Using Artificial Intelligence for Essay Writing

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Abstract
This study hopes to bring insights for researchers and educators in using artificial intelligence for essay writing through a systematic review on the use of AI in writing for the past 10 years. Although Artificial Intelligence has long existed in other fields such as medicine, engineering, journalism, and forensic analysis, it has only made a great impact in the education field after the emergence of ChatGPT. Generative Artificial Intelligence is seen as a tool that can assist teachers and students in academics such as generating ideas, evaluating essays, storytelling, and providing feedback. It has even been considered as the co-author in students’ manuscripts and essays. However, there are still lack of studies on the usage of Artificial Intelligence in developing students’ essay writing performance. Thus, this study hopes to enlighten researchers and educators in using Artificial Intelligence tools in improving students’ essay writing performance. This study will provide insights for researchers and teachers on the different types of artificial intelligence tools that can be used in teaching essay writing. It also provides areas that researchers can focus on since majority of the studies are conducted overseas and only two studies are carried out in Malaysia so far. Hopefully, this study will provide useful information for language teachers in using artificial intelligence tools in teaching essay writing to students.

Keywords: Artificial Intelligence, systematic literature review, technology in education, essay writing, ChatGPT, student-centred activities

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Introduction

Although AI has long existed in other fields, it has only started making tremendous remarks in the education field recently since the emergence of ChatGPT. AI was first termed in 1956 by MacCarthy (Cristianini, 2016) who followed up the work of Turing (Turing, 2004). Turing (2009) asserted that AI is described as the existence of intelligent reasoning and thinking that could go into intelligent machines. Since then, the definition of AI has grown and changed as there have been tremendous advancements in the field. Although there has been a lot of research on the usage of Artificial Intelligence in other fields, the research on AI in particularly in the field of essay writing is still lacking.

Hence, a systematic review on the use of AI in the field of essay writing was conducted in this study. This study highlighted previous studies that have been conducted about AI in the field of essay writing, the types of learners involved, the types of AI tools involved for essay writing and the learning theories that support the use of AI. This study seeks to answer the following research questions.

1. What types of learners are commonly selected for the research on the use of AI in essay writing?
2. What types of AI tools for essay writing are used in the previous studies?
3. What are the learning theories that support the use of AI in essay writing?

Literature Review

Popenici and Kerr (2017) defined AI as a computing system that can engage in human-like processes such as learning, adapting, synthesizing, self-correction and the use of data for complex process in tasks. Acemoglu and Restrepo (2019) further added on that AI is the study and development of machine-like software algorithms that interact with the environment. Although there are many different definitions given to AI, one thing is for sure. AI has made a significant impact on human lives, especially in recent years. AI has impacted many industries such as the medical sector, engineering and film industry. This is because AI derives from developing computing technology that is capable of undertaking many activities that require a higher degree of human intelligence, including speech and visual recognition, as well as natural language processing and decision-making.

Anderson (2023) asserted that ChatGPT which was first introduced in November 2022 was pre-trained based on a vast corpus of human-generated text. Thus, ChatGPT is excellent at using natural language, trained to guess the next word, generating highly human-like text, or performing other human language tasks like having a dialogue. Thorp (2023) added on that ChatGPT also serves as a communication source, a role typically held by humans. In addition, scholars also use ChatGPT to assess their essay feedback and evaluate their performance.

Popenici and Kerr (2017) asserted that AI can revolutionise the field of education through personalised learning experiences for users. Although AI has impacted many fields, it is relatively young in the field of education. Jen and Salam (2024) asserted that the research on AI in education field has only increased since the last few years. Although AI is a relatively young branch of technology in the field of education, there has been a significant interest in AI and its role in education, attracting increased academic, professional, and governmental interest. This is further supported by Chiu et al. (2023), AbdAlgane and Jabir Othman (2023), Aydn and Karaarslan (2022), Farrelly and Baker (2023), Jarrah et al. (2023) and Rahman and Watanobe (2023) who asserted that AI has significantly affected education and classroom practice recently.
In the field of essay writing, AI has even been considered as the co-author in students’ manuscripts. Some examples of AI tools used in education and learning include Chatbots, intelligence tutoring systems, learning analytics, automated grading, and many others. Studies done by Pradana et al. (2023), Rudolph et al. (2023), Dai et al. (2023), Su and Yang (2023), Sundar and Liao (2023) and Hung and Chen (2023) have shown that ChatGPT has been used as the main source of information for students.

