"Using Artificial Intelligence Applications for Developing EFL University Students' Research Writing in MSA University"

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"استخدام تطبيقات الذكاء الاصطناعي لتطوير مهارات كتابة الأبحاث لطلاب اللغة الإنجليزية كلغة أجنبية في جامعة MSA"

مستخلص:

تهدف هذه الدراسة إلى التحقيق في تأثير استخدام بعض الأنشطة الاصطناعية المقترحة لتطوير كتابة الأبحاث في تخصص اللغة الإنجليزية كلغة أجنبية لطلاب السنة الثالثة في جامعة إم إس إيه. كان مشاركو الدراسة عبارة عن 30 طالبًا في السنة الثالثة في كلية اللغات في جامعة إم إس إيه خلال العام الأكاديمي 2022-2023. شملت أدوات الباحث قائمة التحقق من البحث وجدول تقييم واختبار كتابة الأبحاث قبل وبعد الدورة. تم تدريس المشاركين باستخدام بعض التطبيقات الاصطناعية ذات الصلة التي صممها الباحث وتضمنت "شات بوت" و"جوجل كولاب" وأكواد "بايثون" و"ترانسفورمرز" و "Mendley" و"Grammarly" و "Turnitin". تم تحليل درجات المشاركين في الاختبارين القبلي والبعدي إحصائيًا باستخدام اختبار تي وحجم التأثير. أظهرت نتائج الدراسة تأثيرًا إيجابيًا لاستخدام تطبيقات الذكاء الاصطناعي في تعزيز مهارات كتابة الأبحاث لطلاب الجامعة في السنة الثالثة.

الكلمات المفتاحية: (كتابة الأبحاث – تطبيقات الذكاء الاصطناعي).

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Abstract :

This study aimed to investigate the effect of using some proposed AI activities For developing EFL research writing for the third year students in MSA university. Participants of the study were 30 students in the third year in the faculty of languages in MSA university in the academic year 2022– 2023. The researcher`s instruments included research checklist, a rubric and a pre/post research writing test. Participants were taught through using some relevant AI applications designed by the researcher that included chatbot, google colab , python codes , transformers , Mendley, grammarly and Turnitin . Participants' scores on the pre and posttest were statistically analyzed using T- test and effect size. Results of the study revealed the positive effect of using AI applications on enhancing third year university students' research writing skills.

Key words: (Research writing- AI applications).

Introduction :

Research writing is always regarded as vital competence for both the professional success and the academic success . English as a foreign language students have difficulties in producing high quality researches.It is argued that research writing is not a natural activity; it is a complex activity as the writer must demonstrate and control over multiple variables simultaneously (Nunan, 1989). Variables include thinking, relevant knowledge, ideas, and vocabulary (Anwar & Ahmed, 2016). Writing components identified by Ampa and Quraisy (2018) are structure, vocabulary, content, organization, and mechanics. In addition to the myriad of variables involved, students must observe the writing conventions of the second language. They have to document sources, summarize and paraphrase well . They also have to avoid plagiarism. Thus, students need to overcome the complexity to compose correctly. In addition to the linguistic skills involved, the writing process includes steps that students should follow towards the final production of the writing piece, such as generating ideas, organizing, drafting, revising, and editing (Khattar, 2019).

As for teaching research writing, traditional teaching of research writing in higher education do not gurantee the exact aid for students as it only focusses on individual tasks to duplicate writing models .As a shift from the traditional classes to online based technologies , digital techniques and AI is recommended to be implemented to foster and support the learning process in higher education EFL research writing classes(Linh and Ha, 2021). These digital technologies should involve the students in an interactive learning experience. Of such digital technologies, some programs based on artificial intelligence are used to enhance and support the learning process.

To enhance a more personalized assistance with interactive learning experience, AI applications are used for developing EFL students' research writing. AI applications such as grammarly , Mendley , quillbot,turnitin,and google colab are marvelous applications to allow learners to communicate whether online via text or speech , as they create human-like conversations (Clarizia et al., 2018).

