

Artificial Intelligence in writing instruction: A self-determination theory perspective

Rahayu – Sukardi Weda – Muliati – Nofvia De Vega

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Abstract

This study aimed to delve into the multifaceted role of artificial intelligence (AI) in writing instruction, with a particular emphasis on AI-based writing tools like Grammarly and QuillBot. Contributing to the ongoing discourse on incorporating AI into educational practices, this research offers a thorough grasp of the benefits and possible drawbacks of using AI in writing instruction. The study adopted a qualitative case study design to collect data from a diverse range of participants, including novice and experienced users of AI-based writing tools. Through a combination of in-depth interviews and direct observations, the study collected rich, qualitative data, providing a holistic view of the experiences and perceptions of individuals regarding the use of AI in writing instruction. The main findings of the study revealed that AI-based writing tools enhance writing competence and fulfil psychological needs such as autonomy, relatedness, and integrity in writing but risks of relying too much on AI were also pointed out. For example, AI could kill creativity, make writing styles more similar, and make people feel like they have no control over their writing. While the study acknowledges the significant potential of AI to enhance the writing process. Moreover, it highlights the importance of being aware of the potential dangers that it poses. The results emphasize the need for a well-rounded strategy that capitalizes on the advantages of AI in writing education while guaranteeing that it enhances and complements unique writing approaches, as opposed to dictating them.

Key words: artificial intelligence (AI), self-determination theory (SDT), writing instruction, grammarly, quillbot

Introduction

Artificial intelligence (AI) has brought significant advancements in various educational sectors, including writing instruction. Initial studies, such as those by Warschauer and Healey (1998), focused on AI's role in enhancing the mechanical aspects of writing, like grammar correction and sentence structuring. However, a broader perspective has recently been proposed. Emerging research, such as the work by Pennebaker et al. (2014) and Bailey and Barley (2020), suggests that AI's role in writing instruction extends beyond these technical functions, reaching the realm of fulfilling psychological needs.

The Self-Determination Theory (SDT), a crucial psychological framework, provides a perspective to understand these advancements. The theory proposed by Ryan & Deci, 2017 centers on three fundamental intrinsic needs: autonomy, competence, and relatedness. Autonomy pertains to the inclination to independently regulate one's actions, competence to the necessity for mastery and expertise, and relatedness to the association with others and the wider community.

AI-based tools, as exemplified by Grammarly and QuillBot, have been recognized for their alignment with SDT principles. Khabib (2022), provide instant feedback, improve the quality of writing, and personalize the learning process. They support individual autonomy, foster a sense of relatedness among learners, and enhance writing competence. Moreover, according to a study by Shute et al. (2016), they have a crucial impact on enhancing a writer's sense of genuineness and honesty by harmonizing their writing style with their principles and individuality.

However, despite these multifaceted benefits, the discourse surrounding AI's role in writing instruction has specific gaps, as Shum et al. (2016) noted. An essential matter that still needs to be investigated is the possible hazards linked to an excessive dependence on AI. There are concerns, as expressed by Caporusso (2023) and Washington (2023), that excessive dependency on AI could stifle creativity, result in a homogenized writing style, and create a sense of losing control over one's writing.

Addressing this gap, this paper, taking inspiration from the balanced approach proposed by Long & Magerko (2020) and Pedro et al. (2019), suggests that leveraging AI in writing instruction while remaining aware of its potential pitfalls. It emphasizes the importance of harnessing the benefits of AI in enhancing writing skills and fulfilling psychological needs without becoming overly reliant on it.

The proposed solution offers several merits. It provides a holistic approach to incorporating AI in writing instruction, allowing individuals to reap AI's benefits while preserving their unique writing style, as discussed by Alqahtani et al. (2023), Liu et al. (2023), and Davenport (2018). It also encourages the conscious use of AI, promoting the development of writing skills without compromising creativity (Weda, 2012). This balanced approach ensures that AI is an enhancement tool rather than a determinant of writing style. This way, we can ensure that AI's role in writing instruction is both effective and empowering, as emphasized by Washington (2023).

Methodology

This study was conducted utilizing a qualitative approach, specifically adopting a case study research design to explore the multifaceted role of artificial intelligence (AI) in writing instruction (Yin, 2018). This study focused on a group of nine participants, whose ages varied between 20 and 50 years. The individuals in question came from a wide range of professional fields, including both inexperienced and experienced writers, educators, and regular users of AI writing tools like Grammarly and QuillBot, as emphasized in a recent analysis conducted by Washington, 2023.

