THE USE OF DEEP LEARNING IN ENHANCING STUDENTS' WRITING ABILITY: A LITERATURE REVIEW

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Abstract: Effective English writing is a prospective skill that students of all levels must acquire. This skill is the final language skill to be acquired and the most challenging to develop due to the fact that it requires the simultaneous, clear, and effective control of numerous components, including the organization of thoughts in a logical order, the selection of appropriate words, the adherence to grammar rules, and the use of spelling and punctuation while writing. Deep learning approaches are investigated in this study as a prospective alternative for improving students' writing abilities. 15 articles were systematically analysed in the study, which were selected from Scopus, Web of Science, ERIC, and SINTA. The research revealed that the methods of teaching writing varied based on the educational level, with the use of educational technologies ranging. This implied that the efficacy of technology-supported writing processes is contingent upon the cognitive development of students. Teachers are anticipated to possess a comprehensive understanding of the efficacy of deep learning in improving the writing skills of students.
Keywords: Deep Learning, Literature Review, Writing Ability

1. INTRODUCTION

Writing is one of the most important abilities to learn in English, but it is also known to be the hardest to master (Hyland, 2013; Richards & Renandya, 2002). Writing is often the last skill to be learned because it requires coordinating many different parts at once, such as coming up with and organizing ideas in a logical way, choosing the right words, following grammar rules, and making sure that spelling and punctuation are correct (Harmer, 2004; Nation, 2013). Because of this intricacy, there is often a gap between what students want to say and what they actually write, especially for students who are learning a second language (Byrne, 1993).

Recent advances in technology have opened up new ways to help students improve their writing skills, and deep learning methods have shown up as a potential option in this field (LeCun et al., 2015). Deep learning is a part of machine learning that uses multi-layered neural networks to look at and interact with big datasets. It has showed promise in a number of educational settings, such as automatic feedback, text generation, and error detection (Al-Hadhrami & Riahi, 2021; Zhang & Wu, 2020). These strategies can help students organize their thoughts, use vocabulary more effectively, and get better at grammar through smart and flexible feedback systems (Susanti et al., 2023).

Deep learning-based writing tools can give students personalized learning experiences by giving them feedback that is specific to their present level of skill (Zawacki-Richter et al., 2019; Li et al., 2022). But these kinds of tools might not work as well for all students, depending on their age, needs, and level of technology knowledge. This means that teachers should change their methods to fit the students' age, needs, and level of technological knowledge. Also, while using technology in writing lessons is becoming more prevalent, it is very important for teachers to know how to use it effectively and how to include deep learning tools into classroom activities (Mouza et al., 2017).

Taking all of this into account, it is appropriate and timely to look into how deep learning might help students write better. A thorough study of a few peer-reviewed

articles from Scopus, Web of Science, ERIC, and SINTA can give us useful information about how deep learning is currently being used in writing education, what problems it faces, and what tactics are being used to solve them. Such a study can help both teachers and legislators make sure that writing lessons that use technology are effective, open to all students, and meet the requirements of all types of learners.

2. LITERATURE REVIEW

2.1 Writing as a Complex Language Skill

Writing is widely thought to be one of the hardest language skills to learn since it requires the use of several linguistic, cognitive, and social skills (Hyland, 2013). Writing is different from listening and speaking because it requires you to control vocabulary, grammar, organization, coherence, and cohesion all at once and on purpose, as well as think about the audience and the purpose of the communication (Harmer, 2007; Nation, 2013).

Writing is a productive talent from a linguistic point of view since it entails making language instead of just responding to it. Richards and Renandya (2002) say that this procedure demands students to write down their ideas while following the rules for grammar, spelling, and punctuation. This procedure is typically hard for people who are learning a second language because they have to make sure that both the content and the form are correct at the same time (Weigle, 2014).

Writing involves higher-order thinking skills like planning, organizing, drafting, and editing (Flower & Hayes, 1981). The cognitive process theory of writing shows how authors are always moving between coming up with ideas, putting them into words, and going over the text to make it better. This recursive process needs constant focus and metacognitive awareness (Zimmerman & Bandura, 1994). Because writing requires so much mental effort, it usually takes longer to learn than receptive abilities when learning a language.

Writing is also shaped by the genre, the discourse community, and the cultural expectations that come with it (Hyland, 2016). For example, academic writing needs distinct talents than creative writing or drafting business letters. So, students need to learn how to change their writing to fit diverse situations by being flexible with tone, style, and structure (Tuan, 2010).

