"Using Artificial Intelligence Applications for Developing EFL University Students' Self Regulation Skills in MSA University"

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"استخدام تطبيقات الذكاء الاصطناعي لتطوير مهارات تنظيم الذات لطلاب اللغة الإنجليزية كلغة أجنبية في جامعة MSA"

مستخلص:

هدفت هذه الدراسة إلى التحقيق في تأثير استخدام بعض الأنشطة الاصطناعية المقترحة لتطوير مهارات تنظيم الذات 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 مقياس تنظيم الذات والفائدة المتوقعة وسهولة استخدام شاتبوت في تنظيم الذات أثناء التعلم. تم تدريس المشاركين باستخدام بعض التطبيقات الاصطناعية ذات الصلة التي صممها الباحث وتضمنت "شات بوت". 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 تنظيم الذات لطلاب الجامعة في السنة الثالثة.

الكلمات المفتاحية: (مهارات تنظيم الذات – تطبيقات الذكاء الاصطناعي).

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Abstract :

This study aimed to investigate the effect of using some proposed AI activities For developing self regulation skills 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 self regulation scale and the prececived usefulness and easeness of using chatbots to self regulate the learning. Participants were taught through using some relevant AI applications designed by the researcher that included chatbot. 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' self regulation skills.

Key words: (Self regulation skills - AI applications).

"Using Artificial Intelligence Applications for Developing EFL University Students' Self Regulation Skills in MSA University"

Introduction :

Self-regulated learning is an essential skill that can help students plan, monitor, and reflect on their learning in order to achieve their learning goals. Self-regulation skills are crucial for university students for better education.Self regulation helps the students to set their own goals , make their own plan , evaluate their selves, manage their time, and set future goals . However being important , many learners struggle to self-regulate effectively (Jansen et al., 2020), resulting in a deficiency in low academic performance (Kizilcec et al. 2017).

External support using artificial intelligence (AI) could be a potential way of supporting learners' successful SRL (Molenaar et al., 2022). However, supporting learners' SRL is challenging as it comprises metacognitive, cognitive, behavioral and motivational processes (Lodge et al., 2019), and is heavily influenced by contextual and personal factors. AI (artificial intelligence) with its applications is one of the promising and useful ways that may control the learning process for students.

According to Jia (2009), artificial intelligence is an intelligent computerized machine can create a dialogue between human and machine in a natural way situation. Dodigovic (2007) stated the role of artificial intelligence in education as artificial intelligence could diagnose some typical errors in writing in foreign and aid to overcome the errors and improve the second language. Many studies confirmed the benefits and merits of AI in teaching English in EFL classes (Mentsiev etal.,2019,seo et al.,2020).Moreover, Zou et al, (2020) stated that AI

Applications provide a comprehensive instructional practice that helps in self-regulating the learning.

Furthermore, the idea of AI compounded with Mobile teaching and 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).AI does not help in pedagogical flexibility and feedback, but it also helps in regulating the students work(Azevedo et al.,2009; Hut et al., 2021).

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 to self-regulate their learning 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 have problems in self-regulation. This happens despite the great efforts exerted by all team members to refine material, update and organize the course content.

Research questions:

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

2-What are students' perceived usefulness and ease of use of AI chatbots (goal setting and Toqa's chatbot)?

Hypotheses of the study:

1- There is an overall high positive self-satisfaction of students' self-regulation skills post the program.

2-There is an overall high positive self-satisfaction of students' goal setting chatbot post the program.

Review of related literature:

Self regulation skills:

Self-regulated learning is an overarching term that addresses how students approach their learning, work toward the goals, and evaluate their performance. The concept of self-regulation was taken from Bandura's social cognitive theory (1991) and then applied to the academics by Zimmerman (Dinsmore, et al., 2008). Social cognitive theory views SRL as a dynamic changing process, in which the interaction of personal, behavioral, and environmental factors affect one another (Bandura, 1991).

Zimmerman (2002) pointed out that it is all about the efforts made by individuals to accommodate thoughts, feelings and actions towards goals that have been set from the beginning. In order to achieve such goals, students and learners should follow certain strategies which include actions and process in terms of gaining information. Panadero & Alonso-Tapia (2014) have defined self-regulated learning as it is related to how students control their cognitive, behavioral,

emotional, and motivational strategies to achieve the goals that were set from the beginning. Truong (2017) assert the previous definition and they pointed out that there are two important strategies tackled in self-regulated learning namely cognitive and regulation strategies.