Apart from that, Kim (2023) asserted that, AI can be a very useful tool that can assist L2 researchers by gathering necessary information such as the writing structure, relevant sources, and new insights about the topic. AI also can provide feedback on the writers’ paper. In addition, Generative AI such as ChatGPT and Gemini have the ability to generate a variety of content, written and unpublished, which is generally distinguished by a high degree of uniqueness, consistency of ideas, and depth of existing scientific understanding (Quintans-Júnior et al., 2023).

Although AI is a great assistance for students in their essay writing, there are many issues regarding the use of AI such as ChatGPT and Gemini in education. There are cases of students copying the essays from AI tools mainly ChatGPT as it can provide personalised answers based on the students’ manuscripts. The use of AI tools also leads to cheating during online exams and plagiarism in research papers. Thus, it is the responsibility for the instructors and teachers to provide proper guidance to students in using AI. As supported by Lodge et al. (2023), one of the main challenges of teachers is to equip students with proper knowledge in using AI tools.

Methodology

In this study, the principles of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Moher et al., 2015) was used. Researchers explained the eligibility criteria, information sources, data-collection processes, data items, and synthesis of the results. For example, this study reviewed publications indexed in recognized and reputed journals to obtain an overview of AI utilization, specifically in determining the learner types, the AI technology used for essay writing and the theories underpinning AI applications in the field of writing.

Selection of Criteria

To obtain the data for this study, the scientific articles published in two reputable databases were used: Social Sciences Citation Index (SSCI) and SCOPUS databases. The articles chosen were based on the AI utilisation in the field of writing. The two databases were chosen as they are known as reputable and highly-cited journals in the academic world (Bar-Ilan, 2018). The articles in these two databases are more reliable compared to the rest. In addition, they are the main resources of many review studies.

For SSCI-indexed articles, the Web of Science (WOS) was the access point in using advanced search functions, with the input search items ‘artificial intelligence’, and ‘writing’. Also, the parameters were set specifically for this study. For example, the language was limited to only English articles, and the document types were limited to articles and proceeding papers. Finally, the articles collected were from the period of year 2013 until year 2023. A duration of 10 years was adequate to observe the AI trends in writing and the recent use of AI (Jen & Salam, 2024). The results from WOS yielded 8 studies that are used in this study.

Moreover, advanced search functions were also used in the Scopus database, with the same query as the WOS database, except for a slight difference from WOS. For example, there was no
‘Topic’ function, but ‘Topic’ in WOS was similar to the ‘Title, Abstract, and Keyword’ function in SCOPUS. However, ‘keyword’ in this review was not included in the query string to bring more validity to the results (Bar-Ilan, 2018). Similar to Web of Science (WOS) database, similar parameters were also used in Scopus database. The language was limited to English and the document types were limited to articles and proceeding papers. Finally, the articles collected were from the period of the year 2013 until the year 2023. The search from SCOPUS yielded 71 results, with the last search conducted on 22 December 2023.

The approach for the paper selection process is shown in Figure One.