Writing skills are even harder to develop when learning a second language (L2) because of cross-linguistic effect. L2 learners typically bring over patterns of organization, rhetorical frameworks, and language elements from their first language, which might make it hard to meet target-language norms (Connor, 2002). While promoting correctness and fluency in student writing, teachers must also deal with these interlanguage traits.

More and more research in the field has focused on process-oriented approaches to teaching writing, which focus on drafting, peer criticism, and editing instead of only judging the end output (Seow, 2002; Ahmed, 2010). These methods help students see writing as a process of growth, which lowers their stress and helps them get better over time.

In short, writing is a complex talent that includes language, thinking, and social and cultural factors. It is so complicated that teaching methods need to take all of these aspects into account at once, helping students improve both their technical precision and their rhetorical skills so they can communicate effectively in writing.

2.2 Deep Learning in Writing Instruction

Writing in English has long been known to be one of the hardest things to learn in a second language (L2), as it requires students to coordinate many subskills, such as coming up with ideas, organizing texts, choosing the right words, making sure the grammar is correct, and being aware of the audience (Hyland, 2019; Nation, 2013). Process-oriented or product-oriented approaches are typically used in traditional writing training. However, new educational technologies, especially those that use deep learning techniques, have opened up new options (Goodfellow et al., 2016).

Deep learning, a type of machine learning that uses multilayered neural networks, has shown a lot of promise for improving language learning outcomes, such as writing skills (LeCun et al., 2015). Deep learning systems, on the other hand, can look at big data sets, understand complicated language patterns, and give feedback that changes based on what the learner requires (Alonso & de la Torre, 2021). These models can help with automated error identification, style improvement suggestions, and individualized scaffolding in the context of teaching English writing (Zhang & Litman, 2017).

According to research, writing support tools based on deep learning, like automated essay scoring systems, grammar checkers, and intelligent tutoring systems, can help students become more independent and get feedback right away that is tailored to their needs (Li et al., 2022; Ranalli, Link, & Chukharev-Hudilainen, 2017). For instance, convolutional neural networks (CNNs) and recurrent neural networks (RNNs) have been used to find more and more grammatical and semantic mistakes in students' writing (Taghipour & Ng, 2016). Also, transformer-based designs like BERT and GPT have made it possible to look at writing quality in a more context-sensitive and holistic way (Devlin et al., 2019; Flor & Riordan, 2020).

But a number of teaching and learning characteristics affect how well deep learning works for teaching English writing. Students' cognitive development, linguistic skills, and ability to use technology can all affect how well they use these tools (Gok & Kara, 2021). Deep learning systems can make things more efficient and improve the quality of feedback, but they can't replace the important role that teachers play in encouraging originality, rhetorical awareness, and higher-order thinking in writing (Hyland & Hyland, 2019). To get the most out of deep learning technologies in the classroom, teachers need to be able to fit them within a consistent instructional framework (Jiang et al., 2020).

There is also a growing body of research that stresses the need of ethics and fairness when using deep learning to teach writing. If not dealt with, problems including data privacy, algorithmic bias, and unequal access to technology could make educational inequities worse (Bender et al., 2021). So, to be successful, you need to not only come up with new technology, but also make sure it fits with educational goals and the demands of learners (Bai & Hu, 2022).

In short, deep learning has the potential to improve English writing teaching by giving students personalized, data-driven feedback and broadening the range of instructional support. However, its use must be regulated by educational principles, moral protections, and continual instructor participation to make sure that the technology is a supplement to, not a replacement for, good writing teaching.

3. METHODOLOGY

This study used a systematic literature review (SLR) design to combine and look at other research on how deep learning can help students write better. We chose the SLR method to make sure that the process of finding, choosing, judging, and putting together important scholarly works was thorough and open (Kitchenham & Charters, 2007). This method lets us learn about how deep learning techniques have been used in English writing classes and how effectively they work in diverse educational settings.

The review focused on peer-reviewed journal articles that were indexed in Scopus, Web of Science (WoS), Education Resources Information Center (ERIC), and the Indonesian SINTA database to make sure that it covered a wide range of high-quality research. We chose these databases because they have a lot of information about educational research and computer-assisted language learning studies (Harzing & Alakangas, 2016). This study looked at 15 peer-reviewed journal articles that came out between 2018 and 2024.

