A Program Based on Connectivism Theory via Artificial Intelligence Applications for enhancing EFL Writing Skills and Online Academic Engagement of Freshmen Students at Faculty of Education

By

Dr. Eman Mohamed AbdelHaq

Professor of EFL at the Department of Curricula, Instruction & Educational Technology Faculty of Education, Benha University

Dr. Abeer Ali Mahmoud Diab

Assistant professor of EFL , Department of Curricula,Instruction &Educational Technology Faculty of Education, Benha University

2024

A Program Based on Connectivism Theory via Artificial Intelligence Applications for enhancing EFL Writing Skills and Online Academic Engagement of Freshmen Students at Faculty of Education

By

Dr. Eman Mohamed AbdelHaq

Professor of EFL at the Department of Curricula, Instruction & Educational Technology Faculty of Education, Benha University

Dr. Abeer Ali Mahmoud Diab

Assistant professor of EFL , Department of Curricula,Instruction &Educational Technology Faculty of Education, Benha University

ABSTRACT

This research is conducted to investigate the effectiveness of using a program based on connectivism theory via Artificial intelligence applications (Grammarly and QuillBot) for enhancing freshmen students' EFL writing skills and online academic engagement. The research followed a pre-post experimental one group design. The research sample was 46 first year students enrolled in English Language section, Faculty of Education, Benha University. A checklist of EFL writing skills was submitted and validated to identify the suitable and essential skills for the research members. A pre-post EFL writing skills test and online academic engagement scale were designed. Students were pre-assessed to identify their admission level of EFL writing skills and their online academic engagement. Then, they were trained through the suggested program on how to develop their writing skills (content, organization, development of ideas and language usage). The post-test was administered to measure the improvement in EFL writing skills and online academic engagement. Findings of the research showed that there was statistically a significant difference at 0.01 in the pre- and post-assessment of EFL writing skills and online academic engagement in favour of the post-assessment.

Key words*: Connectivism theory**, Artificial Intelligence Applications (Grammarly & Quill Bot), EFL   Writing Skills, online academic engagement*

برنامج قائم على النظرية الأتصالية بأستخدام تطبيقات الذكاء الأصطناعي لتحسين مهارات الكتابة في اللغة الانجليزية كلغة أجنبية والإندماج الأكاديمي عبر الأنترنت لدى طلاب الفرقة الاولى بكلية التربية

الملخص

يهدف البحث الى بيان مدى فاعلية إستخدام برنامج قائم على النظرية الاتصالية باستخدام تطبيقات الذكاء الأصطناعي (Grammarly and QuillBot) لتحسين مهارات الكتابة باللغة الانجليزية كلغة أجنبية والإندماج الأكاديمي عبر الانترنت لدي طلاب الفرقة الاولى شعبة اللغة الانجليزية بكلية التربية جامعة بنها. أستخدمت الباحثتان المنهج شبه التجريبي والقياس القبلي والبعدي لعينة الدراسة . تكونت عينة الدراسة من سته واربعون طالبا من طلاب الفرقة الأولى شعبة اللغة الأنجليزية بكلية التربية جامعة بنها.قامت الباحثتان بإعداد قائمة لمهارات الكتابة باللغة الانجليزية كلغة اجنبية والتحقق من صحتها لتحديد المهارات المناسبة والضرورية لعينة البحث. أشتملت أدوات الدراسة على اختبار لمهارات الكتابة باللغة الإنجليزية كلغة أجنبية ومقياس الاندماج الاكاديمي عبر الأنترنت. تم أختبار عينه الدراسة فى مهارات الكتابة والأندماج الأكاديمي عبر الأنترنت قبل المعالجة وبعد الأنتهاء من تطبيقها للتحقق من مدي فاعلية البرنامج. تم تدريب عينة الدراسة على مدار سبعه عشر جلسة من البرنامج لتنمية مهارات الكتابة والاندماج الاكاديمي عبر الأنترنت. أشارت نتائج الدراسة إلى تفوق عينة الدراسة ؛ فقد أظهروا مستويات عالية من مهارات الكتابة والاندماج الاكاديمي عبر الأنترنت وقد أسفرت نتائج البحث الى وجود فروق ذات دلالة احصائية بين درجات الطلاب فى القياس القبلي– بعدى لمهارات الكتابة ومقياس الاندماج الاكاديمي عبر الأنترنت لصالح القياس البعدى.