There are many models of self-regulated learning that are developed by experts. The model adopted in this study is the second model of self-regulated learning which is Cyclical Phases of Self-Regulated Learning .This model explains the connection between cognitive and motivation of learners .SRL is a cyclic process that involves three main phases: (a) forethought, (b) performance phase, and (c) self-reflection (Zimmerman, 2002). The first phase which is the **forethought phase.** Processes and beliefs that precede learning make up the initial forethought phase. Learners participate in task analysis in the form of goal setting and strategic planning during this phase. According to Bagazi (2016), these phases can be splited into **Task analysis** that contains **goal setting** and **adopting powerful strategies for attaining goals**. Goal setting refers to deciding on specific learning outcomes ,and Strategic planning involves selecting or creating a strategy to optimize one's performance(Zimmerman,2002) . The second phase which is called **performance phase** consists of processes that occur during learning. In this phase, students usually focus on the task and they perform different tasks such as self-control, imagery, self-instruction, imagery, and attention focusing. Students in this phase usually track their own performance and its effects through self-observation such as self-recording and self-experimentation. According to Bagazi (2016), this phase can be split into **monitoring one's performance, restructuring one's physical and social context to make it compatible to one's goal and managing one's time effectively**. The third phase is called the self-reflection phase that

consists of processes that follow students' learning. In this phase, students are required to evaluate their performance through **self-judgment** processes such as the self-evaluation and casual attribution and **self-reaction** processes such as self-satisfaction and being adaptive and defensive.

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.

One of the promising AI tools is chatbot. Chatbots are machine agents that serve as natural language user interfaces to provide data and services (Dale,2020). In recent years this technology has been employed for multiple purposes mainly in messaging applications. Chatbot promises to solve a variety of problems in education today. One of the biggest advantages of chatbot is that it can support students individually and intently (Poirier, et al, 2023). Other research has confirmed that chatbots can be virtual companions for users intended to resolve availability issues, provide support and customer assistance powered by artificial intelligence. In the higher-education, a chatbot can be trained from a wide variety of resources ranging from learning experiences to learning materials. According to Poirier et al (2023),chatbots are trained to answer common questions about the study of a subject. This motivates learning supports more quickly and conveniently. In Poirier et al (2023), the use of a chatbot in an educational context for the

automation of higher education student care is presented. In this study it is used to self-regulate the learning of the students.

Methods and procedures:

The variables of the study are :

1. AI applications
2. Self-regulation 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 participants 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 self-regulation 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 self regulation 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:

Self regulation scale

The perceived usefulness and easeness of using chatbot

1- Self-regulation scale

The researcher studied the available existing scales and reviewed the literature related to self-regulation to create the Self-regulation Scale which focuses on seven self-regulation skills namely, goal setting, Adopting powerful strategies for attaining the goals, Monitoring one's performance, Restructuring one's physical and social context to make it compatible to one's goal, Managing one's time effectively, Evaluating one's method (drafts), and Adapting future methods . The researcher used the existing scales and combined the items in the self-regulation literature to create 44 statements on the Self-regulation Scale and created her own.

Students must respond to each statement by choosing one of four options and the scoring of each option are as follows: Always=4, Sometimes=3, Seldom=2 and Never =1

The validity of the scale

The researcher conducted a pilot study to determine the validity of the questionnaire and to ensure that questions are clear and effectively solicit the desired information. The following modifications were suggested:

a) Reduce the number of items to 44 only instead of 74.

b) Difficult questions or vague wording were deleted to eliminate confusion or misunderstanding. None of the students complained that the questionnaire included difficult words or ambiguous meanings.

The construct validity of the Questionnaire was obtained by measuring the correlation coefficients for the (44) items of the Questionnaire with total degree, where the values of correlation coefficients ranged between (0.874 - 0.735), which are statistically significant values at the level of (0.01), which indicates the validity of the construction of the questionnaire. .

The reliability of the questionnaire

Reliability of the Questionnaire was statistically carried out by using Alpha Cranach method, thus the reliability co-efficient of the Questionnaire were based on administrating of the questionnaire to students. The reliability of the questionnaire is measured by Alpha Cranach equation. The reliability was (0.924). Therefore, the questionnaire was considered reliable for the purpose of the current study.

