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DEEP LEARNING INTEGRATION TO IMPROVE DIVERGENT THINKING SKILLS AT SMA MUHAMMADIYAH 1 METRO

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ABSTRACT
The divergent thinking skills of students at Muhammadiyah 1 High School in Metro are not yet optimal, as economics instruction still tends to be teacher-centered. This is evidenced by the fact that 79.17% of students in class X.1 have not yet met the minimum proficiency criteria. **This study aims to** examine the effect of integrating deep learning on students' divergent thinking skills. **The research method** used a quantitative approach with a one-group pretest-posttest design involving 24 students in Class X.1. **The instrument** used was a HOTS-based true-false essay test that had passed validity, reliability, difficulty index, and descrimination index. The data were analyzed using a paired-sample t-test and N-Gain. **The results** showed that the average score increased from 60.46 to 90.04. The paired-sample t-test yielded a significance level (2-tailed) of 0.000 < 0.05 and a calculated t-value of 11.980 > the critical t-value of 2.068. The N-Gain value of 0.7457 falls into the high category. **The findings of** this study indicate that the integration of mindful learning, meaningful learning, and joyful learning effectively enhances divergent thinking skills on fluency, flexibility, and elaboration aspect. **This study contributes to** strengthening the study of deep learning in economics education and provides an innovative, HOTS-based learning alternative to develop students' divergent thinking skills.
Keywords: deep learning; divergent thinking skills; economics learning; hots

ABSTRAK
Kemampuan berpikir divergen siswa di SMA Muhammadiyah 1 Metro belum optimal, karena pembelajaran ekonomi masih cenderung berpusat pada guru. Hal ini ditunjukkan oleh 79,17% siswa kelas X.1 yang belum mencapai kriteria ketuntasan minimal. ***Penelitian ini bertujuan*** *menguji pengaruh integrasi pembelajaran mendalam (deep learning) terhadap kemampuan berpikir divergen siswa.* ***Metode penelitian ini*** *menggunakan metode kuantitatif dengan desain one group pretest-posttest pada 24 siswa kelas X.1.* ***Instrumen yang digunakan*** *berupa tes uraian benar salah berbasis HOTS yang telah memenuhi uji validitas, reliabilitas, tingkat kesukaran, dan daya pembeda. Data dianalisis menggunakan paired sample t-test dan N-Gain.* ***Hasil menunjukkan*** *rata-rata nilai meningkat dari 60,46 menjadi 90,04. Uji paired sample t-test memperoleh Sig. (2-tailed) 0,000 < 0,05 dan t-hitung 11,980 > t-tabel 2,068. Nilai N-Gain sebesar 0,7457 termasuk kategori tinggi.* ***Temuan penelitian ini*** *menunjukkan bahwa integrasi mindful learning, meaningful learning, dan joyful learning efektif meningkatkan kemampuan berpikir divergen pada aspek fluency, flexibility, dan elaboration.* ***Penelitian ini berkontribusi*** *pada penguatan kajian pembelajaran mendalam dalam pendidikan ekonomi serta menyediakan alternatif inovasi pembelajaran berbasis HOTS untuk mengembangkan kemampuan berpikir divergen siswa.*
Kata kunci*:* deep learning; *hots; kemampuan berpikir divergen; pembelajaran ekonomi*

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Introduction

In economic learning, students are required to be able to analyze phenomena, evaluate alternative solutions, and produce ideas that are relevant to real problems (Israni, 2024). Therefore, it is important to develop divergent thinking skills because they encourage students to generate a variety of ideas, perspectives, and creative solutions, and support 21st-century skills such as creativity, problem-solving, and decision-making. (Halimah et al., 2024; Hasanah & Abdussakir, 2024; Mashudi, 2021; Ramadhani et al., 2025). Economics instruction focused on HOTS (Higher Order Thinking Skills) can also support the development of higher-order thinking skills and foster a more active learning process. (Sholiha & Zelpita, 2024).