![Figure 1. The Procedure Involved in The Systematic Review Process](image)

In order to conduct the systematic review process, a set of inclusion and exclusion criteria that were used for the systematic review in this study were presented in Table One. Following the criteria applications, 79 articles were found to be relevant to the study’s purpose.
Table 1. Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion</th>
<th>Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Research must include empirical study.</td>
<td>• Articles do not address the actual application of AI in writing.</td>
</tr>
<tr>
<td>• Must involve AI as primary or additional</td>
<td>• Symposium, editorial writings,</td>
</tr>
<tr>
<td>component in learning language.</td>
<td>meeting abstracts, book, book</td>
</tr>
<tr>
<td>• The articles present results of the</td>
<td>chapters, master thesis, PhD thesis,</td>
</tr>
<tr>
<td>application of AI for academic writing and</td>
<td>biographical items are excluded.</td>
</tr>
<tr>
<td>the instruments used in evaluation of AI</td>
<td>• Articles that mention the term</td>
</tr>
<tr>
<td>involved,</td>
<td>‘artificial intelligence’, but are about other topics.</td>
</tr>
<tr>
<td>• Types of documents included journal articles,</td>
<td>• Abstract only paper</td>
</tr>
<tr>
<td>and conference proceedings, written in English.</td>
<td>• Design-based research</td>
</tr>
<tr>
<td>• The target language can be either in English</td>
<td>• The study does not present the results clearly and the instruments used</td>
</tr>
<tr>
<td>or other languages.</td>
<td>in the evaluation of AI.</td>
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</table>

Research Procedures

All 79 articles were downloaded, examined and read thoroughly to determine the inclusion eligibility in the final review. The inclusion and exclusion criteria presented in Table One were applied during the stage. Also, the articles were selected during the study’s discussion on AI usage in the teaching of essay writing.

Nonetheless, the articles mentioning AI elaborated on writing, with no discussion on the effects of using AI, design-based studies, conceptual and theoretical frameworks, and abstract-only papers were excluded. The relevant information was organized and presented in the form of a table using Microsoft Excel. In addition, the data collected from the articles were determined using the qualitative content analysis method, which allowed for more systematic and objective categorizations of qualitative data (Akçayır & Akçayır, 2017).

All the articles were analysed, synthesized, and presented in relevant diagrams based on the outlined research questions. Some of the information was derived from the articles with word searches to find keywords, such as paper distribution according to time, learner types, and research designs.

Categories

The year of the journal publications ranged from 2013 to 2023 in this review. The 10-year span was adequate to observe the research trends using AI, specifically in the direction of academic writing concerning AI technology. Types of learners were divided into 4 main groups: preschool or kindergarten, primary school, secondary school, college or tertiary students, in-service teachers and senior citizens. The AI tools used were divided into tools for idea generation that include Wordtune, ChatGPT, Google Bard and tools that provide corrective feedback such as Grammarly and Turnitin. Learning theories that support the use of AI in writing are also discussed in this study. The findings of the study are summarized in the following section.
Results

Research Question 1: Types of Learners Commonly Selected for The Research

Figure 2. Types of Learners Commonly Selected for The Research

Figure 2 shows that from the 32 samples involved in this study, 23 samples or 71.9%, of the respondents were from high school, two samples or 6.25% of the respondents were from secondary school while another three samples 9.38% from kindergarten. One sample or 3.12% of the respondents were elderly people and lastly, three samples or 9.37% of the respondents were in-service teachers. This shows that AI has been used extensively in higher education institutions for essay writing but not in other education institutions. Thus, there is a need to carry out studies regarding the use of AI in other educational institutions as well.

Research Question 2. Types of AI Tools Used in Writing

Figure 3. Types of AI Tools Used in Writing

Figure Three shows the AI tools that have been used for writing based on the studies conducted. Basically, the AI tools used for writing can divided into four main categories: AI based platforms, tools for writing, tools for evaluation or correction and tools for grading. The main tools involved in AI for writing are AI tools for writing. These tools help users in idea generation. Some of them can also provide feedback or evaluation for users' writing. There are
many types of AI tools for writing. However, the main AI tool for writing is ChatGPT. It was mentioned in 20 articles, followed by Google Bard three times and Perplexity two times. Other AI tools for writing mentioned in the studies include BLOOM, ChatSonic, Cloude, Whisper, Jasper Chat, AJET Digital, Dream Writer, Jenni, Kuai Bi Xiao Xi, Inspire, Xiao Ming, A Tong and A Le.

