

The Effect of Discovery Learning Model by Integrating Virtual Writing Tutor on Students' Writing Achievement

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Received:

23 April
2025

Revised:

19 November
2025

Accepted:

30 December
2025

ABSTRACT

Writing remains one of the most challenging skills for students, especially in generating ideas and using correct grammar coherently. Therefore, interactive learning strategies that provide immediate feedback are needed to support their writing achievement. The objective of this research is to find out if Discovery Learning model by integrating Virtual Writing Tutor significantly affects students' writing achievement by employing a quantitative experimental approach. This study employed a quantitative experimental design, and data were collected through written tests in the form of pre-tests and post-tests. The population consisted of tenth-grade students at SMA Negeri 11 Medan. There were 10 parallel classes at the tenth-grade, each consisted of 35 students. Two classes were selected as samples, resulting in a total sample of 70 students. Cluster random sampling technique was used in selecting the samples. The finding revealed that the use of Discovery Learning model integrated with Virtual Writing Tutor positively affected students' writing achievement. After the data analysis was conducted using t-test with SPSS version 20 software, the significance value (2-tailed) it was found that t_{observed} was higher than t_{table} ($16.143 > 1.995$) with the degree of freedom $df = 68$ at the level of significance $\alpha = 0.05$. Therefore, it can be concluded that H_0 is rejected and H_a is accepted, indicating that the Discovery Learning model integrated with Virtual Writing Tutor significantly affected students' writing achievement. This approach can be considered an alternative strategy for delivering more interactive, engaging, and relevant writing instruction to meet students' learning needs in the digital era.

Keywords: *Discovery Learning Model; Students' Writing Achievement; Virtual Writing Tutor.*

INTRODUCTION

Writing involves a series of activities that requires continuous learning. It means that students must gradually learn and experience the writing process through their education at school Pratama & Hastuti, (2024). In line with that theory Helaluddin (2020) said that with the increasing frequency of writing activities, a person will gain an understanding of the potential and skills that need to be developed. Consistency in writing also encourages the emergence of new and valuable insights. Therefore, students

need an instructional model that can support the continuous development of writing skills in school to improve their writing achievement. One model that can be applied is the Discovery Learning Model within the Kurikulum Merdeka (*Emancipated Curriculum*), which encourages students to actively build knowledge and skills, solve problems, and draw conclusions from their own ideas.

Sumarmi (2023) explains that the Kurikulum Merdeka (*Emancipated Curriculum*), introduced in 2020, aims to encourage students to become more active, creative, and independent by shifting the learning approach from teacher-centered to student-centered. This curriculum provides flexibility in selecting learning materials, methods, and instructional models based on students' needs and interests. Mahtum et al. (2022) emphasize that writing is an essential component of the Kurikulum Merdeka (*Emancipated Curriculum*) because it contributes to the development of students' creativity. According to the Ministry of Education and Culture Regulation number 12 of 2024, writing instruction at Phase E (tenth grade) focuses on students' ability to produce various oral and written texts through the writing process. Therefore, writing topics are designed to be relevant to students' daily lives, with emphasis on the use of appropriate and commonly used vocabulary and verbs.

Based on initial observations conducted by the researcher in February 2024 at SMA Negeri 11 Medan, along with an interview with one of the English teachers, it was found that the Discovery Learning model had already been implemented in the learning process. However, its application in writing instruction had not been carried out optimally because it was not supported by the use of innovative digital media, particularly media capable of providing immediate feedback on students' written work. The writing instruction process still relied heavily on conventional media, such as printed textbooks and manual writing assignments, which limited students' opportunities to receive feedback, make revisions, and perform self-correction. As a result, students tended to be less aware of errors in their writing and experienced difficulties in improving the quality of their work, including capitalization errors (e.g., names of people or places), punctuation errors, grammatical inaccuracies, as well as insufficient cohesion and coherence in organizing ideas. To address this issue, integrating the Discovery Learning model with the Virtual Writing Tutor as a digital feedback tool can be considered an alternative instructional approach. The Virtual Writing Tutor provides automatic and immediate feedback, enabling students to independently identify and correct errors in their writing. Through this integration, students are expected to become more actively engaged in the writing process while receiving structured guidance to improve the accuracy and overall quality of their writing achievement.