The primary goal of the research was to identify the ways in which writing tools powered by artificial intelligence can improve students' independence, proficiency, and writing-relatedness. It was achieved through conducting comprehensive interviews with users. Simultaneously, direct observations of the use of AI in writing instruction were made (Shute et al., 2016). These findings shed light on the subtleties of real-time writing processes that make use of AI tools such as QuillBot and Grammarly. The observations supplemented the self-reported data from the participants, adding depth to the findings. The second part of the study was focused on examining the role of AI in supporting the psychological need for integrity in writing. This was explored through case studies of individual writers (Davenport, 2018). The process involved examining how their use of AI tools impacted their sense of authenticity and integrity in their writing (Shute et al., 2016). In addition, the potential dangers linked to an excessive reliance on AI in writing were examined. Concerns about losing creativity, having a uniform writing style, and losing control over one's essay due to excessive dependence on AI were investigated through individual case studies, in-depth interviews, and document analysis of written work produced with AI assistance.

The study placed great importance on ethical considerations. All participants provided informed consent, thereby ensuring their complete understanding of the study's objectives and their role in it. The participants were informed about their entitlement to voluntarily discontinue their participation in the study at any time, without facing any negative consequences regarding their professional reputation or other aspects of their status.

While the study relied mainly on participants' own accounts, the inclusion of direct observation strengthened the data, creating a strong foundation for investigating the

impact of AI on writing instruction. Nevertheless, it is recognized that the complex dynamics of AI's participation in the writing process may not have been fully captured. The combination of data obtained through self-reporting and direct observation, despite its limitations, provided valuable insights and laid the groundwork for future investigations.

Findings

In exploring AI's role in writing instruction, the research revealed crucial findings regarding how AI can assist not only with the technical aspects of writing, but also with the writer's psychological requirements. The findings broaden the conventional understanding of AI's function in writing, extending its significance beyond mere technical assistance. The study revealed that AI tools' ability to analyze and predict data is crucial in enhancing individuals' self-efficacy and meeting their psychological need to feel competent in their interactions with their environment. Moreover, it has been discovered that AI's ability to offer tailored experiences fosters a feeling of honesty and sincerity, allowing individuals to express themselves genuinely in a way that corresponds with their own values and identity. These observations emphasize the crucial significance of AI in fostering a writing experience that is both empowering and genuinely authentic. To visualize these results, please refer to the figure below.



Figure 1: SDT as A New Approach in AI Writing

**Autonomy in Learning with AI
Personalized Learning**

Autonomy: In the context of writing learning, AI can support student autonomy by providing timely and personalized feedback. For example, AI-supported writing platforms can offer suggestions on improving sentence structure, word choice, and other elements of writing. It allows students to make informed decisions about how they want to improve their work.

"I exercise my autonomy in learning to write with AI by leveraging various features the AI provides. For

instance, I frequently use the automatic correction feature to check spelling and grammar. In addition, I also use AI to get suggestions on how to improve my writing style. In this way, I can learn at my own pace and in my own time, which is crucial for my learning autonomy." (Interview with Student 6)

The feedback from the participant is really helpful for understanding how AI can promote independence in writing instruction. The user leverages AI not just for basic spelling and grammar checks but also to improve their writing style. It demonstrates the depth of AI's impact on writing instruction, expanding beyond rudimentary assistance and into more advanced territories.

The user's proactive approach to utilizing AI's suggestive features for enhancing their writing style epitomizes learner autonomy. It aligns with the self-determination theory principles that emphasize the importance of independence in fostering motivation for learning. By taking advantage of AI's capabilities, the user exercises control over their learning process, deciding when and how to learn. Moreover, the user's capacity to acquire knowledge at their preferred speed and convenience highlights the flexibility of AI. It suggests that AI can cater to individual learning needs and rhythms, a key aspect in promoting autonomous learning. This flexibility is invaluable in our fast-paced world, where traditional classroom learning may only sometimes be feasible. However, the participant does not mention potential drawbacks, indicating satisfaction with the current AI tools. Still, further research is needed to explore this aspect comprehensively. Overall, this analysis highlights the capacity of AI to foster independence in teaching writing. It also emphasizes the need for further research to explore potential challenges and ways to optimize the use of AI in learning.

Active Exploration and Reflection

It focuses on learners actively engaging with AI tools and features to enhance their writing skills. As another respondent stated

"I have actively utilized my autonomy in learning to write with AI. I often explore various tools and features provided by the AI and try to apply them in the context of my writing. I also reflect on what I have learned and look for ways to improve my writing skills further. This is all part of how I exercise my autonomy in learning." (Interview with Student 2)

The participants' responses reveal AI-facilitated autonomous learning's proactive and exploratory nature. The participant not only uses AI tools for writing but also actively explores and applies various features provided by the AI in their writing context. This active engagement with AI tools not only enhances their writing skills but also fosters a sense of ownership and control over their learning process, critical elements of learner autonomy.