Administering the scale

The questionnaire was administered once towards the end of the semester and before the final exam revision. In order to ensure high return rate, completing the questionnaire was considered a requisite for submitting the Term Paper.

2- The perceived usefulness and easeness of using goal setting chatbot

The researcher studied the available existing scales and reviewed the literature related to goal setting by using scales which focuses on the usefulness and the easeness of using chatbot . The researcher used the existing scales and combined the items to create 8 statements and created her own.

Students must respond to each statement by choosing strongly agree, agree, neutral, disagree, and strongly disagree.

The construct validity of the Questionnaire was obtained by measuring the correlation coefficients for the (8) items of the Questionnaire with total degree, where the values of correlation coefficients are statistically significant values at the level of (0.01), which indicates the validity of the construction of the questionnaire.

Reliability of the Questionnaire was statistically carried out by using Alpha Cranach method, thus the reliability co-efficient of the Questionnaire were based on administrating of the questionnaire to students. The reliability of the

questionnaire is measured by Alpha Cranach equation. The reliability was (0.931). Therefore, the questionnaire was considered reliable for the purpose of the current study.

Results of the study :

1- Findings of Hypothesis One

2- There is an overall high positive self-satisfaction of students' self-regulation skills post the program.

Table (1) students satisfaction regarding self-regulation skills post the program

Statements	group	Mean	SD
Goal setting			
1- I set standards for my writing.	Control	1.93	0.640
	Experimental	3.73	0.450
2- I create certain goals for every writing task need to accomplish.	Control	2.07	0.521
	Experimental	3.77	0.430
3- I can narrow the topic before writing the research.	Control	2.07	0.691
	Experimental	3.77	0.430
4- I plan the contents and sub ideas of the research that I would write.	Control	2.03	0.669
	Experimental	3.67	0.479
5-I think of my target audience and reason for writing a certain piece.	Control	2.10	0.662
	Experimental	3.77	0.430
6- I set a specific time in which I would write my research.	Control	2.00	0.525
	Experimental	3.73	0.450
7- I have a certain word count for my research that I	Control	2.07	0.521
will work on.	Experimental	3.43	0.774
Adopting powerful strategies for attaining the goals	Group	Mean	SD
8-I brainstorm for ideas before I write.	Control	2.07	0.365
	Experimental	3.40	0.498
9- I can use my sub ideas to search for academic and	Control	1.97	0.183

scholarly sources.	Experimental	3.87	0.346
10- I can differentiate between academic scholarly articles a nonacademic articles.	Control	2.13	0.507
	Experimental	3.93	0.254
11-I read and understand the sources that I have collected.	Control	2.00	0.830
	Experimental	3.87	0.346
12-I identify the gaps in my research and search for additional sources to fill in the gaps.	Control	2.03	0.669
	Experimental	3.23	0.430
13- I use certain writing strategies such as annotating, outlining, summarizing, paraphrasing …etc. whenever doing a writing task.	Control	2.03	0.669
	Experimental	3.83	0.379
Monitoring one's performance	Group	Mean	SD
14- I proofread my work.	Control	2.00	0.371
	Experimental	3.73	0.450
15- I make sure that I integrated quotations with effective signal phrase.	Control	2.20	0.407
	Experimental	3.77	0.430
16- I make sure that I used the proper APA in text citation in the quotation, summarizing and paraphrasing.	Control	2.00	0.371
	Experimental	3.77	0.430
17- I make sure that I used the proper APA full citation.	Control	2.20	0.610
	Experimental	3.83	0.379
18- I use grammarly to check the grammar of my research.	Control	2.03	0.414
	Experimental	3.80	0.407
19-I reread my work several times to find some errors in my writing.	Control	1.47	0.507
	Experimental	3.60	0.563
20- I check my work on the general level then to the sentence level.	Control	1.93	0.365
	Experimental	3.83	0.379
21- I change some learning strategies when I find difficulties.	Control	1.87	0.346
	Experimental	3.50	0.509
Restructuring one's physical and social context to make it compatible to one's goal			
22- I avoid watching television when I am writing my research paper.	Control	2.03	0.669
	Experimental	3.63	0.490