According to Fahmi et al. (2019) the Discovery Learning Model aims to shift students' learning behavior from passive to more active and creative by transitioning instruction from teacher-centered to student-centered. In contrast to the expository model, where students only receive information from the teacher, this model encourages

them to seek information independently. Furthermore, stated by Khasinah (2021), Discovery learning encourages students to actively ask questions, formulate hypotheses, and draw conclusions based on direct experience. In the context of writing, this approach is relevant because its stages help students organize and express their ideas gradually through writing.

According to Ulfah et al. (2023) one of the commonly used media in the implementation of the Kurikulum Merdeka (*Emancipated Curriculum*) is technology-based learning media. The application of the Discovery Learning model to improve students' writing achievement can be supported by recent technological tools, such as the use of the Virtual Writing Tutor. Viantika & Dangin (2024) emphasize that the Virtual Writing Tutor facilitates independent revision by providing instant corrective feedback that helps students identify errors in their writing. Whereas Nasution et al. (2024) explain that the use of the Virtual Writing Tutor may be limited by factors such as the need for stable internet access and the potential overreliance on automated feedback, which may reduce students' awareness of independent writing skills.

According to Nasution et al. (2024) state that the Virtual Writing Tutor utilizes artificial intelligence to assess various components of writing, such as syntax, punctuation, vocabulary, coherence, and overall organization. Furthermore, Harwood & Koyama (2020) describe the Virtual Writing Tutor as a digital writing center that supports independent learning. Moreover, research by Al Badi et al. (2020), shows that the use of the Virtual Writing Tutor enhances writing accuracy as well as students' motivation toward the revision process. Overall, digital feedback plays a crucial role in improving writing skills. By using the Virtual Writing Tutor, students and teachers can identify writing errors and obtain suggestions for improvement. This tool assists in detecting various types of writing mistakes, such as punctuation, capitalization, grammar, and others. The use of the Virtual Writing Tutor shows a strong correlation with improvements in students' writing achievement through constructive feedback. Norpin et al. (2024) stated that technological advancements bring significant transformations to the field of education, influencing teaching approaches and promoting a more efficient and effective learning process.

Several previous studies have supported the effectiveness of the Discovery Learning method in improving writing skills. Paraningtias & Susanto (2021) highlighted that the Discovery Learning method significantly enhanced students' ability to write narrative texts compared to conventional methods. Sobari & Husnussalam (2019) also examined the use of Discovery Learning to improve students' descriptive writing skills, showing notable improvements particularly in vocabulary and sentence structure. Furthermore, Satriani et al. (2022) provided evidence that Discovery Learning effectively improved EFL students' writing skills in hortatory exposition texts when implemented through the STAD strategy based on Discovery Learning without technological media. Meanwhile, Noviani et al. (2020) found that applying Discovery Learning also contributes positively to students' skills in writing fantasy stories.

The similarity between the four previous studies focuses on the effectiveness of the Discovery Learning Model in improving students' writing skills. However, the key difference between prior research and the present study is the integration of technology into the learning process. Previous studies implemented the Discovery Learning model with limited digital support, whereas more recent research has begun incorporating technology into the Discovery Learning framework. Resmini et al., (2023) examined the integration of Discovery Learning and Powtoon in teaching recount text, highlighting students' responses and challenges in using digital media. This study explores the use of technology, specifically the Virtual Writing Tutor, to support the Discovery Learning model in improving students' writing achievement. Accordingly, the study aims to provide a new perspective on the effectiveness of technological integration within writing instruction. The underlying research question is: "Does the integration of the Discovery Learning Model with the Virtual Writing Tutor significantly affect students' writing achievement?"

Thus, this study seeks to determine whether the integration of the Virtual Writing Tutor significantly influences students' writing achievement, while also offering a deeper understanding of the effectiveness of technology-based Discovery Learning. Writing itself is a fundamental skill that enables students to express ideas in written form and develop their cognitive and linguistic abilities. This aligns with Yuliani et al. (2023) who state that writing is an activity used to convey ideas, information, experiences, or feelings in a written form that can be easily understood by readers. According to Suprpto et al. (2022) one of the most effective approaches to overcoming problems in writing is to apply the writing process itself. Sa'adah (2020), explains that the complex nature of the writing process involves planning, drafting, editing, and finalizing, while paying attention to content, organization, vocabulary, grammar, and writing mechanics.

