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The Pedagogical Impact of AI-Assisted Idea Generation on Self-Efficacy and Idea Development Skills in General Foundation Program Students' Research-Based Essay

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Abstract

Foundation Program students often struggle to generate research ideas and organise their thoughts when writing research-based essays, which can undermine their confidence and academic performance. Traditional assessment methods provide limited insight into students' independent development of ideas. However, recent advances in educational technology, particularly Artificial Intelligence (AI), offer new opportunities to support learning. This study aims to investigate the pedagogical impact of AI-assisted idea generation on General Foundation Program (GFP) students' self-efficacy and idea-generating skills in research-based essay writing. The study adopts a quantitative research design using a single-group pre-test and post-test approach. The sample consists of 25 randomly selected GFP students. The intervention is conducted over a period of 4-6 weeks. Students use ChatGPT as their primary AI tool for brainstorming, outlining, and refining ideas. Students' self-efficacy is measured based on a structured questionnaire, while idea development skills are assessed through a writing rubric. Data is analysed using paired-sample comparison. The results indicate improvement in both self-efficacy and idea development. The study highlights the importance of integrating AI tools into writing instruction to enhance student confidence and performance.

Keywords:- Artificial Intelligence (AI), idea generation, self-efficacy, pedagogical impact, General Foundation Program (GFP), educational technology, research-based essay

I. INTRODUCTION

Developing strong writing skills is a fundamental requirement for students in the General Foundation Program (GFP), as it prepares them for the academic demands of higher education. However, writing research-based essays remains a challenging task for many students, particularly when it comes to generating and developing ideas. These challenges often lead to low confidence and limited engagement in the writing process. In today's digital learning environment, students are not only expected to acquire knowledge but also to use technology effectively to support their learning. Artificial Intelligence (AI) has recently emerged as a powerful educational tool that can assist students in overcoming common learning difficulties. Tools such as ChatGPT provide immediate support by helping students brainstorm ideas, organise their thoughts, and improve the structure of their writing.

The integration of AI into writing instruction offers a new approach to addressing students' difficulties in idea generation. By providing guided support during the early stages of writing, AI tools may help students become more confident and capable writers. This is particularly important for GFP students, who are still developing their academic writing skills. This study investigates the impact of AI-assisted idea generation on students' self-efficacy and idea development skills in research-based essay writing. It focuses on how the use of AI tools can support students in building confidence and producing clearer, more organised, and well-developed written work.

II. LITERATURE REVIEW

2.1. Pedagogical Impact of AI in Writing Instruction

The integration of Artificial Intelligence (AI) in education has introduced new pedagogical approaches to teaching and learning. AI tools can support teachers by providing additional guidance to students during the writing process. In writing instruction, AI-assisted tools such as ChatGPT can be used to support idea generation, organisation, and development. Research suggests that AI has the potential to enhance teaching practices by promoting more interactive and student-centred learning environments (Holmes et al., 2019).

From a pedagogical perspective, AI tools allow teachers to shift from a traditional teacher-centred approach to a more student-centred learning environment. Students are able to explore ideas independently while receiving immediate support, which can enhance both their engagement and learning experience (Luckin et al., 2016).

2.2. Self-Efficacy in Writing

Self-efficacy is an important factor in students' academic success, particularly in writing tasks. It refers to students' belief in their ability to complete a task successfully. According to Albert Bandura (1997), students with high self-efficacy are more confident, motivated, and willing to engage in challenging tasks. In writing, students with higher self-efficacy are more likely to generate and develop ideas effectively (Zimmerman, 2000).

2.3. Idea Generation and Idea Development in Writing

Idea generation and idea development are essential components of research-based essay writing. Many students struggle to generate relevant ideas and expand them into clear and organised paragraphs. Research by Steve Graham and Dolores Perin (2007) shows that structured support can significantly improve students' writing skills and help them produce more coherent essays. Providing guided instruction allows students to better organise and develop their ideas (Hyland, 2003).

2.4. ChatGPT as an AI Tool for Idea Generation

Recent developments in AI have introduced tools that specifically support writing tasks. One such tool is ChatGPT, which is widely used by students for idea generation and writing support. ChatGPT can assist learners in brainstorming ideas, organising content, and refining their writing by providing immediate responses and suggestions. AI-based tools have been shown to support writing development by offering timely feedback and scaffolding (Godwin-Jones, 2018).

2.5. The Relationship Between AI Use and Self-Efficacy

The use of AI tools, including ChatGPT, may positively influence students' self-efficacy. When students receive support and guidance during writing tasks, they may feel more confident in their abilities. This increased confidence can lead to better engagement and improved writing performance. Studies in educational psychology suggest that supportive learning environments enhance students' self-efficacy and motivation (Schunk, 2012).

III. METHODOLOGY

3.1. Research Design

This study adopts a quantitative research design using a single-group pre-test and post-test approach. This design allows the researcher to measure changes in students' self-efficacy and idea development skills before and after the intervention. Quantitative designs are commonly used to examine cause-and-effect relationships in educational research (Creswell, 2014).

3.2. Participants

The participants in this study consist of 25 students enrolled in the General Foundation Program (GFP) at the National University, School of Foundation Studies. Students are randomly selected from the F2 level. All participants share a similar academic level and are currently developing their research-based writing skills.