4. RESULTS

Based on 15 peer-reviewed journals indexed in Scopus, Web of Science (WoS), Education Resources Information Center (ERIC), and the Indonesian SINTA database, the findings of this study can be seen in the following table:

Table 1. Summary of Reviewed Studies on Deep Learning in Enhancing Students' Writing Ability

No.	Author(s) & Year	Country	Educational Level	Participants	Deep Learning Approach / Tool	Writing Focus	Main Findings
1	Chen & Meurers (2021)	Germany	Secondary	80 EFL students	Automated Writing Evaluation (AWE) with neural network-based error detection	Grammar & syntax	AI feedback improved grammatical accuracy and reduced repeated errors over 6 weeks.
2	Choi (2022)	South Korea	University	60 undergraduates	Transformer-based feedback system	Revision & coherence	Students revised essays more effectively, improving cohesion and idea flow.
3	Lee & Shin (2023)	South Korea	University	45 EFL students	GPT-3 text generation	Idea generation & organization	AI-assisted brainstorming led to more coherent outlines and higher-rated essays.

4	Ranalli et al. (2020)	USA	University	90 ESL students	AI-supported peer feedback platform	Content development	Combined AI & peer feedback improved content depth and lexical variety.
5	Brown et al. (2020)	Multiple	Mixed	N/A (model demonstration)	GPT-3	General writing	Demonstrated LLM capacity for human-like writing and contextual accuracy.
6	Devlin et al. (2019)	USA	N/A	N/A	BERT-based scoring model	Automated essay scoring	Achieved high scoring accuracy comparable to human raters.
7	Ahmad et al. (2021)	Malaysia	Secondary	70 ESL students	CNN-LSTM hybrid model	Narrative writing	Improved vocabulary richness and reduced spelling errors.
8	Siau & Wang (2022)	USA	Mixed	N/A	AI ethical framework	Pedagogical integration	Emphasized AI literacy for ethical and effective use in classrooms.
9	Wang & Li (2021)	China	Secondary	50 high school students	AI grammar correction tool	Sentence-level accuracy	Reduced grammatical errors by 35% over 4 weeks.
10	Ferris (2018)	USA	University	120 ESL students	AWE integration in curriculum	Academic writing	Sustained improvement in thesis writing with continuous AI feedback.
11	Al-Khalifa et al. (2020)	Saudi Arabia	University	40 EFL students	Deep learning-based plagiarism detection	Academic integrity	Raised students' awareness of paraphrasing and citation practices.
12	Li & Sun (2022)	China	Secondary	60 students	AI-supported storytelling app	Creative writing	Increased originality scores and narrative coherence.
13	Zhao, D (2024)	China	University	N/A	AI-enhanced	Language Precision	Enhanced students'

					Natural Language Processing (NLP) tools		creative writing
14	Park & Kim (2020)	South Korea	University	55 students	AI discourse analyzer	Argumentative writing	Improved use of cohesive devices and logical connectors.
15	Rahman et al. (2023)	Indonesia	University	40 students	AI essay evaluator with feedback loops	Expository writing	Significant gains in organization and clarity.

The table below shows the results of this study based on 15 peer-reviewed journals that are listed in Scopus, Web of Science (WoS), the Education Resources Information Center (ERIC), and the Indonesian SINTA database.

The table shows the results of 15 peer-reviewed research that looked at how deep learning can help students improve their writing skills in a variety of educational settings, countries, and writing topics. The research takes place in several nations, such as Germany, South Korea, the US, Malaysia, China, Saudi Arabia, and Indonesia. There are studies that look at people with secondary education (Chen & Meurers, 2021; Wang & Li, 2021) and people with university degrees (Choi, 2022; Lee & Shin, 2023). This collection shows how deep learning-based writing support may be used by people of all ages and stages of learning.

The studies used different types of deep learning tools and methods, such as Automated Writing Evaluation (AWE) tools with neural networks for finding mistakes (Chen & Meurers, 2021; Ferris, 2018), Transformer-based models like GPT-3 for making text and coming up with ideas (Lee & Shin, 2023; Brown et al., 2020), Hybrid deep learning architectures like CNN-LSTM for writing stories (Ahmad et al., 2021), BERT-based scoring models for automatically scoring essays (Devlin et al., 2019), Specialized AI writing assistants like grammar correction tools (Wang & Li, 2021), discourse analyzers (Park & Kim, 2020), and AI-supported storytelling apps (Li & Sun, 2022), and Ethical and pedagogical frameworks for using AI in writing education (Siau & Wang, 2022).Then, the main things that were taught in writing classes were language mechanics (grammar, syntax, and sentence-level accuracy), higher-order skills (idea generation, organization, and coherence), creative writing and motivation (narrative writing), and academic integrity (plagiarism detection and citation awareness).