In this context, the Virtual Writing Tutor serves as an effective tool, particularly during the editing stage, as it helps writers revise drafts more accurately, especially in terms of grammar, spelling, and coherence, thereby improving the quality of the final text. As stated by Helaluddin (2020), writing serves various purposes, including informational, academic, aesthetic, creative, and consumptive functions. Based on these purposes, the present study focuses on writing recount text, which aim to convey information, complete tasks, and express creativity. Thus, the writing of recount text is not only intended for task completion but also functions as a medium to share information and creatively express ideas.

Learning models are crucial in achieving learning outcomes, one of which is the Discovery Learning model. Yukamana (2023), states that the discovery learning model is effective in improving students' English skills and can be integrated with technology to support writing proficiency. Developed by Jerome Bruner in the 1960s, Discovery Learning emphasizes learning through exploration and hands-on experiences, encouraging students to think critically and discover concepts independently. This learning model is considered effective in achieving the expected learning outcomes. The

Ministry of Education and Culture of the Republic of Indonesia, as explained by Kharismawati et al. (2020) outlines six main stages in the Discovery Learning process: (1) stimulation, (2) problem statement, (3) data collection, (4) data processing, (5) verification, and (6) generalization. In addition, Yuliana (2018) notes that Discovery Learning encourages students to actively develop their knowledge and problem-solving skills while fostering a more active and creative learning environment.

The Virtual Writing Tutor is an artificial intelligence-based assessment tool that provides automated feedback on various writing aspects, including sentence structure, punctuation, word choice, and text cohesion. Viantika & Dangin (2024), explain that artificial intelligence, including the Virtual Writing Tutor, accelerates English language learning by providing instant and efficient feedback in writing. Similarly, Al Badi et al. (2020), state that the Virtual Writing Tutor enhance writing performance through personalized feedback and targeted support.

Previous studies have implemented the Virtual Writing Tutor in various contexts. Nasution et al. (2024) stated that the use of the Virtual Writing Tutor enhances writing accuracy as well as student engagement through AI-based corrective feedback. Similarly, Harwood & Koyama (2020) also developed a Virtual Writing Center supported by the Virtual Writing Tutor, which promotes independent learning and student autonomy in the revision process. In addition, Al Badi et al. (2020) found that Omani university students who used the Virtual Writing Tutor showed significant improvements in grammatical accuracy and sentence structure compared to those who received traditional feedback. In contrast to previous studies, this research integrates the Virtual Writing Tutor with the Discovery Learning Model to explore how technology-based feedback combined with discovery-based learning can more effectively enhance students' writing achievement in recount texts within the Kurikulum Merdeka (*Emancipated Curriculum*). While most previous studies focused on the Virtual Writing Tutor as a standalone tool, they did not integrate it into a specific pedagogical model.

Although the Virtual Writing Tutor provides easy access and quick feedback, its role cannot completely replace direct guidance from teachers. However, when used effectively, this tool significantly contributes to improving students' writing performance, strengthening language proficiency, and providing targeted feedback in a technology-supported learning environment. Therefore, the integration of the Discovery Learning Model and Virtual Writing Tutor has great potential to improve students' writing skills through active exploration and automatic corrective support.

This study is limited to the writing achievement of tenth-grade students in composing recount texts based on the established curriculum. Students were required to write a personal experience while adhering to the appropriate text structure. The researcher focused on identifying errors related to organization (coherence and cohesion), content (unity), writing mechanics (capitalization, spelling, punctuation), and grammar, particularly the use of the Simple Past Tense. This study carries both theoretical and practical implications. Theoretically, the findings demonstrate that

integrating the Discovery Learning Model with the Virtual Writing Tutor can enhance writing outcomes through fast and relevant feedback, while also emphasizing the importance of responsive instructional models in the digital era. Practically, the implementation of the Discovery Learning Model increases student engagement in the writing process and provides an effective alternative strategy for teachers. Moreover, this study opens opportunities for further research to deepen the understanding of teaching writing through the Discovery Learning Model integrated with the Virtual Writing Tutor

The hypotheses in this study include:

Alternative hypotheses (H_a): Discovery Learning model by integrating Virtual Writing Tutor significantly affects students' scores in writing.