Therefore, the researcher proposes using AI applications and designs AI programs to help the students to summarize, paraphrase, evaluate the sources, set goals and achieve them, plan well, and revise their work. That is to say, the researcher proposes AI applications to help the students to write a proper research paper.

Statement of the problem:

It has been a common complaint often heard in Egypt that university students are in capable of writing research in a proper way. Therefore, the present study is an attempt to solve this problem through a program using AI (artificial intelligence) applications for developing EFL university students' research writing skills.

Context of the problem:

The researcher has noticed the low performance of ENG201 (English for research purposes) third year language students in MSA university. Most of students' research skills are not up to university requirements. This happens despite the great efforts exerted by all team members to refine material, update and organize the course content.

Research questions:

1- What are the research skills required for university students in MSA University?

2- What is the effect of a program based on artificial intelligence applications for developing EFL university students' research writing skills in MSA University?

Hypotheses of the study:

1-There is statistically significant difference between the experimental group and those of the control in the post research-writing test at (0.05) level in favor of the experimental group.

2- There is statistically significant difference between the experimental group and those of the control in the post research-writing sub skills at (0.05) level in favor of the experimental group.

Review of related literature:

Research writing:

Research writing is piece of academic writing based on its author's original research work on a particular topic and the analysis and interpretation of research findings. In other words, a research paper is an expanded essay that presents your own interpretation or evaluation or argument. It involves surveying a field of knowledge in order to find the best possible information in that field. It refers to academic research using systematic way aim to finding, proofing, and developing knowledge. Undergraduate research writing is always persuasive and informative. That is because they attempt to educate the reader and to convince that reader to do something. Also, that is because the goal of the researcher is to make the reader believe that the solution is practical and appropriate.

According to Rajasekar et al. (2013) research is significant in scientific and unscientific fields. In EFL area, different problems, activities, and methods happen

daily. That's why researches are carried out to find out causes, answers and justifications. Research writing is important as it offers strategies and guidelines for finding solutions. Also, it is important for students to boost their educational performance at higher education level (Sajid & Siddiqui, 2015). In addition, it paves the road for future scholary works. As the students not only learns how to conduct a research (selecting a topic, narrowing it down, reviewing literature, collecting data, and evaluating data), but it also helps the student to understand how to find answer of a question scholarly and scientifically.

Albeckay (2014) adds writing research paper will help the researcher to develop reading skills. That is to say that research writing develops reading for critical evaluation that is followed by critical reflection not just reading to get the purpose of knowledge. It helps to reason as you read any article, to know the hidden agenda of the writer. It helps the researcher to develop the skills of inferring meaning and making conclusions based on what he / she read. It helps the researcher to think differently when he/she reads something. In short the purpose of reading several sources here (for a research paper) is to understand, break into pints, evaluate and conclude it. Research writing is not important only for developing reading, but is also important for developing writing skills.

Artificial intelligence :

Artificial intelligence is an approach that employs the use of new innovative technologies in facilitating learning and facing the challenges result from unmotivated learning and the absence of expert teachers. Artificial intelligence could be leveraged to create a better student experience. The benefits of artificial intelligence (AI) in online learning and teaching are broad (Anderson, 2013;Seo et al., 2021), ranging from personalized learning for students and automation of instructors' routine tasks to AI-powered assessments.

Seo et al (2012) explain that the main objectives and aims of AI is to stimulate human intelligence and processes , and that may appear in learning, thinking, and processing natural language and conversation through the use technology. AI applications differs and varies and listed the most significant applications that may be used in education. AI Applications provide a comprehensive instructional practice and plagiarism detection component that may assist ESL in research writing progress (Zawacki-Richter et al., 2019). Furthermore, the idea of AI compounded with Mobile teaching and learning (m-learning) is emerging in higher education (Pedro et al., 2018), which can afford new opportunities to enhance pedagogical flexibility, learning process or outcome, and feedback immediacy (Cheung, 2015).