الكلمات المفتاحية: النظرية الاتصالية –تطبيقات الذكاء الأصطناعي Grammarly and (QuillBot)– مهارات الكتابة فى اللغة الإنجليزية كلغة أجنبية– الأندماج الأكاديمي عبرالانترنت– طلاب الفرقة الاولى شعبة اللغة الانجليزية

1-Introduction

English is an important language for communication. Writing is an active manner of conveying oneself, in addition to articulating opinions, ideas, and beliefs. As the world is altering every day, and innovative technologies have altered the way of communication, instructors have to pursuit for innovative methods that provoke scholars and manage with the new eternities. Effective writing is crucial in academic and professional settings, as it showcases knowledge, evaluates arguments, and shapes opinions.

Moreover, well-written papers are considered a predictor of academic prowess, but it presents challenges, especially for English as a foreign language (EFL) learners. Effective writing allows individuals to communicate their ideas clearly, persuasively, and concisely, which is essential for success in various areas of life (Zhou & Hiver, 2022). Additionally, in writing process the writer has to present and synthesize information, advance and assess arguments, and explain and shape viewpoints. A concise paper or presentation engages, enlightens, and convinces the reader far further effectively than a weakly composed text on an identical theme. So, writing efficiently becomes a significant indicator of successful academic achievement in university for EFL students (Batanero,et.al.,2021)

Students' writing performance is affected by many affective factors, such as their academic engagement, which is considered one of these reasons that can enhance the students' motivation to write effectively. The engaged students obtain the capability to transmute their incentive into real actions, as engagement relates motivations and actions (Mercer& Dornyei, 2020). Moreover, it is deliberated one of the leading indicators for the apprentices' accomplishment in the language learning process.

 The continuous advance of the instructional setting supplemented by technology has converted how information is retrieved and employed. This leads to reconsidering how the English language is educated, precisely, once it is required for obtaining the main skills. Connectivism theory is centered on a collaborative approach through the learning development, distinct from using the traditional textbooks, wherever the

accessible materials are restricted (Alam,2023). Spotting the usage of the connectivism theory the technological environment allows instructors to impact the immense properties existing online to enhance their teaching resources. Through digital content, interactive platforms, and collaborative tools, teachers can create dynamic   learning experiences (Malave Tomala,2024). Furthermore, Artificial Intelligence (AI) has completed an excessive contribution to the language arena. It has the benefit of facilitating mutually the instructors and the apprentices to boost their language skills (Malik, Tayal, & Vij, 2019).

Therefore, the present research tried to examine the effectiveness of a Program based on Connectivism theory via some artificial intelligence applications for enhancing EFL writing skills and online academic engagement of English majors at Faculty of Education.

1.1. Context of the Problem

Regardless of the importance of writing skills and online-academic engagement, first year students enrolled in English language section, Faculty of Education, Benha University lack these skills.

According to their previous experience instructing at the university level, the researchers noticed that first-year English section students lack proficiency in EFL writing and online academic engagement. They are not able to compose a concise paragraph in terms of their proficiency of the language, organization, development, and content.

In the majority of Egyptian English language programs offered today, students are not given the chance to practice EFL writing skills in a communicative setting. Previous studies have demonstrated that EFL apprentices have certain writing difficulties. They do not freely express themselves since they have slight curiosity in the issue the educator has asked them to write about. They are incapable of articulating their thoughts in a reasonable and regulated style of writing. (Abdelqader, 2024; Ali, 2021 ; Elshazly, 2024 ; Hetata, 2024; Khedr,2021; Mohamed, 2023; Sirag,2022; Tolba, 2023)

To articulate the problem of the research, a pilot study was accompanied by the researchers to identify the writing skills among 30 first year students enrolled in the English language section. The pilot study consisted of two tests: an EFL writing test adopted from

Mohamed, (2023) and online academic engagement scale adapted from Dixon, (2015).

Results showed that student's paragraph is poor due to its weak topic sentence, inadequate supporting details, and lack of examples. Because it is a fragment, asks a question, makes an announcement, and lacks an appropriate guiding notion, a topic sentence is ineffective. Since the writer student eliminates key terms, alters them, and inserts extraneous improper details to them, subsequently blends them in appropriate instances, the support details become ineffective. Since they are not provided one at a time, lacking little transitional phrases, and lack precise information to make them appealing, the related examples are worthless. They are unaware of writing the words precisely. Students often make mistakes in grammar in their sentences and ignore syntax and punctuation.

The results of the pilot study indicated that there is a low level of first year students' writing skills and online academic engagement. So, the current research proposes a program based on Connectivism Theory via some Artificial Intelligence Applications for enhancing EFL writing skills and online academic engagement among first year students enrolled in the English language section at the Faculty of Education, Benha University.