Null hypotheses (H_0): Discovery Learning model by integrating Virtual Writing Tutor does not significantly affect students' scores in writing.

METHOD

This study employed a quantitative experimental research design, using a pre-test–treatment–post-test procedure. This design was chosen to examine the effect of implementing the Discovery Learning Model integrated with the Virtual Writing Tutor on students' writing achievement. The experimental approach allowed the researcher to compare the learning outcomes of two groups that received different treatments, thereby enabling the cause-and-effect relationship to be verified statistically. This design was considered more suitable than a qualitative approach, which emphasizes the exploration of meaning, because this study relied on numerical data in the form of test scores and required statistical significance testing to determine the effectiveness of the treatment.

The study was conducted at SMA Negeri 11 Medan in July–August 2024. The population consisted of 350 tenth-grade students, and the sample included 70 students selected using cluster random sampling. In this study, the control and experimental classes were selected using the spinning wheel method, due to the large population, and it was determined that class X-1 would be the experimental group and class X-8 would be the control group. Both classes were considered equivalent in terms of academic ability, number of students, and curriculum material, so they were deemed representative for observing the effect of learning models and media on students' writing skills.

Table 1. Research Design

Group	Class	Pre-test	Treatment	Post-test
Experimental (X)	X-1	√	√	√
Control (Y)	X-8	√	-	√

Notes:

X : Experimental group, the sample is taught by using Discovery Learning model by integrating Virtual Writing Tutor.

Y : Control group, the sample is taught by using Discovery Learning model without

integrating Virtual Writing Tutor.

The research procedure included 1) Pre-test: given to both groups to measure basic writing skills in recount texts based on their generic structure; 2) Treatment: the experimental group applied the Discovery Learning Model by integrating the Virtual Writing Tutor to evaluate writing outcomes, while the control group used the same model without integrating this media; 3) Post-test: given to measure changes in writing performance after treatment.

The instrument used to collect data was a writing test, in which students were asked to compose a recount text based on personal experiences. The writing products were assessed using a Writing Assessment Rubric adapted from Brown (2007) in Praditha et al. (2022), covering aspects of content, organization, grammar, vocabulary, and mechanics. In the experimental group, students' drafts were also checked using the Virtual Writing Tutor as a self-assessment tool to automatically detect errors in grammar, vocabulary, and sentence structure. To ensure the quality of the instruments, construct validity was tested using Pearson Product-Moment correlation to ensure the alignment between the instrument and the construct being measured, while reliability was tested using the Kuder-Richardson 21 (KR-21) formula to ensure the consistency of the results. The data were analyzed using SPSS version 20. Statistical analysis was chosen because this study used numerical data in the form of test scores. The stages of analysis included: normality test (Kolmogorov–Smirnov) to ensure the data distribution was normal, homogeneity test (Levene's test) to examine the equality of variances between groups, and Independent Samples t-test to determine the significance of the difference in writing results between the experimental and control classes.

FINDINGS AND DISCUSSION

The research related to the effect of Discovery Learning model by integrating Virtual Writing Tutor on students' writing achievement of X-1 grade students at SMA Negeri 11 Medan showed significant results. The average pre-test score of the experimental class (X-1) was 60.32 (score range: 50 to 68), while the average post-test score increased to 80.21 (score range: 70 to 88). Meanwhile, the control class (X-8) obtained an average pre-test score of 56.51 (score range: 50 to 63), and the average post-test score was 64.29 (score range: 58 to 70). These differences indicate a more substantial improvement in the experimental class compared to the control class. Assessment was conducted through recount text writing tasks in both the pre-test and post-test to measure students' development and writing achievement.

