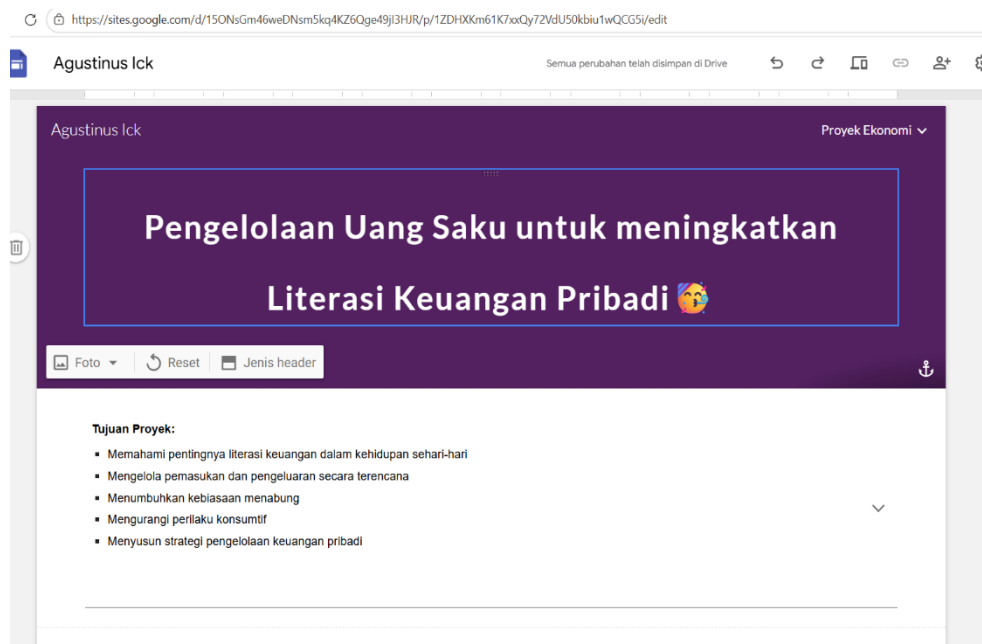


Figure 2. Project report written using E-Portfolio with Google site

Students' Creative Thinking Skills Level

Creative thinking skills are measured using indicators proposed by Paul E. Torrance with dimensions of fluency, flexibility, originality, and elaboration (Moh. Looti, 2025). The following are the scores produced by students using the creative thinking creativity rubric.

Table 3. Results of Students' Creative Thinking Ability Scores

No	Category	Score Range	Frequency (f)	Percentage (%)	Interpretation
1	Very High	53-64	0	0.0%	Significantly above the class mean
2	High	41-52	16	53.3%	Above the class mean
3	Moderate	29-40	14	46.7%	Around the class mean
4	Low	16-28	0	0.0%	Below the class mean
Total			30	100.0%	

From the table it is known that those who got scores in the creative thinking instrument during economics learning in the high category were 16 students (53.3%) and those in the medium category were 14 students (46.7%), while there were no students in the very high and low categories. This achievement reflects that students are able to understand theoretically and develop ideas adaptively in material analyzing the role of financial institutions in the economic system critically and contextually. Creative thinking skills are integrated into tasks or products required by the learning objectives, namely being able to present analysis results in the form of infographics or presentations.

Descriptive Statistics per Dimension of Creative Thinking Ability

The results of the descriptive statistical analysis of students' creative thinking abilities, measured through the dimensions of torrance, namely fluency, flexibility, originality, and elaboration, are in the high category. The following is presented in table form.