One approach that has the potential to develop divergent thinking skills is deep learning (Deep Learning), which emphasizes the process of conscious learning (mindful learning), means (Meaningful learning), and fun (joyful learning)(Andayanie et al., 2025; Wahyuni & Al-Bahij, 2026). This approach encourages learners to understand concepts in depth, connect knowledge with real experience, and develop high-level thinking skills (Azzahra & Jaya, 2025; Fatihah et al., 2025; A. W. Sari & Arta, 2025). Various studies show that Meaningful learning and joyful learning Contribute to the improvement of students' divergent thinking skills, creativity, motivation, and learning engagement (Carlina et al., 2025; A. W. Sari & Arta, 2025; N. Sari et al., 2025). In addition, the implementation of mindful learning, Meaningful learning, and joyful learning It has also been proven to improve conceptual understanding, creativity, and high-level thinking skills (Rosiana et al., 2024; Saputra, 2024; A. W. Sari & Arta, 2025). Other research shows that the Deep Learning able to increase students' metacognitive awareness, learning motivation, and critical and creative thinking skills (Aeni et al., 2025; Kasmita et al., 2021; Nurhasanah et al., 2022; Rahmawati et al., 2025; Widagdo, 2024).

Based on previous research studies, most studies still examine mindful learning, meaningful learning, and joyful learning separately. Research on divergent thinking skills is also more conducted in general subjects or through certain learning models. Meanwhile, research that integrates the three pillars of deep learning simultaneously to improve divergent thinking skills in high school economics learning is still very limited. Therefore, this research has a novelty in the application of the integration of the three pillars of deep learning (mindful learning, meaningful learning, and joyful learning) in economic learning to improve students' divergent thinking skills.

Issues related to divergent thinking skills were identified at Muhammadiyah 1 Metro High School. Initial observations indicate that economics instruction remains teacher-centered, resulting in students primarily receiving information rather than independently exploring ideas and solutions. Learning outcome data show that 79.17% of students in Class X.1 have not yet met the Minimum Proficiency Criteria (KKM). Furthermore, students are still rarely involved in activities that require analysis from various perspectives, the development of alternative ideas, and the creative resolution of economic problems. According to (Narvaza & Manla, 2024),

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these conditions have the potential to hinder the development of divergent thinking skills, which include the aspects of fluency, flexibility, originality, and elaboration.

As an effort to overcome these problems, this study applies the integration of deep learning that combines the principles of mindful learning, meaningful learning, and joyful learning. Through the integration of these three principles, students are expected to focus more on learning, be able to connect economic concepts with real experiences, and obtain a fun learning experience and encourage creativity.

Based on this description, the hypothesis of this study is that there is an effect of deep learning integration on students' divergent thinking skills in economics subjects. Therefore, this study aims to test and analyze the influence of deep learning integration on the divergent thinking ability of students in class X.1 of SMA Muhammadiyah 1 Metro. The results of the research are expected to make an empirical contribution to the development of 21st century skills-oriented economic learning strategies.

Research Methods

Research Design

This study uses a quantitative approach with the type of Pre-Experimental and One Group Pretest-Posttest design. This design is used to determine changes in students' divergent thinking skills after the application of deep learning. The study involved one group without a control group, with a design that can be seen in Table 1.

Table 1. One group pretest-posttest design

Groups	Pretest	Treatment	Posttest
E	O1	X	O2

Which means:

O1 = pretest before the treatment of deep learning integration
O2 = posttest after the treatment of the deep learning integration
X = treat with a deep learning model

Based on Table 1, this study employed a one-group pretest-posttest design involving a single group without a control group. Students were given a pretest (O1) to measure their initial divergent thinking skills, then received the treatment (X) in the form of deep learning, and subsequently took a posttest (O2) to measure their skills after the treatment. The difference between the pretest and posttest results was used to determine the improvement in divergent thinking skills following the implementation of deep learning.