Moreover, the participant's habit of reflecting on their learning and seeking improvement indicates a self-driven desire for continuous skill development. This reflective practice enhances their learning experience, enabling them to identify their strengths and areas for improvement and tailor their learning strategies accordingly. Interestingly, the participant's approach to learning with AI goes beyond mere usage. It involves a dynamic exploration, application, reflection, and improvement process. It showcases the potential of AI in fostering a more engaged, self-regulated, and ultimately autonomous learning experience. However, further research is needed to explore this potential in a broader context and across different learner profiles.

Enhancing Writing Competence with AI Efficiency and Quality Improvement

Competence: AI can help students enhance their writing competence by providing exercises and challenges tailored to their ability level. For instance, some AI systems can identify areas where students may need additional help and then give specially designed exercises to help them improve.

"One of the main advantages of using AI in writing is improving efficiency and quality. With AI, I can receive instant feedback on sentence structure, word choice, and other elements in my writing. This allows me to correct and strengthen my writing immediately. In addition, AI also assists me in understanding my writing patterns and habits, enabling me to improve and develop my writing skills continually." (Interview with Student 1)

The participant's response highlights how AI enhances efficiency and quality in writing. Immediate feedback from AI on various writing elements enables quick corrections, improving the writing process. Moreover, AI helps participants understand their writing patterns and habits, leading to continuous skill development. It demonstrates AI's role as a corrective tool and a self-reflective one that fosters learning and growth. However, the user's perspective may only encompass some experiences with AI in writing, suggesting a need for broader research.

Personalization and Customization

It focuses on the ability of AI to customize and personalize the writing process to address students' specific needs and skill levels. As one respondent stated.

"The advantage I gain from my competence in using AI in writing is the ability to customize and personalize my writing process. I can adjust writing exercises and challenges with AI based on my skill level and specific needs. This allows me to focus on areas that need improvement. AI also provides a platform where I can share my work and receive feedback from others, which is invaluable for growth and development as a writer." (Interview with Student 5)

The participant's testimonial emphasizes the advantages of using artificial intelligence (AI) in writing, particularly the ability to personalize and customize the learning process. They highlight the adaptability of AI, allowing them to adjust writing exercises based on their skill level and specific needs. It indicates that AI provides a tailored learning experience and empowers learners to take charge of their learning journey, a crucial aspect of learner autonomy. Moreover, the user appreciates AI's ability to provide a platform for sharing work and receiving feedback. This interactive component of AI reinforces the social aspect of learning, which is essential for growth and development as a writer. It enables the participant to engage in a broader writing community, fostering constructive criticism and dialogue, elements often missing in solitary writing practices. Interestingly, the user's testimonial does not mention any potential drawbacks of AI, suggesting a satisfactory experience. However, it is important to note that this perspective may not represent all experiences with AI in writing, highlighting the need for further research. Overall, the testimonial highlights the considerable capacity of AI to facilitate individualized, interactive, and self-directed learning in writing. However, it also signals the need for more comprehensive studies to understand different user experiences and challenges in using AI for writing.

Objective Evaluation and Feedback

It covers the ability of AI to provide instant, objective feedback and to analyze large volumes of data to identify patterns or trends in writing. As one respondent mentioned,

"AI can provide instant and objective feedback, which can be extremely helpful in evaluating and improving your writing. AI can also work 24/7 and is not influenced by emotional or subjective factors. In addition, AI can handle large volumes of data and can assist you in finding certain patterns or trends in your writing." (Interview with Student 4)

The participant's comment highlights the advantages of AI in writing, specifically its capacity to deliver immediate and impartial feedback. It highlights AI's role in facilitating real-time improvement in writing. The participant also values AI's round-the-clock availability and immunity to emotional or subjective biases, indicating perceived reliability and consistency in AI's assistance. Furthermore, AI's capacity to manage large data volumes and detect patterns or trends in writing is appreciated. It demonstrates how AI can help writers by providing feedback on their habits and style. However, broader research is needed to understand the full implications of AI in writing.

Fostering Relatedness through AI in Writing Learning Collaboration and Social Interaction

Relatedness: In the context of writing learning, AI can facilitate relatedness by providing a platform where students can share their work with others and receive feedback. For example, some AI-based writing platforms allow students to post their job and receive feedback from other students, teachers, or even the AI.