Methods and procedures:

The variables of the study are :
1.   AI applications
2.   EFL research writing skills

Sample of the study:

The subjects of this study were selected at random from Faculty of languages Students' English research writing in the academic year 2022- 2023.The mean age of the sample ranged between 18 And 21 years old. The particiapnts were divided into two groups experimental group (N30), and control group (N 30).Moreover, the Students in the experimental group were informed that the study was being carried out with the aim of developing their research writing skills using AI applications ; they were pleased to take part in the experiment.

Design of the Study:

The current study utilized the experimental design employing two groups. One group was receiving the program which relied on applications for developing research writing skills. The second group was receiving traditional teaching through the academic year 2022-2023. A pre- post test was administered to the two groups before and after the treatment.

Instruments of the study:

The present study utilized the following instruments to carry out the treatment:

Research writing checklist
Research writing test.
Rubric

1- The Checklist of research Writing Skills

The prime form of the checklist was designed in light of the under- mentioned items:

1- Reviewing the literature and previous related studies concerned with fostering the development of research writing sub-skills in EFL context.

The reason for which the researcher used the checklist was the identification of the most salient research writing skills so as to suit third year university students and construct the research writing test to be used as a pre-posttest. The checklist, in actuality, is comprised of 18 sub-skills classified as title, introduction, statement of the problem, scope of the study and delimitation, research questions/ hypothesis, outline of subsections, literature review, methodology/ theoretical framework, data analysis and interpretation, results and findings, discussion , conclusion , content, avoiding plagiarism, language and style, mechanics, reference, and appendices. A

three-point rating scale ranging from highly required to not required incorporated into the checklist.

Validity of the Checklist

The checklist was submitted to a panel of jury specialized in the domain of curriculum and instruction (TEFL) so as to determine the degree of salience of each sub-skill and its appropriateness for third year university students. The jury members contended that the skills subsumed into the checklist were largely adequate and appropriate to its purpose.

2-The Research Writing Test

Aim of the test

The researcher constructed and administered a pre-post research writing test, which can be utilized prior to the program implementation to ascertain that the students in the experimental group are comparable to their counterparts in the control group in their writing levels before commencing the experiment. The progress achieved by the experimental group would be thus unequivocally attributable to the suggested program based on artificial intelligence and self-regulation to master the research writing skills of this group.

Context of the test

The Pre-post test aimed to measure students' overall research writing skills and the sub skills. These sub skills are: writing an academic title and introduction, writing clear objectives and literature review, writing data analysis, writing results and conclusion, writing with good language, and writing with good in text and full citation. The students were asked to write research of 5000 words. Students should critically read online sources and evaluate them whether academic and scholarly or not and should include these sources in the research and write a documented research of 5000 words. They had to use in text citation and compile a final reference list following the APA referencing system. The paper should be uploaded to Turnitin for plagiarism checking and then discussed in a presentation.

Validity of the test

To establish the validity of the EFL research writing skills test, it was submitted to a number of specialized jury members in the domain of curriculum and instruction to voice their opinions regarding the clarity of test instructions, the suitability of the topics to the level of the third year university students , and the clarity of the questions. The jury members confirmed that the test proved to be valid (see appendix A).

The Reliability of the test

Reliability of the test was statistically carried out by using test re-test method. Thus, the reliability co-efficient of the test were based on administrating of the test to students. The reliability of the test is measured by correlation coefficients between two tests and the table below illustrates the reliability coefficients.

Table (3) Reliability coefficients of the research writing test

Dimension	Correlation Coefficient (Reliability coefficients)	Level of significance
Title and introduction	0.919	0.01
Objectives and literature review	0.925	0.01
Analysis of Data	0.953	0.01
Results and conclusions	0.936	0.01
Language and style	0.929	0.01
Citation and referencing	0.948	0.01
Total	0.971	0.01

As shown in the above table, the Reliability coefficients for the all dimensions of the test are high, therefore the test was considered reliable for the purpose of the current study.