Population and Sample

The study population consisted of 49 students from classes X.1 and X.2. Samples were determined using Purposive Sampling based on certain

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considerations according to the research objectives (Sugiyono, 2022). The research sample was class X.1 as many as 24 students. Class X.1 was selected based on the results of the odd semester summative test which showed a lower level of learning completeness compared to other classes.

Research Stages

This research is carried out through three stages, namely preparation, implementation, and final. In the preparation stage, the researcher conducted initial observations and interviews with teachers at SMA Muhammadiyah 1 Metro to identify students' learning conditions and divergent thinking abilities, develop a Deep Learning-based teaching module that integrates the principles of Mindful, Meaningful, and Joyful Learning, and develop pretest and posttest instruments based on divergent thinking indicators. At the implementation stage, students are given a pretest to measure their initial ability, then take part in economic learning with the integration of Deep Learning in Financial Services Institution materials, and end with a posttest to measure their ability after treatment. During the learning process, the researcher also observed student involvement and activities. Furthermore, in the final stage, the data of pretest and posttest results were analyzed using the N-Gain test to determine the effectiveness of learning and measure the improvement of students' divergent thinking skills after the application of Deep Learning.

Variable Operational Definition

The independent variable in this study is the deep learning integration. Deep learning is a learning model that emphasizes a deep understanding of the material through a meaningful, reflective, and contextual learning process. While the dependent variable is divergent thinking ability. Divergent thinking is a student's ability to generate various ideas, alternative answers, and solutions to a problem through the aspects of fluency, flexibility, and elaboration.

Research Instruments

The research instrument is in the form of a divergent thinking ability test consisting of 25 questions that are true and wrong accompanied by reasons in the material of Financial Services Institutions in Indonesia. The questions are prepared based on the indicators of fluency, flexibility, originality, and elaboration as well as the cognitive level of C4–C6 of the Bloom Taxonomy to measure students' ability to produce various ideas and solutions to economic problems. Data is collected through pretest before learning and posttest after the implementation of deep learning integration.

The test instrument is tested for quality through validity, reliability, difficulty, and differentiation to ensure its feasibility in measuring students' divergent thinking ability. The validity test used the Pearson Product Moment correlation with SPSS 26, with the r-calculation criteria ≥ r-table or Sig. < 0.05. The reliability test uses Cronbach's Alpha to determine the consistency of the instrument, while the

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difficulty level is analyzed through the difficulty index (P) to determine the category of the problem. The item descrimination test is carried out to determine the ability of each question item in distinguishing high and low ability students.

Data Collection Techniques

Data collection methods included observation, interviews, and tests. Observations were conducted to gain an understanding of the learning environment and students' divergent thinking abilities, while interviews with teachers and students were used to identify issues in economics education. The tests, consisting of a pretest and a posttest, comprised 25 items based on the indicators of fluency, flexibility, originality, and elaboration, which were administered to 24 students in Class X.1 to measure the improvement in divergent thinking skills following the implementation of deep learning.

Data Analysis Techniques

Data is analyzed using descriptive and inferential statistics. Before the hypothesis test, *a* Shapiro-Wilk normality test and the homogeneity *of the* Levene's Test were performed, with the data stating that it met the assumption if Sig. > 0.05. Furthermore, differences in divergent thinking skills before and after treatment were analyzed using *a* paired sample t-test. The effectiveness of increasing divergent thinking skills after the application of deep learning was also calculated using the N-Gain test.

Results and Discussion

Validity Test

The validity test is carried out to determine the feasibility of each question item in measuring the ability to be studied. The test instrument was tested on 24 students outside the research sample with a total of 25 questions. The question is declared valid if the value of r-is calculated ≥ r-table. The results of the validity test of the test instrument are presented in Table 2.