The second most studied AI tools for writing are automated written corrective Feedback tools with Grammarly as the most frequently studied tool. Grammarly occurred in four of the studies conducted. Other automated written corrective feedback tools included in the study are Worldvice AI Proofreader, Perfect It, and Prowriting Aid. The third most studied AI tools are automated scoring tools or Automated Essay Scoring (AES). It occurred 4 times in the studies conducted. In addition, automated grading tools or automated evaluation tools have occurred twice in the studies conducted. Besides, AI Translator Baidu, was also involved in one of the studies conducted. Finally, AI-based platforms such as Sudo Writer, Jasper, Shortly AI, and Idealthon were also involved in the studies conducted.

This shows that there is a variety of AI tools that can help in the process of essay writing such as idea generation, evaluation of essays, or essay grading. Furthermore, AI can also be integrated into platforms to assist students in learning writing. However, most of the studies so far have been centred on the use of ChatGPT. Thus, there is a need to carry out research in examining the use of other types of artificial intelligence tools as well (Jen & Salam, 2024).

**Research Question 3: Theories or Concepts Mentioned in The Studies**

<table>
<thead>
<tr>
<th>Learning Theories/Concepts</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructivism</td>
<td>2</td>
</tr>
<tr>
<td>Social cognitive theory</td>
<td>4</td>
</tr>
<tr>
<td>TAM model</td>
<td>2</td>
</tr>
<tr>
<td>21st-century learning skills</td>
<td>2</td>
</tr>
<tr>
<td>AI literacy framework</td>
<td>2</td>
</tr>
</tbody>
</table>

In total, there were 12 learning theories or concepts mentioned with the use of Artificial Intelligence in writing. The learning theories that are mentioned more than once in this study include constructivism, social cognitive theory, TAM model, 21st-century learning skills and AI literacy framework. On the other hand, learning theories that are only mentioned once in this study include Theory of Planned Behaviour Model, Self-Determination Theory, Item-Response Theory, CALL, complex thinking, connectivism and Social Constructive Theory. All these learning theories guide and support the use of AI in teaching essay writing to students.

**Conclusion**

This paper presented a systematic review regarding the utilisation of Artificial Intelligence in the field of essay writing within the span of 10 years starting from the year 2013 to 2023. A total of 79 papers were collected and evaluated for this purpose. The findings of the study show that most of the studies so far centre on higher learning institution students. There is still lack of studies with other types of learners such as young children and secondary school students. Studies done by Chiu et al. (2023), Dai et al. (2023), Pradana et al. (2023), Rudolph et
al. (2023) and Su and Yang (2023) have highlighted the benefits of AI tools for writing. Among the benefits of AI tools for writing include generation of ideas, provision of feedback, and evaluation of students’ scripts. This study highlighted the apparent gaps in AI tools for essay writing such as there is still lack of studies among other types of learners apart from higher educational institution students. Thus, there is a need to carry out more studies on other age group of students. Apart from that, there is a need to carry out research with other AI tools. This is because studies on other AI tools for essay writing apart from ChatGPT are still lacking. As asserted by Alharbi (2023) and Jen and Salam (2024), future research should concentrate on using different AI tools to evaluate students’ writing performance.

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**Conflicts of Interest**
The authors declare no conflict of interest.

**Authenticity**
This manuscript is an original work

**Artificial Intelligence Statement**
AI and AI-assisted technologies were not used.

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**References**


Chiu, T. K., Moorhouse, B. L., Chai, C. S., & Ismailov, M. (2023). Teacher support and student motivation to learn with Artificial Intelligence (AI) based chatbot. Interactive Learning Environments, 1-17.