Table 2. Descriptive Statistics of Pre-test and Post-Test in Experimental Class

	N	Minimum	Maximum	Mean	Std. deviation
Pre-test eksperimen	35	50	68	60.32	5.460
Post-test eksperimen	35	70	88	80.21	4.084
Valid N (listwise)	35				

Table 3. Descriptive Statistics of Pre-test and Post-Test in Control Class

	N	Minimum	Maximum	Mean	Std. deviation
Pre-test control	35	50	63	56.61	3.356
Post-test control	35	58	70	64.29	4.171
Valid N (listwise)	35				

After obtaining the students' scores, the researchers conducted further analysis using the t-test. Previously, normality and homogeneity tests were performed to ensure that the basic assumptions of the t-test were met based on the pre-test and post-test data.

The normality test was conducted to ensure that the pre-test and post-test data of both groups were normally distributed. The Kolmogorov–Smirnov test was used, with data considered normal if the significance value exceeded 0.05 (5%).

Table 4. Test of Normality

		Kolmogorov-Smirnov ^a		
	Kelas	Statistic	df	Sig.
Hasil belajar siswa	1	.147	35	.054
	2	.116	35	.200*
	3	.148	35	.051
	4	.139	35	.083

Based on the previously table, the pre-test and post-test significance values in both the experimental and control classes show a number greater than 0.05. This indicates that the data in this study is normally distributed.

Furthermore, the homogeneity test was conducted to determine whether the student achievement data in the experimental and control groups had the same variance (homogeneous). The test was conducted by comparing the Fcount and Ftable values at the significance level $\alpha = 0.05$. If Fcount < Ftable, then the data is declared homogeneous; otherwise, if Fcount \geq Ftable, then the variance is considered inhomogeneous. The results of this test are presented in the following table.

Table 5. Test of Homogeneity of Variance

		Levene Statistic	df1	df2	Sig.
Hasil Belajar Siswa	Based on mean	.488	1	68	.487
	Based on median	.256	1	68	.609
	Based om median and with adjusted df	.256	1	66.540	.609
	Based on trimmed mean	.475	1	68	.493

Based on the explanation of the table above, the homogeneity test shows a significance value of 0.487. Since this value is greater than 0.05, it can be concluded that the data has a homogeneous variance and qualifies for the t-test.

After the normality and homogeneity tests are met, the next step is to test the hypothesis using the independent sample t-test. Based on the test criteria, if t -observed > t table, then H_0 is rejected and H_a is accepted; conversely, if t -observed $\leq t$ table, then H_0 is accepted and H_a is rejected. This test was conducted at a significance level of $\alpha =$

0.05. The following table presents the hypothesis test results analyzed using SPSS version 20.

Table 6. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% confidence interval of the difference	
Hasil Belajar Siswa	Equal variances assumed	.488	.487	16.143	68	.000	15.929	.987	13.960	17.898
	Equal variances not assumed			16.143	67.970	.000	15.929	.987	13.960	17.898

Based on the data presented, the hypothesis of this study states: H_a - Discovery Learning model by integrating Virtual Writing Tutor significantly affects writing achievement, while H_0 - Discovery Learning model by integrating Virtual Writing Tutor does not affect writing achievement. The test results showed the significance value (2-tailed) was $0.000 < 0.05$, t observed was higher than t table ($16.143 > 1.995$) with degree of freedom (df) = 68, and the level of significance $\alpha = 0.05$, thus the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted. This proves that the use of Discovery Learning model integrated with Virtual Writing Tutor has a significant positive impact on students' writing achievement. The mean score of students in the experimental class (X-1), which utilized the integration of Virtual Writing Tutor, exceeded the score of the control class (X-8), without Virtual Writing Tutor integration.

Referring to research findings, media integration in learning has a significant impact on improving student writing achievement. Perdana et al. (2023), state that various media and applications can serve as effective learning resources for teachers and tools for students, including the Virtual Writing Tutor, which supports the development of writing skills. The findings indicate a noticeable improvement when instructional models are integrated with digital tools. This finding is supported by Viantika & Daging (2024), who emphasize that the Virtual Writing Tutor supports independent revision by providing immediate corrective feedback, allowing students to identify and solve errors more effectively. However, consistent with Nasution et al. (2024), this study also found that the use of the Virtual Writing Tutor may be limited by technical constraints, particularly unstable internet access, which can impact the consistency of its implementation.