3-The scoring rubric for research writing test
The researcher used an analytical scoring rubric based on the features of the writing research that are adequate for the university stage students taking into consideration that this checklist track improving research writing. The research writing test has six aspects which are (Title and introduction, Aims, Objectives, Literature Review and integration of theoretical knowledge, Analysis of data, presentation of ideas, and Research methodology, Results and conclusions, Language, style, structure and voice, and Citation and referencing) each aspect was scored on a basis of scoring scale from (A) to (F) where "A" represents the highest performance level, while "F" represents the failing performance level.

Validity of the rubric:
The Rubric was submitted to a jury for validation and it has been approved.
Inter-rater reliability :

To ensure reliability of scoring, an analytical scoring was utilized to evaluate students' writing during the pre-posttest, which was conducted by two raters. To increase inter-rater reliability, the Pre-Posttest was first corrected by the researcher; then was blindly and secondly marked by a non-participating teacher and the average mark was taken.

Results of the study:

1- Findings of Hypothesis One

The first hypothesis states that "There is statistically significant difference between the experimental group and those of the control in the post research-writing test at (0.05) level in favor of the experimental group"

To verify this hypothesis, t-test for paired samples was used to investigate the difference between the post administration of the experimental group and that of the control group in the post-test of the EFL overall argumentative writing skills.

Table (4) presents the students' mean scores, standard deviations, t-value, and level of significance of the pre and post assessment of the control group and the experimental group in EFL research writing test

Table (4)

t" test between the control group and the experimental group in the post-test of the EFL overall research writing skills

EFL research writing skills	Group	No	Mean	STD	T VALUE	Sig
Overall research writing skills	Control	30	53.65	3.906	33.275	.000
	Experimental	30	85.27	3.028		

Table (4) demonstrates that the experimental group outperformed the control group in the overall argumentative writing skills, where "t-value" is (33.275) which is significant at the (.000) level. Thus, the first hypothesis is confirmed, and this shows the effectiveness of the program.

2- Findings of Hypothesis Two

The second hypothesis states that "There is statistically significant difference between the experimental group and those of the control in the post research-writing sub skills at (0.05) level in favor of the experimental group"

To verify this hypothesis, t-test for paired samples was used to investigate the difference between the post administration of the experimental group and that of the control group in the post-test of the EFL research writing sub-skills.

Table (5) presents the students' mean scores, standard deviations, t-value, and level of significance of the pre and post assessment of the control group and the experimental group in EFL research writing sub-skills.

Table (5)

"t" test between the control and the experimental group in the post-test of the EFL research writing sub-skills

Research writing skills	Group	No	Mean	STD	T value	Sig
Title,topic and the Introduction	control	30	4.30	1.264	20.630	.000
	Experimental	30	7.77	1.073		
Aims , Objectives and Literature	control	30	10.09	1.682	27.580	.000
	Experimental	30	17.23	1.165		
Analysis of data	control	30	20.23	3.906	52.795	.000
	Experimental	30	27.13	1.042		
Results and conclusion	control	30	11.67	2.187	35.661	.000
	Experimental	30	17.03	1.098		
language	control	30	3.73	1.081	18.288	.000
	Experimental	30	7.83	.747		
Citation and referencing	control	30	3.63	1.129	16.585	.000
	Experimental	30	8.27	.828		

Table (5) shows that that the mean scores of the experimental group in the post-test assessment are substantially higher than those in the pre-test assessment in the EFL research writing sub-skills, where "t" value is (20.630) for introduction skills, (27.580) for writing Aims , objectives and literature review , (52.795) for data analysis and integration of sources , (35.661) for Results and conclusion , (18.288) for language, and (16.585) for citation and referencing, which is significant at the level of significance. Thus, the second hypothesis is supported, and this demonstrates the efficacy of the program.