3.3. AI Tool Utilised

The AI tool used in this study is ChatGPT. The selection of this tool is based on students' prior familiarity and positive feedback regarding its usefulness in classroom activities. Students use ChatGPT to generate ideas, organise their thoughts, and refine and improve their writing. The use of AI tools in writing has been shown to provide immediate feedback and support during the learning process (Holmes et al., 2019).

3.4. Instruments

3.4.1. Self-Efficacy Scale

A structured scale is used to measure students' self-efficacy in writing. The scale is administered before and after the intervention to identify changes in students' confidence levels. Self-efficacy measurement is widely used in educational research to assess learners' beliefs about their abilities (Bandura, 1997).

Table 1. Dimensions of Self-Efficacy in Writing

Dimension	Description
Idea Generation Confidence	Students' confidence in their ability to generate ideas for an essay.
Organization Confidence	Students' confidence in organising ideas clearly and logically.
Development Confidence	Students' confidence in expanding ideas into full paragraphs.
Task Initiation Confidence	Students' confidence in starting a research-based essay.
Coherence Confidence	Students' confidence in connecting ideas smoothly.
Writing Completion Confidence	Students' confidence in completing essays independently.

Self-efficacy in writing was measured through several key dimensions, as presented in Table 1.

3.4.2. Writing Rubric

A rubric is used to assess students' idea development skills in research-based essays. These dimensions were assessed using a rubric with scores ranging from 1 (weak) to 4 (excellent), where higher scores indicate better idea development. Rubrics provide a reliable method for evaluating writing performance in a structured way (Hyland, 2003).

Table 2. Dimensions of Idea Development in Writing

Dimension	Description
Idea Relevance	The extent to which ideas are related to the essay topic.
Idea Clarity	The clarity and understandability of the ideas presented.
Organization	The logical arrangement of ideas within the essay.
Coherence	The smooth connection and flow between ideas and paragraphs.
Idea Development	The extent to which ideas are expanded with explanations and examples.
Argument Support	The use of examples, details, or evidence to support ideas.

3.5. Procedure

The study is conducted over a period of 4–6 weeks and follows these steps:

- Students complete a pretest, including the self-efficacy questionnaire and a writing task.
- Students are introduced to ChatGPT and trained on how to use it for idea generation and writing support. They are also guided on how to provide clear and precise prompts to obtain effective and suitable responses. Students practice writing essays using AI assistance during the intervention period.
- At the end of the intervention, students complete a post-test, including the same questionnaire and a writing task.

3.6. Data Analysis

The collected data is analysed using paired-sample comparison to examine differences between pretest and post-test scores. This method is used to determine whether there is a significant enhancement in students' self-efficacy and idea development skills after the intervention (Creswell, 2014).

IV. RESULTS

4.1. Self-Efficacy

The results indicate clear progress in students' self-efficacy after the intervention. The mean score increased from 2.8 in the pre-test to 4.1 in the post-test. This suggests that students became more confident in their ability to generate and develop ideas in research-based essay writing.

4.2. Idea Development

Students' idea development skills also showed significant improvement. The mean score increased from 7.5 in the pre-test to 12.8 in the post-test. This indicates that students were able to produce more organised, coherent, and well-developed ideas after using AI-assisted support.

V. DISCUSSION

The findings of this study indicate that AI-assisted idea generation has a positive impact on both students' self-efficacy and their ability to develop ideas in writing. The improvement in self-efficacy scores suggests that students became more confident in their writing abilities after receiving support from AI tools. This result is consistent with the theory of Albert Bandura (1997), which emphasises that increased support and successful experiences can enhance students' confidence. When students are provided with guidance during the writing process, they are more likely to feel capable of completing tasks successfully.

Furthermore, the improvement in idea development skills aligns with the findings of Steve Graham and Dolores Perin (2007), who highlight the importance of structured support in improving writing performance. The use of ChatGPT provided students with immediate assistance in generating and organising ideas, which contributed to better writing outcomes. These

findings also support previous research on the pedagogical use of technology in education. Studies suggest that AI tools can enhance learning by providing interactive and supportive environments (Holmes et al., 2019). In this study, AI tools helped reduce students' difficulties in idea generation and allowed them to engage more actively in the writing process.

From a pedagogical perspective, the results demonstrate that integrating AI tools into writing instruction can improve both students' skills and their confidence. This supports the shift towards more student-centred learning environments, where learners are encouraged to explore ideas independently while receiving guided support (Luckin et al., 2016).

Overall, the findings confirm that AI-assisted idea generation is an effective strategy for improving students' writing performance and self-efficacy in the General Foundation Program.

VI. CONCLUSION

This study examined the impact of AI-assisted idea generation on students' self-efficacy and idea development in research-based essay writing. The findings show that using AI tools (Chat GPT) can support students in generating and organising ideas effectively.

Students demonstrated improved confidence in their writing, as well as clearer and more developed ideas, after the intervention. This suggests and shows that guided support can help to reduce difficulties in the writing process and improve overall performance.

VII. RECOMMENDATION AND IMPLEMENTATION

Based on the findings, it is recommended that AI tools be included in writing lessons to support students during idea generation. Tools like ChatGPT can help students think of ideas, organise them, and improve the overall structure of their writing. Research suggests that AI can support learning by offering quick feedback and increasing student involvement (Holmes et al., 2019).

In the classroom, teachers can ask students to use AI for planning their essays before writing. At the same time, students should be guided to use AI carefully and depend on their own thinking. This helps maintain their independence while improving their learning (Schunk, 2012).

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