Observations during the pre-test, treatment, and post-test stages were conducted to examine several key aspects related to students' participation, and the use of the Virtual Writing Tutor platform. The observation results are presented in the following table.

Table 7. Observation Results Across Research Stages

Observation Focus	Pre-Test Stage	Treatment Stage	Post-Test Stage
Student Engagement	Students tended to complete writing tasks passively and showed low motivation.	Students were introduced to the Virtual Writing Tutor and demonstrated increased participation, actively exploring its features.	Students showed higher engagement and confidence in writing, revising, and submitting their work.
Technology Usage	The platform was not yet utilized, and students still wrote manually.	Several technical issues occurred, such as unstable internet connections, initial access difficulties, and limited data packages for some students. However, Virtual Writing Tutor continued to assist by detecting errors and providing instant feedback.	Most students successfully accessed and used the platform with minimal technical difficulties.
Students' Writing Quality	Many errors were found in grammar, punctuation, and organization of ideas.	Students began to identify and correct their mistakes through the automatic feedback provided.	Writing quality improved in terms of accuracy, structure, and vocabulary use.

Based on observations, student engagement, technology use, and writing quality improved significantly after implementing the Discovery Learning Model with Virtual Writing Tutor. Despite technical issues such as unstable internet and limited data access, most students adapted well, and these obstacles did not hinder the learning process.

To overcome this, students are advised to access the platform outside of school hours. Teachers and students can share connections, and schools need to improve their network facilities. The short duration of the study is also a limitation, so long-term research is needed in the future to explore other factors that affect learning outcomes and the effectiveness of learning models and media. Teacher-student interaction has not been studied in depth, so teachers still need to integrate technology with the Discovery Learning Model to increase engagement. Although Virtual Writing Tutors provide quick feedback, the role of teachers remains crucial, so technology training is needed to ensure more effective and innovative learning strategies that improve the quality of student writing.

Besides noting the weaknesses, this study also highlights the advantages of Virtual Writing Tutor the research process. This media proved effective in providing quick and relevant feedback, helping students identify and correct errors in grammar, punctuation, and sentence structure. This is in line with Nasution et al. (2024) who state that although the Virtual Writing Tutor offers advantages such as accessibility, quick feedback, and artificial intelligence-based independent learning support, its effectiveness still depends on internet stability and the ability of students to not rely too much on automatic feedback. This shows that the successful use of this tool requires a balance between technology, teacher guidance, and critical student involvement in revision. The

integration of Virtual Writing Tutor in the Discovery Learning Model also encourages students to think critically, explore, and build understanding independently. Overall, these findings reinforce that the use of technology in writing instruction not only improves student achievement but also offers an innovative approach that meets the learning needs of the digital age.

Thus, it can be concluded that the application of the Discovery Learning Model integrated with the Virtual Writing Tutor significantly improved students' writing achievement, especially in class X-1 of SMA Negeri 11 Medan. The integration of the Virtual Writing Tutor into the Discovery Learning Model has a positive impact on the accuracy and organization of students' writing, especially when they actively revise and develop ideas. However, several limitations were identified, such as unstable internet access, limited availability of devices, and the potential for dependence on automatic feedback, which can reduce critical editing skills. Therefore, further research is needed to explore strategies for overcoming technological constraints, balancing automatic feedback with teacher guidance, and examining the long-term impact of using the Virtual Writing Tutor in writing instruction.

CONCLUSION

In conclusion, the implementation of the Discovery Learning Model integrated with the Virtual Writing Tutor demonstrated a significant improvement in students' writing achievement, particularly in terms of accuracy, organization, grammar, and writing mechanics. Statistical analysis indicated that the research objectives were achieved, with the comparison between the pre-test and post-test confirming the effectiveness of implementing Discovery Learning integrated with the Virtual Writing Tutor. This implementation had a positive impact on the students of class X-1 at SMA Negeri 11 Medan. However, several limitations encountered during the implementation, such as unstable internet connectivity, limited device availability, and students' tendency to rely excessively on automated feedback, which may reduce their independent revision skills. Therefore, further research is recommended to explore strategies for addressing technological constraints, balancing automated feedback with teacher guidance, and evaluating the long-term impact of using the Virtual Writing Tutor across various educational contexts.