Table 4. Descriptive Statistics Table per Dimension of Creative Thinking Skills

Dimensions	N	Mean	Std. Dev	% Mean	Category
Fluency	30	12,1	1,81	75.6%	High
Flexibility	30	11,7	1,34	73.1%	High
Originality	30	11,97	1,35	74.8%	High
Elaboration	30	11,77	1,57	73.5%	High
Total	30	47,53	2,83	74.3%	High

The results of creative thinking scores on the fluency dimension with an average value of 12.1 with a standard deviation of 1.81 indicate that students are quite capable of generating relevant ideas during learning. The Flexibility dimension is at an average of 11.7 with a standard deviation of 1.34 indicating that students are able to see solutions to problems regarding bank and non-bank financial institutions. The originality dimension has an average value of 11.97 with a standard deviation of 1.35 indicating that students generate

new and unique ideas during project work. Elaboration which has an average of 11.77 with a standard deviation of 1.57 indicates that students are able to develop ideas or project results in detail and systematically. The results of the scores for each indicator can also be seen in the following diagram.

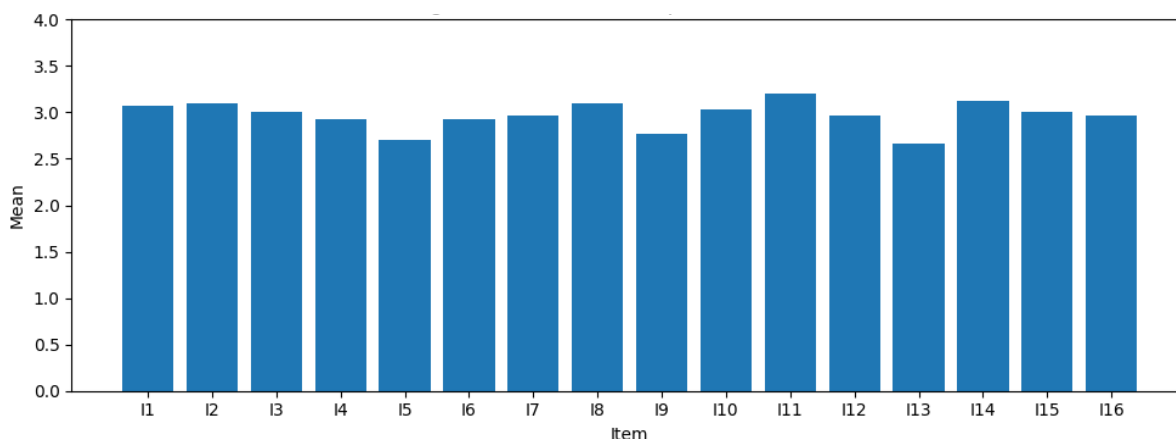


Figure 3. Average per instrument item

Descriptively, the originality and fluency aspects had the highest average scores compared to the flexibility and elaboration dimensions. This indicates that students' creative thinking has developed, although there is variation in achievement across indicators. Thus, students' creative thinking abilities tend to vary across each dimension.

Project Product Assessment Results

The average score for each aspect is obtained by dividing the total score by the number of groups assessed. The average score is categorized based on a 1-4 scale assessment criteria. The e-portfolio-based learning focuses on analyzing financial institutions and banking products, and the expected competency is to present product results in the form of infographics and presentations. The product assessment results are as follows.

Table 5. Summary of Project Product Values

No	Group Name	Score Total (40)	Value (100)	Category
1	Group 1	34	85	Very Good
2	Group 2	33	82,5	Good
3	Group 3	32	80	Good
4	Group 4	31	77,5	Good
5	Group 5	35	87,5	Very Good
6	Group 6	30	75	Good

From the results of the project product assessment, it was found that out of 6 groups of students consisting of 5 students per group, 4 groups were in the good project results category, and 2 groups were in the very good category. If concluded overall, the group obtained an average score of 32.5 out of a total score of 40 or equivalent to a value of 81.25 out of 100. This shows that most of the product assessment rubrics were successfully achieved by students.

Discussion

The results of the research show that students' creative thinking skills are in the medium to high category with an average creative thinking skills score of 47.53 with a standard deviation of 2.83 which is in the high category. This is in line with Rahmawati et al., (2024) who found that creative thinking skills were developed with e-portfolio based learning. Students' involvement in solving problems, looking for ideas and solutions gives them space to explore their creative thinking. Creative thinking skills can be measured by E. Paul Torrance's theory which includes fluency, flexibility, originality and elaboration (Kurnia, 2025).