23- I avoid using my cell phone whenever I am writing my research paper.	Control	2.03	0.669
	Experimental	3.50	0.509
24- I isolate myself in quiet places whenever I do my writing tasks.	Control	2.07	0.365
	Experimental	3.53	0.507
25- I can write efficiently when I am working in a clean and quiet environment	Control	1.97	0.183
	Experimental	3.63	0.490
26-I am able to finish a writing task when I am listening to music.	Control	2.13	0.507
	Experimental	3.87	0.346
27- I prefer having people or friends around when I write so that I can gather more ideas from them.	Control	2.07	0.365
	Experimental	3.73	0.450
Managing one's time effectively			
28- I create a time table of the writing outputs I need to accomplish.	Control	2.10	0.403
	Experimental	3.73	0.450
29-I use my calendar to set up plans for writing my research.	Control	2.00	0.371
	Experimental	3.63	0.490
30-I create a checklist of all the writing tasks I need to finish.	Control	2.07	0.365
	Experimental	3.37	0.490
31-I seek to finish my writing task before the deadline.	Control	2.17	0.592
	Experimental	3.90	0.305
32- I immediately start with the writing task as soon as the teacher gives it.	Control	2.10	0.403
	Experimental	3.77	0.430
33- I set an alarm for every writing task I have scheduled.	Control	1.50	0.509
	Experimental	3.60	0.498
34-I allot specific time for every writing task.	Control	1.93	0.365
	Experimental	3.77	0.430
Evaluating one's method (drafts)			
35- I take into consideration the comments of my instructor about writing.	Control	2.07	0.365
	Experimental	3.53	0.507
36- If the drafts of my outputs are not getting good marks, I ask an English teacher for help.	Control	2.03	0.669
	Experimental	3.87	0.346
37-I proofread and edit based on the instructor's suggestions.	Control	2.07	0.365
	Experimental	3.90	0.305
38-I am open to feedbacks which can help improve my research writing.	Control	2.17	0.648
	Experimental	3.47	0.507
39- I check if my research writing output matches the outline I created.	Control	2.00	0.371
	Experimental	3.57	0.728

40- I evaluate my written outputs after every session.	Control	2.13	0.629
	Experimental	3.40	0.770
Adapting future methods			
41- I take notes of the comments of the writing instructor and make sure that they are applied in the next writing activity	Control	1.97	0.183
	Experimental	3.63	0.490
42-I read more so that a wide range of knowledge is obtained for the next writing task.	Control	2.13	0.507
	Experimental	3.77	0.430
43-I reread written outputs carefully and finding the reasons/points of weaknesses/errors.	Control	1.90	0.403
	Experimental	3.70	0.466
44- I compile my work so that I can see the progress and development of my writing.	Control	2.13	0.819
	Experimental	3.13	0.900

Table (2) goal setting control and experimental mean, SD , t value and Significant

Goal setting	Mean	SD	T	Sig	eta	Eta squared	Effect size
Control	2.03	0.320	13.403	.000	0.933	0.870	Large
Experimental	3.69	0.190					

Analysis of the mean pre application and post application in table (7) revealed a significant difference (t = 13.403, sig .00) as students in the control group were not able to set their own goals and self regulate their learning , but the students in the experimental group were able to set their own goal before writing and self regulate their writing .Also by measuring the effect size the effect size was large .

Table (3) adopting powerful strategies control and experimental mean , SD , t value and Significant

Adopting powerful strategies for attaining the goals	Mean	SD	T	Sig	eta	Eta squared	Effect size
Control	2.03	0.242	13.539	.000	0.938	0.879	Large
Experimental	3.68	0.184					

Analysis of the mean pre application and post application in table(8) revealed a significant difference (t = 13.539 , sig .00) as students in the control group were not able to adopt powerful strategies for attaining goals and self-regulate their learning , but the students in the experimental group were able to adopt powerful strategies for attaining goals and self-regulate their writing .Also by measuring the effect size the effect size was large .

Table (4) Monitoring one's performance control and experimental mean , SD , t value and Significant

Monitoring one's performance	Mean	SD	T	Sig	eta	Eta squared	Effect size
Control	1.976	0.2574	12.995	.000	0.927	0.859	Large
Experimental	3.729	0.1944					

Analysis of the mean pre application and post application in table(9) revealed a significant difference (t = 12.995 , sig .00) as students in the control group were not able to monitor their own performance and self regulate their learning , but the students in the experimental group were able to monitor their own performance and self regulate their writing .Also by measuring the effect size the effect size was large.