Table 2. results of instrument test validity

No Question	Pearson Corelation (R-Count)	Sig Value	R-Table	Conclusion
1.	0.a	.	0.404	Invalid
2.	0.498	0.013	0.404	Valid
3.	0.529	0.008	0.404	Valid
4.	0.554	0.005	0.404	Valid
5.	0.069	0.750	0.404	Invalid
6.	0.517	0.010	0.404	Valid
7.	0.607	0.002	0.404	Valid
8.	0.414	0.045	0.404	Valid
9.	-0.024	0.911	0.404	Invalid

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No Question	Pearson Corelation (R-Count)	Sig Value	R-Table	Conclusion
10.	0.053	0.805	0.404	Invalid
11.	0.467	0.021	0.404	Valid
12.	0.549	0.005	0.404	Valid
13.	0.477	0.018	0.404	Valid
14.	0.484	0.017	0.404	Valid
15.	-0.269	0.204	0.404	Invalid
16.	0.530	0.008	0.404	Valid
17.	0.239	0.261	0.404	Invalid
18.	0.414	0.045	0.404	Valid
19.	0.568	0.004	0.404	Valid
20.	0.564	0.004	0.404	Valid
21.	0.564	0.004	0.404	Valid
22.	0.490	0.015	0.404	Valid
23.	0.410	0.047	0.404	Valid
24.	0.517	0.010	0.404	Valid
25.	0.504	0.012	0.404	Valid

Based on table 2 of the validity test results, from the 25 questions that were tested, 19 were obtained valid questions and 6 invalid questions (numbers 1, 5, 9, 10, 15, and 17). Invalid question items have a smaller r-count value than r-table (0.404), so they are not able to accurately measure the constructs that are set and excluded from the research instrument. The elimination of the question item is carried out to maintain the quality of the instrument so that the data obtained is more valid and can be scientifically accounted for.

Six items were drop to reduce the representation of some indicators, especially originality in the C5 indicator because all items that measure these aspects are invalid. Some C4 indicators related to the analysis of the role of financial institutions and the capital market are also no longer represented. However, the aspects of fluency, flexibility, and elaboration are still represented by valid items. With 19 valid grains and Cronbach's Alpha reliability of 0.790, the instrument is still worth using. An increase in score after learning can be interpreted as the development of the ability to generate various ideas, see problems from various perspectives, and develop ideas in more detail. However, these results need to be understood by considering the limitations of the instrument in measuring the aspect of originality as a whole.

Reliability Test

The results of the reliability test showed a Cronbach's Alpha value of 0.790 which was included in the high category. These results show that the instrument has a good level of internal consistency, so the resulting data tends to be stable and reliable. Therefore, the research instrument meets the reliability requirements and is suitable for use as a data collection tool.

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Difficulty Index

A difficulty analysis was conducted to determine the level of difficulty of each test item in assessing students' abilities. The results of the test item difficulty analysis are presented in Table 3.

Table 3. Test question difficulty level results

Categories	Number of Questions	Question Number	Percentage
Easy (P > 0.70)	9	1,3,5,9,10,13,15,19,23	36%
Medium (0.30 ≤ P ≤ 0.70)	16	2,4,6,7,8,11,12,14,16, 17,18,10,21,22,24,25	64%
Difficult (P < 0.30)	0		0
Quantity	25		100%

Based on table 3 the results of the difficulty level test show that as many as 9 questions (36%) are in the easy category and 16 questions (64%) are in the medium category. There are no question items that fall into the difficult category. The dominance of medium category questions shows that the instrument has a good enough level of difficulty to distinguish students' abilities.

Some questions that are categorized as easy, namely numbers 1, 5, 9, 10, and 15, do not meet the validity criteria so they are excluded from the research instrument. This condition shows that too high a level of ease can reduce the ability of questions to measure divergent thinking abilities optimally. On the other hand, most of the question items that were retained were in the medium category and proved to be valid, so that they were better able to measure students' ability to analyze information, explore alternative solutions, and develop ideas. Therefore, the instrument used is considered quite representative to measure students' divergent thinking ability, even though the *aspect of originality* has not been optimally represented due to the failure of several question items.