Overall, deep learning tools consistently helped students write better by lowering the number of mistakes they made and making their grammar more accurate (Chen & Meurers, 2021; Wang & Li, 2021), making their essays more organized and cohesive (Choi, 2022; Rahman et al., 2023), giving them a wider range of vocabulary and lexical variety (Ahmad et al., 2021; Ranalli et al., 2020), and making them more aware of the rules of academic writing (Ferris, 2018; Al-Khalifa et al., 2020).

5. DISCUSSION

Analysis of 15 peer-reviewed papers on using deep learning in English writing training showed that it can be used in many different ways at different levels of education, with different language focuses, and with different types of technology. Overall, the results show that systems based on deep learning can greatly improve many parts of students' writing skills. The level of schooling, level of cognitive maturity, and specific writing focus targeted all affect the type and amount of changes.

AI-powered grammar checkers and automated writing evaluation tools showed considerable improvements in sentence-level accuracy and grammatical correctness at the secondary education level. For instance, Chen and Meurers (2021) in Germany and Wang and Li (2021) in China found that after getting AI-supported feedback for a few weeks, their grammatical errors went down by as much as 35%. Ahmad et al. (2021) in Malaysia discovered that a CNN-LSTM hybrid model made narrative writing more interesting by adding more words and making fewer spelling mistakes. These results imply that secondary-level students do better with immediate, specific corrective feedback, which fits with their developmental requirement for clear language form direction.

Using transformer-based models and large language models (LLMs) at the university level has shown a lot of promise for improving higher-order writing skills including coherence, organization, and content generation. In South Korea, Choi (2022) and Lee and Shin (2023) showed that AI-assisted feedback tools and GPT-3-based idea creation made writing more cohesive, logical, and able to handle difficult arguments. Ranalli et al. (2020) in the USA also talked about how integrating AI-generated input with peer review had a synergistic impact that not only made the material deeper but also added more variation to the vocabulary. These studies show how deep learning techniques can help with the iterative process of refining and revising ideas by acting as cognitive scaffolds.

Ferris (2018) and Rahman et al. (2023) are two examples of studies that look at academic writing at the college level. They both stress the long-term benefits of including AI-assisted evaluation in the curriculum. These studies found that students' thesis writing, organization, and clarity improved over time, which shows how important it is to have regular and formative AI feedback loops instead of just one-time fixes. Also, deep learning tools used in academic integrity, including Al-Khalifa et al.'s (2020) plagiarism detection system, helped students learn more about how to paraphrase and cite sources. This shows that AI could play a bigger role in teaching students how to write ethically. Li and Sun's (2022) study of creative writing demonstrated that AI-assisted storytelling apps improved originality and narrative coherence. This suggests that deep learning technology can help people develop both technical and imaginative skills.

Looking at the bigger picture, foundational research on model capabilities, including Brown et al. (2020) on GPT-3 and Devlin et al. (2019) on BERT-based scoring models, shows that large-scale neural networks can do some writing evaluation tasks just as well as or even better than people. Siau and Wang (2022) did say, though, that for these systems to work, people need to know how to use AI and think about ethics, especially when it comes to being open, fair, and accountable in the classroom.

In conclusion, the research shows that deep learning technologies can help teach English writing in a meaningful way in a variety of educational settings.

However, their effectiveness depends on the learners' cognitive stage, how well the AI tools fit with the instructional goals, and how well the teachers can use feedback in their teaching. Grammar-focused interventions work right away at lower levels, but higher education settings benefit more from tools that improve writing skills at the discourse level. Ethical and pedagogical preparedness are still very important for getting the most out of AI-assisted writing teaching.

6. CONCLUSION

Deep learning is a great way to help students improve their writing skills, but it only works if it is used in a smart way and teachers are aware of how their students' brains are developing. Teacher training should cover both how to use AI technologies and how to help students become more independent writers if it wants to have a lasting effect.

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