Fluency

The results of the study showed that the fluency indicator obtained the highest score with an average of 12.10 (75.6%). This indicates that students are able to generate many ideas in understanding banking concepts. According to E. Paul Torrance in Guerra, fluency is the ability to generate various ideas quickly and relevantly. The high fluency in this study indicates that e-portfolio-based learning provides space for students to explore ideas, express opinions freely and develop thinking without pressure (Guerra, Aida; Chen, 2020). This finding is also supported by J. P. Guilford in Xu who emphasized that divergent thinking is the basis of creativity, especially in generating many alternative solutions (Xu et al., 2025).

Flexibility

The flexibility indicator was in the high category with an average of 11.70 (73.1%), indicating that students were able to view a problem from multiple perspectives. Flexibility relates to the ability to shift from one way of thinking to another (López Martínez et al., 2024). In the context of e-portfolio learning, students were able to compare various banking services, relate economic concepts to real-world phenomena, and discuss and adapt ideas in groups. This suggests that project-based learning encourages a more open and adaptive mindset.

Originality

The originality indicator obtained a value with an average score of 11.97 (74.8%). This shows that students are able to put forward unique ideas and present examples and illustrations that support their arguments. According to E. Paul Torrance in Wahyudi, originality is the ability to produce ideas that are unusual or rarely thought of by other people (Wahyudi et al., 2022). This finding is also in line with Calma's opinion which states that high creativity requires an environment that supports exploration, freedom in thinking and intrinsic motivation (Karunarathne & Calma, 2024).

Elaboration

The elaboration indicator had an average score of 11.77 (73.5%), indicating that students were able to develop ideas in detail and systematically. Elaboration is the ability to enrich ideas with details to make them clearer and more structured (Santana et al., 2023). In this study, students were able to systematically compile reports or infographics, provide

examples and supporting data, and explain economic concepts in detail. This demonstrates that e-portfolio-based learning is effective in practicing elaboration skills through tangible products.

The Role of E-Portfolio in Learning

The results of this study can also be explained through the constructivist learning approach proposed by Lev Vygotsky, which states that learning occurs through social interaction and direct experience (Nurhasnah et al., 2024). In this context, the e-portfolio functions as a medium that facilitates the process of knowledge construction through documentation of learning experiences, self-reflection, and interaction with teachers and peers. This approach aligns with the Project-Based Learning (PjBL) model, which, according to John W. Thomas, can improve higher-order thinking skills, including creativity (Yuanti et al., 2025). This study demonstrates the integration of project learning with increased creativity, where students are able to compile and present analytical results regarding financial institutions in the form of systematic and creative infographics or presentations.

Conclusion

This study aims to analyze the level of students' creative thinking skills in e-portfolio-based economics learning. Overall, students' creative thinking skills are in the high category, indicating that creative thinking skills can be developed through learning that provides space for expressing and exploring students' ideas. Judging from the measured Torrance dimensions, such as fluency, flexibility, originality, and elaboration, students' creative thinking skills are in the high category. The highest achievement in the dimensions of fluency and originality indicates students are able to generate new and unique ideas that differ from examples. Meanwhile, elaboration and flexibility have lower scores because students have not yet optimally processed ideas in depth and still require structured learning stimulation.

This e-portfolio is not merely a documentation tool; it also encourages students to produce more creative reports and communicate the results of their creative thinking in an innovative and contextual manner. Thus, these creative thinking skills have the potential to develop in e-portfolio-based economics learning. For future research, the development of learning strategies should be more focused on strengthening flexibility and elaboration. This is a recommendation for future research so that student creativity can develop more evenly and optimally across all dimensions of creative thinking. This study is limited by the number and scope of samples from a single class, so the results need to be interpreted according to the research context. Further research with a larger number of participants and involving several schools is needed to expand the external validity of the findings.

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