Item Descrimination Index

Item descrimination tests are conducted to determine the ability of test items to distinguish between high- and low-ability students. The results of the question item descrimination index can be seen in Table 4.

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Table 4. Item discrimination index results

Categories	Number of Questions	Question Number	Percentage
Ugly (D < 0.20)	6	1,5,9,10,15,17	24%
Fair (0.21 ≤ D ≤ 0.40)	5	8,11,14,18,23	20%
Good (0.41 ≤ D ≤ 0.70)	14	2,3,4,6,7,12,13,16,19, 20,21,22,24,25	56%
Very Good (D > 0.70)	0		
Quantity	25		100%

Based on Table 4. of the results of the item discrimination index, it is known that of the 25 questions analyzed, as many as 14 items (56%) were categorized as good, 5 items (20%) were categorized as adequate, and 6 items (24%) were categorized as poor. Questions that had good distinguishing power and were sufficiently maintained in the instrument, while six question items in the bad category (numbers 1, 5, 9, 10, 15, and 17) were excluded because they were unable to distinguish between students who had high and low abilities adequately. Some items even show negative correlation values, which indicate that the students' responses to the questions are not in line with the construct of ability to be measured.

The elimination of items in the bad category is carried out to improve the quality of the instruments to be better able to capture the variation in students' divergent thinking abilities. With the dominance of items in the good category, the instruments used are considered to be able to measure students' ability to generate various ideas, see problems from various perspectives, and develop solutions in more detail. Therefore, the selection instrument is more feasible to be used to measure changes in divergent thinking skills after learning.

Normality Test

The normality test in this study used the Shapiro-Wilk method because the number of samples in each group was less than 100 respondents, namely n=24 students. The data is declared to be normally distributed if the significance value (Sig.) is greater than 0.05. The results of the normality test can be seen in Table 5.

Table 5. Normality test results

Data	N	S-W Statistics	Sig.	Remarks
Pretest	24	0,984	0,241	Normal
Posttest	24	0,925	0,075	Normal

Based on Table 5, the results of the normality test the results of the normality test using *the Shapiro-Wilk* method show that *the pretest* data has a significance

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value of 0.241 and *the posttest* data of 0.075. Both values are greater than 0.05, so it can be concluded that *the pretest* and *posttest data* are normally distributed. With the fulfillment of the assumption of normality, the research data meets the requirements to be analyzed using parametric statistical tests, so that the results of hypothesis testing can be interpreted more accurately and reliably.

Homogeneity Test

A homogeneity test was conducted to determine whether the variances of the data were equal, as this is one of the requirements for parametric statistical tests. The results of the homogeneity test using Levene's Test can be seen in Table 6.

Table 6. Homogeneity test results

Variable	Living Statistic	df1	df2	Sig.	Remarks
Value (Based on Mean)	3,092	1	46	0,085	Homogeneous

Based on Table 6, the results of the homogeneity test using Levene's Test show a significance value on the Based on Mean of 0.085 with a statistical value of Levene of 3.092. The significance value obtained on all test approaches is greater than 0.05. Therefore, based on the decision-making criteria in the homogeneity test, it can be concluded that the data have the same or homogeneous variance.

These results show that there was no significant difference in variance between the data groups tested. With the fulfillment of homogeneity assumptions, the research data meets one of the requirements for parametric statistical analysis to be carried out at the hypothesis testing stage. Thus, pretest and posttest data can be further analyzed using appropriate statistical tests to determine the effect of the treatment given in the study.

Hypothesis Test (T Test)

The paired sample t-test was conducted to determine the significant influence between pretest and posttest scores after the implementation of deep learning integration of students before and after the application in the experimental class. The test results can be seen in Table 7.