REFERENCES

- Al Badi, A. A., Osman, M. E. T., & M. Al-Mekhlafi, A. (2020). The Impact of Virtual Writing Tutor on Writing Skills and Attitudes of Omani College Students. *Journal of Education and Development*, 4(3), 101. <https://doi.org/10.20849/jed.v4i3.828>
- Fahmi, Setiadi, I., Elmawati, D., & Sunardi. (2019). Discovery Learning Method for Training Critical Thinking Skills of Students. *European Journal of Education Studies*, 6(3), 342–351. <https://doi.org/10.5281/zenodo.3345924>

- Harwood, C., & Koyama, D. (2020). Creating a Virtual Writing Center to Support Self-Regulated Learning. *SiSal Journal*, 11(3), 164–186. <https://doi.org/10.37237/110306>
- Helaluddin, H. (2020). *Keterampilan Menulis Akademik [Academic Writing Skills]*. <https://www.researchgate.net/publication/344235495>
- Kharismawati, L. R. S., Nirwansyah, Fauziah, S., Puspita, R. A., Gasalba, R. A., & Rabbani, T. A. S. (2020). *HOTS-Oriented Module: Discovery Learning*. SEAMEO QITEP in Language. <https://repositori.kemendikdasmen.go.id/21350/>
- Khasinah, S. (2021). Discovery Learning: Definisi, Sintaksis, Keunggulan dan Kelemahan [Discovery Learning: definition, syntax, advantages, and disadvantages]. *Jurnal MUDARRISUNA: Media Kajian Pendidikan Agama Islam*, 11(3), 402. <https://doi.org/http://dx.doi.org/10.22373/jm.v11i3.5821>
- Mahtum, A. R., Asih, A., Tantri, S., Ayu, S., & Sriasih, P. (2022). Penggunaan Media Blogspot dalam Pembelajaran Menulis Cerpen pada Siswa Kelas X Kuliner 5 SMK Negeri 2 Singajara [The use of Blogspot Media in Teaching Short-Story Writing to grade X Students of SMK Negeri 2 Singajara]. *Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, 12, 438–444. <https://doi.org/10.23887/jpbsi.v12i4.63377>
- Nasution, R., Debora, M., Saragih, B., Gultom, J., & Lubis, S. (2024). Students' Writing Skill Improvement through Virtual Writing Tutor (VWT). *Proceedings of the 5th International Conference on Innovation in Education, Science, and Culture, ICIESC 2023*, 24 October 2023, Medan, Indonesia. <https://doi.org/https://doi.org/10.4108/eai.24-10-2023.2342123>
- Norpin, Naibaho, L., & Rantung, D. A. (2024). Peran Teknologi dalam Proses Pembelajaran [The Role of Technology in the Learning Process]. *JURNAL KOLABORATIF SAINS (JKS)*, 7, 444–448. <https://doi.org/10.56338/jks.v7i1.4896>
- Noviani, N., Missriani, & Wardiyah, D. (2020). The Effect of Discovery Learning Model on Students' Ability to Write Fantasy Stories. *Journal of Development and Innovation Language and Literature Education*, 1(2), 150–160. <https://ejournal.karinosseff.org/index.php/jadila/>
- Paraningtias, E., & Susanto. (2021). The Effect of Discovery Learning Method on Students' Ability in Writing Recount Text. *International Conference on Islam, Law, and Society (INCOILS)*, 1(1), 191–200. <https://doi.org/10.5281/zenodo.3345924>
- Perdana, P. R., Hidayani, S., & Fitriana, R. (2023). Pemanfaatan Artificial Intelligence-Virtual Writing Tutor untuk Meningkatkan Kemampuan Menulis Karya Ilmiah Guru di Kabupaten Serang, Banten [The Utilization of Artificial Intelligence-Virtual Writing Tutor to Improve Teachers' academic Writing Ability in Serang Regency, Banten]. *Jurnal Respon Komunitas Dan Pemberdayaan* , 1(1), 10–17. <https://jurnal.untirta.ac.id/index.php/JRKP>
- Praditha, K. T., Dambayana, P. E., & Budiarta, L. Gd. R. (2022). An Analysis of Student's Skills in Writing Descriptive Text for Tenth Grade in SMA Negeri 1