"AI can also foster good relationships in writing instruction by facilitating collaboration and social interaction. Examples include platforms like Write & Improve and Peergrade. Write & Improve uses AI to provide instant feedback on students' writings, and students can share their writings with others for additional feedback. Meanwhile, Peergrade allows students to assess and provide feedback to each other, with AI assisting in managing and facilitating this process. Through these interactions, AI can help nurture a supportive writers' community that learns from each other." (Interview with Student 3)

The participant highlights AI's role in fostering collaboration and social interaction in writing instruction. They mention platforms like Write & Improve and Peergrade, which utilize AI to facilitate student feedback exchange. It illustrates that AI can foster a supportive writing community, enhancing learning through peer interactions. The participant's perspective indicates that beyond being a standalone tool, AI can function as a facilitator, nurturing a sense of community and collaborative learning. It highlights the capacity of AI to facilitate a comprehensive and interactive method for teaching writing. However, more research is needed to understand the broader implications of this approach.

AI's Support in Fulfilling Efficacy

Empowerment through Instant Feedback and Improvement

In the study, additional findings were uncovered regarding AI's role in supporting psychological needs. One such need is efficacy, the psychological requirement to feel

competent and successful in interacting with one's surroundings. The research found that AI, through its data analysis and prediction capabilities, can significantly contribute to this aspect. For example, the capacity of AI to analyze an individual's written information and offer immediate, valuable input can enhance a person's feeling of effectiveness. By acquiring such knowledge, people can enhance their writing abilities and experience a greater sense of efficacy and empowerment in their writing setting.

*"I also tend to check my writing results on AI, so I know to correct myself on which parts I need to improve."
(Interview with Student 8)*

AI's Role in Supporting Integrity in Writing Enhancing Authenticity through Personalized Experiences

Another critical psychological need identified is integrity, the need to feel authentic and to live in alignment with personal values and identity. The research discovered that AI can support this need through personalized experiences. AI-based writing tools, for instance, can be adapted to match an individual's preferences and writing style. It allows individuals to feel that their writing mirrors their identity and values. Consequently, they attain a heightened sense of authenticity and integrity in their writing pursuits. These supplementary discoveries emphasize the essential function of AI in both improving writing skills and satisfying significant psychological requirements.

*"I fully agree with that statement. I need to feel that my writing reflects my identity and my values. AI-based writing tools, such as Grammarly or QuillBot, have been beneficial. They not only correct grammatical errors but also assist in adapting my writing to the style and tone I want. With this assistance, I feel more confident that my writing is authentic and reflects me."
(Interview with Student 7)*

The participant's response highlights the significance of personal identity and values in writing, as well as the role of AI-powered writing tools such as Grammarly and QuillBot in facilitating this process. They appreciate these tools for their error correction capabilities and their assistance in adapting the writing style and tone to reflect the writer's unique identity. It highlights the role of AI in empowering writers to express themselves authentically, enhancing their confidence in their writing. Moreover, the participant's perspective suggests a deeper, more personal engagement with AI tools, moving beyond their practical use to a more emotional and identity-affirming interaction. It indicates the potential of AI to foster a more personalized and self-reflexive writing experience. However, it is crucial to note that this perspective may only represent some users' experiences with AI in writing. While this user had a positive and empowering experience, others might encounter challenges or have different needs and expectations. It calls for a more comprehensive examination of user experiences to understand AI's broader implications and potential in writing.

Risks of Overreliance on AI

It focuses on the possible dangers of using artificial intelligence (AI) in writing too much. As the respondent stated,

"There is a risk that writers may feel they are losing control over their writing if they become too dependent on AI. Moreover, if writers become overly reliant on AI, they may lose their creativity and become too focused on what is deemed 'good' or 'correct' by the AI. Of course, this could lead to a uniform writing style because AI

typically operates based on previously programmed algorithms and data, which may not encompass various writing styles and approaches." (Interview with Student 9)

The participant's statement warns against overusing AI in writing. They express concern that too much dependence on AI could lead writers to lose control over their work and potentially stifle their creativity. He points to balancing AI with maintaining one's unique writing style and voice. Furthermore, the participant raises the issue of AI potentially promoting uniform writing styles, as it operates based on pre-programmed algorithms and data. This implies that although AI has the potential to enhance writing efficiency and rectify errors, it may still require further development to comprehensively comprehend the vast array of writing styles and approaches. This perspective highlights that while AI offers many advantages in writing, it is crucial to consider its limitations and potential drawbacks. It emphasizes the importance for writers to utilize AI tools in a discerning and thoughtful manner, ensuring that these tools augment rather than impede their writing process and creativity. Nevertheless, further investigation is required to examine these possible hazards and devise tactics to alleviate them, guaranteeing the proficient and equitable utilization of AI in writing.