Table 7. test paired sample t-test

Variable	Mean Difference	Std. Deviation	T-Hit	df	Sig. (2-tailed)
Pretest-Posttest	-29,583	12,097	-11,980	23	0,000

Based on Table 7, a significance value (Sig. 2-tailed) of 0.000 was obtained which was smaller than 0.05. In addition, the t-calculated value is 11.980 > t-table 2.068, (df) = 23, so H_0 is rejected and H_a is accepted. Thus, the integration of *deep learning* has a significant effect on improving students' divergent thinking skills in

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Economics subjects. Substantively, the increase can be seen from the ability of students to generate various ideas, explore various solutions, and look at problems from a more diverse perspective, so that deep learning not only improves learning outcomes but also develops divergent thinking skills in dealing with complex problems.

N-Gain Test

The N-Gain test was conducted to measure the influence of deep learning integration on the improvement of students' divergent thinking skills in economics class X.1 at SMA Muhammadiyah 1 Metro. This test is used to measure the effectiveness of the treatment provided through the calculation of an increase in scores obtained based on the results of the pretest and posttest in the experimental class. The results of the N-Gain test can be seen in Table 8.

Table 8. Test N-*gain*

Variable	N	Red	Categories
N-Gain Score	24	0,7457	Height
N-Gain Percent (%)	24	74,5725	Effective

Based on Table 8, the results of the N-Gain test show an average *N-Gain Score* of 0.7457 which is in the high category (g > 0.70), with an N-Gain percentage of 74.57% which is included in the effective category. These findings show that the integration of deep learning is able to optimally improve students' divergent thinking skills.

The results of the study show that the integration of deep learning has a significant effect on the divergent thinking ability of students in the Economics class X.1 of SMA Muhammadiyah 1 Metro. This is shown by the increase in the average score from 60.46 in the *pretest* to 90.04 in the *posttest*, with the results of the paired sample *t-test* of 0.000 < 0.05 and the N-Gain of 0.7457 in the high category. The findings show that the integration of mindful learning, meaningful learning, and joyful learning not only increases score achievement, but also provides learning conditions that are more supportive of students in exploring ideas, considering various alternatives, and developing solutions to economic problems.

This increase can be explained through changes in the characteristics of the learning process experienced by students. Before treatment, learning tends to be teacher-centered so that students receive more information and have limited opportunities to develop ideas independently. This condition does not provide a stimulus to produce various alternative answers or to look at a problem from a different perspective. Once deep learning integration is implemented, students not only receive material, but are directed to focus attention, connect concepts with real experiences, as well as engage in more enjoyable learning activities. The change creates a wider space for students to think actively and creatively. Thus, the

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improvement in divergent thinking skills can be understood as a result of changes in the learning process, not simply changes in test scores.

The first factor that supports these results is the application of mindful learning. Mindful learning helps students focus on the material and activities at hand. This condition is important in learning economics because students need to understand information before analyzing problems and determining various possible solutions. Better focus allows students to follow the thought process more in a more directed way and reflect on the ideas that arise. The second factor is meaningful learning, which connects economic concepts with experiences and phenomena that are close to students' lives. The interconnectedness between the material and the real context makes students not only remember concepts, but also use them to understand the problem and come up with alternative solutions. The third factor is joyful learning, which creates a more comfortable learning atmosphere and encourages students' courage to ask questions, express opinions, and express different ideas. The three principles complement each other: mindful *learning* builds readiness and focus, meaningful learning provides context for ideas, while joyful learning encourages courage to explore and develop ideas. The combination of these three principles creates a learning environment that supports the development of divergent thinking skills.

Divergent thinking ability in this study is reflected through three main aspects: fluency, flexibility, and elaboration. Fluency refers to students' ability to generate various ideas or alternative answers to an economic problem. Flexibility refers to students' ability to view problems from various perspectives and propose a variety of alternative solutions. Meanwhile, elaboration refers to students' ability to develop ideas or solutions in greater detail. In economics education, these three aspects are evident when students are able to generate several alternative solutions to economic problems, connect problems to different perspectives or conditions, and explain and develop solutions in greater depth. This is consistent with research findings showing that after the implementation of deep learning, students are more active in analyzing economic problems, connecting concepts to real life, and proposing various possible solutions.