Figure (11)The mean scores between the control and the experimental group in the post-test of the EFL argumentative writing sub-skills
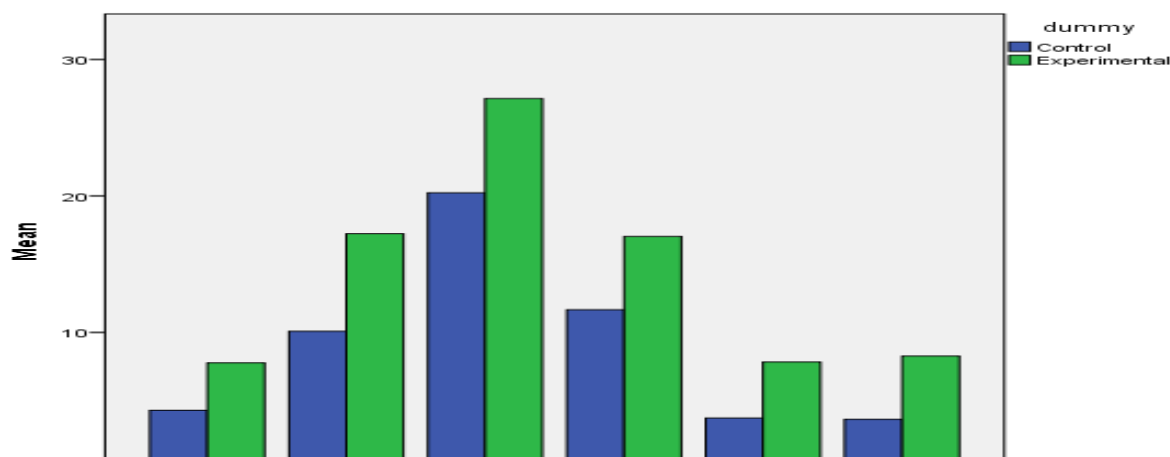
Discussion:

The overall purpose of the current study was to develop EFL research writing skills through a program based on AI applications and classroom application. The study examined the EFL knowledge of writing researches.The result of the present study revealed that the experimental group had significantly high scores in the post test. The findings corroborate the research of Fahmi and Cahyono (2021) who reported that ESP students got high marks in the TOEFL. However, these two researchers focused on using grammarly only for developing writing skills , but the present study focusses on developing EFl research writing skills using different applications google Colab, python , grammarly , Mendley Turnitin, two chatbots , and transformers. Also, this present study focusses on EFL writing research skills and how to develop the self-regulated learning. The participants in the experimental group who practiced AI applications and self-regulated learning outperformed their counterparts in the control group on the post-administration of the EFL research writing test. The data analysis demonstrated that the program proved to be statistically and educationally significant in developing third year university students EFL research writing skills. Effect size values were obtained through comparing the experimental group research writing test. Thus, the experimental students' considerable improvement in writing skills and sub-skills can be substantially attributed to the suggested program. These results revealed the significant effect of AI applications to enhance EFL writing and self regulated skills and this is consistent with the results of Fahmi and Cahyono (2021) ,Fryer (2006), and Tuomi (2018).

Conclusion:

This study investigated the effectiveness of using AI applications for developing research writing skills. This study gives scientific evidence of the effectiveness of the suggested program based on Artificial intelligence programs to refine the EFL research writing skills for third year university students. The effectiveness of the suggested program may be largely attributable to the numerous applications, activities, tasks, guides, and steps the researcher presented to the students to aid students produce fruitful results in this mode of research writing. It can also be concluded that the mentioned AI program can satisfy the majority of the learners in the language course . At last the significant point that was revealed by conduction of this research was that, using AI applications helped the students to be active learners rather than passive learners . Hence, it can be concluded that this AI

program is accepted by learners in addition to teachers, and providing that by considering learners' perceptions is necessary in language education particularly writing courses to improve learners' written accuracy originally.

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