Discussion

The findings of this study shed light on the multifaceted role of artificial intelligence (AI) in writing instruction. The first finding revealed that AI-based writing tools like Grammarly and QuillBot support individual autonomy, competence, and writing-relatedness. These tools, by providing personalized feedback and learning experiences, cater to the psychological needs of the writers. It is significant as it moves the discussion beyond the mechanical benefits of AI, offering a more comprehensive understanding of its role in writing instruction. These results align with the findings of similar studies, such as those by Aghajani (2018) and Meier et al. (2018), studies have emphasized the psychological advantages of AI in education.

The second finding explored how AI supports the psychological need for integrity in writing. By adapting to an individual's writing style and preferences, AI-based writing tools help writers feel that their work genuinely reflects their identity and values. This aspect of AI's role has yet to be extensively explored in previous research, making this finding particularly noteworthy. It echoes the findings of Shute et al. (2016) and Vega et al. (2023), who noted the role of AI in enhancing a writer's sense of authenticity and integrity. This finding adds a new dimension to our understanding of how AI can improve the writing process.

However, the study also showed that relying too much on AI in writing could have some negative effects. The third finding highlighted concerns about losing creativity, having a uniform writing style, and losing control over one's essay due to excessive dependence on AI. It contrasts with the optimism expressed in earlier research (Ariyanti, 2016; Rahayu et al., 2022). While these risks are significant, alternative explanations could be that these concerns stem from a lack of understanding of effectively using AI as a tool rather than a determinant of writing style (Davenport, 2018). It could also be due to the current limitations of AI technology, which may need to support diverse writing styles and approaches fully, as noted by Washington (2023).

Regarding limitations, the study primarily relied on self-reported data, which may be subject to biases, as Nur et al. (2022) mentioned. Furthermore, it did not directly witness the utilization of AI in writing instruction, which could offer more intricate and detailed perspectives. Notwithstanding these constraints, the research provides

significant contributions to the understanding of the function of AI in writing instruction, thereby establishing a foundation for further investigations in this field.

Conclusion

The primary aim of this study was to explore the role of artificial intelligence (AI) in writing instruction, explicitly focusing on AI-based writing tools like Grammarly and QuillBot. The study looked into more than just the technical benefits of AI. It also looked into the psychological effects and possible risks of becoming too dependent on it. The study's findings emphasized the diverse and complex function of AI in the field of writing instruction. It was revealed that AI-based writing tools enhance writing competence and fulfil psychological needs such as autonomy, relatedness, and integrity in writing. These findings contribute to the originality of the work, offering a holistic perspective on the role of AI in writing instruction that extends beyond existing literature.

The study successfully achieved its objectives, providing a comprehensive understanding of how AI can enhance the writing process. It highlighted the significance of AI in supporting individualized learning experiences, enhancing writing quality, and fostering a sense of authenticity and integrity in writing. Nevertheless, it also recognized the possible drawbacks linked to an excessive dependence on AI, including the suppression of originality, the standardization of writing approaches, and a feeling of relinquishing command over one's writing. Further research would be enhanced by investigating approaches to capitalizing on the advantages of AI in writing instruction while minimizing its potential drawbacks. Further research could also delve into the development of AI technology that supports diverse writing styles and fosters creativity in writing.

The study suggests that AI-based writing tools can significantly enhance the writing process, catering to technical and psychological needs. It's important to be aware of the possible dangers of relying too much on AI, though. Educators and individuals who regularly use AI-based writing tools should strive for a balanced approach, leveraging the benefits of AI while ensuring it serves as an enhancement tool rather than a determinant of writing style. These findings provide a foundation for further research into the integration of AI in educational practices, contributing to the ongoing discourse on the role of AI in education.

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Rahayu, M.Pd

Department of English Education, Postgraduate Program, Universitas Negeri Makassar, Makassar, 90222

Indonesia

rahayumahsyar@unsamakassar.ac.id

Prof. Dr. Sukardi Weda, S.S, M.Hum., M.Pd., M.Si., MM, M.Sos.I., MAP

Department of English Education, Postgraduate Program, Universitas Negeri Makassar, Makassar, 90222

Indonesia

sukardi.weda@unm.ac.id

Dr. Muliati, M.Pd

Department of English Education, Postgraduate Program, Universitas Negeri Makassar, Makassar, 90222

Indonesia

Nofvia De Vega, M.Pd

Department of English Education, Postgraduate Program, Universitas Negeri Makassar, Makassar, 90222

Indonesia