- Banjar. *Jurnal Penelitian Mahasiswa Indonesia*, 2, 242–252. <https://jurnal.stkipahsingaraja.ac.id/index.php/jpmi/article/view/408/365>
- Pratama, R. D., & Hastuti, D. P. (2024). The Use of Artificial Intelligence to Improve EFL Students' Writing Skill. *English Learning Innovation (Englie)*, 5(1). <https://doi.org/https://doi.org/10.22219/englie.v5i1.30212>
- Resmini¹, S., Rizkiani, S., & Maulana, A. (2023). Discovery Learning and Powtoon in Teaching Writing Recount Text: Students' Responses and Challenges. *The Journal of English Language Teaching*, 5(2). <https://jela.stkippasundan.ac.id/index.php/jela/article/view/113>
- Sa'adah, A. R. (2020). Writing Skill in Teaching English: An Overview. *EDUCASIA*, 5(1), 21–35. <https://www.educasia.or.id/index.php/educasia/article/view/41>
- Satriani, Razaq, Y., & Muzkiyah, N. (2022). The Impact of Using Discovery Learning on EFL Students' Writing Skill. *Indonesian Journal of Research and Educational Review*, 1(3), 389–397. <https://doi.org/10.51574/ijrer.v1i2.393>
- Sobari, M. R., & Husnussalam, H. (2019). *The Use of Discovery Learning Method to Improve Students' Writing Descriptive Text*. 2(2). <https://scispace.com/pdf/the-use-of-discovery-learning-method-to-improve-students-41d71mk55n.pdf>
- Sumarmi, S. (2023). Problematika Penerapan Kurikulum Merdeka Belajar [The Problems of Implementing the Merdeka Learning Curriculum]. *Social Science Academic*, 1(1), 94–103. <https://doi.org/10.37680/ssa.v1i1.3193>
- Suprpto, M. A., Anditasari, A. W., Sitompul, S. K., & Setyowati, L. (2022). Undergraduate Students' Perceptions towards the Process of Writing. *Journal of English Language Teaching and Linguistics*, 7(1), 185. <https://doi.org/10.21462/jeltl.v7i1.765>
- Ulfah, A., Fitriyah, L., Zumaisaroh, N., & Jesica, E. (2023). Pemanfaatan Media Pembelajaran Digital dalam Pembelajaran Menulis Puisi di Era Merdeka Belajar [The Utilization of Digital Learning Media in Teaching Poetry Writing in the Merdeka Learning Era]. *GHANCARAN: Jurnal Pendidikan Bahasa Dan Sastra Indonesia*, 5(1). <https://doi.org/10.19105/ghancaran.v5i1.7914>
- Viantika, S., & Dangin, D. (2024). Improving Students' Writing Skill Using Virtual Writing Tutor: Automatic Corrective Feedback. *EDULIA: English Education, Linguistic and Art Journal*, 4(2), 138–151. <https://doi.org/10.31539/edulia.v4i2.8890>
- Yukamana, H. (2023). The Effect of Discovery Learning Method and Motivation on the Writing Ability of Students in the Tenth Grade of SMA Negeri 20 Palembang. *Journal of Social Work and Science Education*, 4(3), 1141–1149. <https://ejournal.sembilanpemuda.id/index.php/jswe/article/view/660>
- Yuliana, N. (2018). Penggunaan Model Pembelajaran Discovery Learning dalam Peningkatan Hasil Belajar Siswa di Sekolah Dasar [The Use of the Discovery Learning Model in Improving Students' Learning Outcomes in Elementary School]. *PPs Universitas Pendidikan Ganesha JIPP*, 2. <https://ejournal.undiksha.ac.id/index.php/JIPP/article/view/13851/8671>

Yuliani, O. M., Hartati, Y. S., & Pebriani, Y. (2023). Pengaruh Discovery Learning terhadap Keterampilan Menulis Esai Siswa [The Effect of Discovery Learning on Students' Essay Writing Skills]. *Journal of Language Education, Linguistics, and Culture*, 3, 251–261. <https://journal.uir.ac.id/index.php/j-lelc>