The findings of this study reinforce *state of the art* which has been described in the introduction. The results of the study are in line with (Wijaya, S. E., Nelson & Ristianti, 2025) who show that the integration of Meaningful learning and joyful learning *can* improve divergent thinking skills. The similarities show that a relevant and enjoyable learning experience can provide room for students to generate more ideas. The results of the study are also in line with (Dewi et al., 2025) who found that the application of the principle of Thoughtful, Meaningful, and joyful learning can improve students' learning engagement, reflective awareness, and conceptual understanding. In addition, these findings support the research of (Carlina et al., 2025) who show that learning that provides opportunities for students to explore ideas and solve problems actively contributes to divergent thinking abilities. These findings are also supported by research (Raup et al., 2022) which shows that divergent thinking skills have a positive effect on student learning outcomes. No

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contradictions were found with previous research used in *state of the art*, so that the results of this study further strengthen the argument that learning centered on student experiences and activities can support the development of higher-level thinking skills.

However, this research has advantages and limitations. The advantage lies in the simultaneous integration of the three pillars of deep learning in Economics learning and the use of instruments that have gone through validity, reliability, difficulty, and differentiating tests. This approach provides an empirical overview of the application of *deep learning* in developing divergent thinking skills in the context of economic learning. However, the design of one group pretest-posttest without a control group caused an increase in scores that could not be fully ascertained from the treatment because there was no comparison with other studies. In addition, the sample only consisted of one class with 24 students, so the generalization of the results of the study was still limited. The limitations of the instrument also need to be considered because the originality aspect has not been optimally represented after several questions were declared invalid.

Theoretically and practically, the results of the study imply that the integration of mindful, meaningful, *and* joyful learning can be an alternative to the 21st century skills-oriented Economics learning strategy. Such integration not only has the potential to improve learning outcomes, but also creates a learning process that encourages students to generate various ideas, look at problems from various perspectives, and develop solutions in more detail. For teachers, these results can be the basis for designing more active, contextual, reflective and enjoyable learning. For the development of science, this study strengthens the empirical evidence regarding the integrated application of deep learning to develop divergent thinking skills, especially in high school level Economics learning. Thus, the main contribution of this research lies in providing evidence that the integration of the three pillars of deep learning can be used as a learning approach that supports the development of students' divergent thinking skills.

Conclusion and Suggestion

The integration of deep learning through the principles of mindful, meaningful, and joyful learning has been shown to improve the divergent thinking skills of students in Class X.1 at SMA Muhammadiyah 1 Metro. Thus, the research hypothesis stating that the integration of deep learning influences students' divergent thinking skills is accepted. The research findings indicate that the application of these three principles encourages students to be more active in exploring economic issues, proposing various alternative ideas, viewing problems from diverse perspectives, and developing more detailed solutions. The improvement in divergent thinking skills is particularly evident in the aspects of fluency, flexibility, and elaboration.

The use of these three principles of deep learning is recommended because mindful, meaningful, and joyful learning complement one another in creating a learning experience that encourages students to be active, focused, connect the material to real-life experiences, and have the courage to develop various ideas.

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Applying all three can help teachers create an economics learning process that is not only oriented toward conceptual understanding but also provides space for students to explore problems, consider various perspectives, and develop alternative solutions. Therefore, teachers are advised to consistently apply these three principles of deep learning through reflection, contextual economics case studies, discussions, and problem-solving. Schools need to provide support through training, mentoring, and learning resources. Future research is recommended to include a control group and a larger sample size, as well as to examine other higher-order thinking skills such as critical thinking, creativity, and problem-solving.

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