Table (5) Restructuring one's physical and social context to make it compatible to one's goal control and experimental mean , SD , t value and Significant

Restructuring one's physical and social context to make it compatible to one's goal	Mean	SD	T	Sig	Eta	Eta squared	Effect size
Control	2.05	0.248	13.602	0.000	0.905	0.819	Large
Experimental	3.65	0.319					

Analysis of the mean pre application and post application in table (10) revealed a significant difference (t = 13.602 , sig .00) as students in the control group were not able to restructure their own physical and social context to make it compatible to their goal and self-regulate their learning , but the students in the

experimental group were able to restructure their own physical and social context to make it compatible to their goal and self-regulate their writing .Also by measuring the effect size the effect size was large .

Table (6) Managing time control and experimental mean , SD , t value and Significant

Managing time	Mean	SD	T	Sig	Eta	Eta squared	Effect size
Control	1.98	0.256	13.064	0.000	0.927	0.848	Large
Experimental	3.680	0.256					

Analysis of the mean pre application and post application in table (11) revealed a significant difference (t = 13.064 , sig .00) as students in the control group were not able to manage their time and self-regulate their learning , but the students in the experimental group were able to manage their time and self-regulate their writing. Also by measuring the effect size the effect size was large.

Table (7) evaluating one control and experimental mean , SD , t value and Significant

Evaluating one	Mean	SD	T	Sig	eta	Eta squared	Effect size
Control	2.077	0.2040	13.929	0.000	0.950	0.902	Large
Experimental	3.622	0.239					

Analysis of the mean pre application and post application in table (12) revealed a significant difference (t = 13.929 , sig .00) as students in the control group were not able to evaluate themselves and their own work and self-regulate their learning , but the students in the experimental group were able to evaluate themselves and self-regulate their writing. Also by measuring the effect size the effect size was large.

Table (8) Adapting future methods control and experimental mean, SD, t value and Significant

Adapting future methods	Mean	SD	T	Sig	Eta	Eta squared	Effect size
Control	2.033	0.291	13.628	0.000	0.893	0.798	Large

Experimental	3.558	0.312					

Analysis of the mean pre application and post application in table (13) revealed a significant difference (t = 13.628 , sig .00) as students in the control group were not able to adapt future methods , but the students in the experimental group were able to adapt future methods and self-regulate their writing. Also by measuring the effect size the effect size was large.

2- Findings of hypothesis Two :

There is an overall high positive self-satisfaction of students' goal setting post the program

Table (9) Perceived usefulness and ease of use of the *goal-setting* chatbot

Item		N	Mean	SD
Usefulness	1. Using the chatbot enabled me to set my learning goals	30	4.80	0.407
	2.Using the chatbot made it easier to complete my goal setting process	30	4.93	0.254
	3.The chatbot enhanced my efectiveness in setting my learning goals	30	4.43	0.504
	4.Overall, I found the chatbot was useful in my learning	30	4.27	0.450
Ease of use	1.I found it easy to use the chatbot to communicate	30	4.07	0.254
	2.The chatbot often behaves in expected ways	30	4.50	0.509
	3.1 found it easy to recover from errors encountered while using the chatbot	30	4.80	0.407
	4.Overall, I found the chatbot easy to use	30	4.13	0.346

This table shows that average mean of students' perceived usefulness and perceived ease of use. Students reported that goal-setting chatbot was easy to communicate. During the interaction, the goal setting chatbot performed in expected ways to help students to set personal goals.

Discussion:

The overall purpose of the current study was to develop EFL self regulation 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 as they self regulated their learning. The findings of the study demonstrated that the students in the experimental group found that using Artificial intelligence helped the students to self-regulate their learning and write proper research through planning their outines , setting goals using SMART Framework, adopting powerful

strategies , monitoring their learning and performance, restructuring one's physical and social context to make it compatible to one's goal, managing one's time effectively, evaluating one's method, and adapting future methods. The researcher can confirm that students with low self regulation skills can improve their self-regulation through this intervention programme. Therefore, this programme appears to be effective in developing self-regulation skills. This is consistent with Zydan and AbdualRaseg (2009) and Ali (2012);as these studies show that students who have learning difficulties can improve their self regulation skills.

Conclusion :

This study investigated the effectiveness of using AI applications for developing self-regulation skills . This study gives scientific evidence of the effectiveness of the suggested program based on Artificial intelligence programs to self regulate the learning process 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 regulating the learning process . 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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