1.2. Statement of the problem

Despite the significance of writing skills, first-year students in the English language program at Benha University's Faculty of Education lack some basic writing skills, making it harder for them to write accurately. For this reason, the current research employs an artificial intelligence application-based tool called Quillbot and Grammarly and the principles of the connectivisim theory to help students improve their EFL written skills and their online academic engagement.

1.3. Questions of the Research

In an attempt to overcome this problem, the current research endeavored to response the following questions:

1. What are the EFL writing skills required for first year English section students at the Faculty of Education?

2. What are the features of a program that based on connectivism theory via some artificial intelligence applications?
3. What is the effectiveness of using a program based on connectivism theory via some artificial intelligence applications in enhancing the first year student ' EFL writing skills?
4. What is the effectiveness of using a program based on connectivism theory via some artificial intelligence applications in enhancing the first year student ' online academic engagement?

1.4. Hypotheses of the Research:

In the light of the review of literature, the following five hypotheses are submitted:

1- There is a statistically significant difference between the mean scores of the participants in the pre- and post-assessment of overall EFL writing skills in favor of the post-assessment.

2- There is a statistically significant difference between the mean score of the research participants in the content sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post-assessment.

3- There is a statistically significant difference between the mean score of the research participants in the organization sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post-assessment.

4- There is a statistically significant difference between the mean score of the research participants in the development and language use sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post- assessment.

5- There is a statistically significant difference between the participants' mean scores in the pre- and post-assessment of online academic engagement in favor of the post- assessment.

1.5 Delimitations of the Research:

The present research was delimited to:

1. Fourty-six first year, English section students, Faculty of Education at Benha University ,in the second semester of the academic year 2023/2024

2. Some EFL writing skills (content, organization, development and language use) needed for first year, English section students at Faculty of Education.
3. Some AI Applications (QuillBot and Grammarly) integrated with the principles of the connectivism theory to enhance first year students' EFL writing skills and online academic engagement.

1.6 Significance of the study
The current study is significant for:
1. **Freshmen students**: it helps them develop some EFL writing skills and their online academic engagement.
2. **EFL instructors**: it affords them a program based on the connectivism theory via some artificial intelligence applications to enhance their students' EFL writing skills and their online academic engagement.
3. **Curriculum planners**: it sheds light on the connectivism theory via some artificial intelligence applications (Quillbot and Grammarly) as important applications for enhancing writing performance.

1.7 Definition of Terms
Some terms were repeatedly used in the current study. These are:
EFL writing Skills
Writing skills are operationally defined as first year, English section students' abilities to communicate their thoughts, desires, perspectives, and opinions in barrier-free written cooperating styles.
Online Academic engagement:
Online academic engagement is operationally defined as freshmen students' state to be intellectually, socially and emotionally engaged in the utilization of online and digital resources to assist their academic language learning. It includes using a variety of online applications, and other digital platforms that give them access to enhance their writing skills.
Artificial Intelligence (AI):
Artificial intelligence (AI) in the study refers to the utilization of AI technologies, like natural language processing and machine learning, to enhance the instructional process and language learning especially writing skills. It comprises the use of technologies that analyze data, identify patterns, and predict outcomes, allowing the researcher to

personalize instruction for all students, such as QuillBot and Grammarly applications.

2. Literature Review

This section sheds the light on the theoretical background and previous studies concerning the variables of the study research variables, which are: writing skills, online academic engagement, conncetivism theory and artificial intelligence.

EFL Writing skills:

Writing is the act of accumulation of symbols or words on a surface in order express thoughts. The writer can use symbol as the basis for a concept, idea, or object, or by employing each letter to symbolize a group of sounds that are combined into phrases. Certainly, for students who study EFL, writing is not a proficiency in language that might be mastered effortlessly and with no practice (Weigle, 2002). To have good writing competencies, learners need to understand and grasp specific features or components, such as sentence structure, choice of words, writing organization, consistency, and other aspects (Phuket,2015).

Obtaining proficiency in fundamental writing skills enables students with an opportunity to structure their concepts and efficiently grasp the content. Inadequate writing instruction is yet another significant obstacle for EFL students (Ibnian, 2017). Writing is quite complex, consequently for students to write well, one requires developing a wide range of capacities. Learners must concentrate on "lower skills of spelling, punctuation, and word choice along with higher-level skills of planning and organization." It is challenging for language teachers to teach writing skills, especially while focusing on providing learners beneficial feedback on what they have written. But as noted by Fathi et al. (2020), writing is a skill that ought to be improved with constant instruction and immediate feedback.

To enhance EFL students' writing skills, various studies were conducted to examine the effect of various instructional approaches and strategies to develop these skills. For example, Zhang, and Zhang, (2021) indicated in their research the importance of received explicit stance instruction in developing writing quality and stance performance. The students also showed improved understanding of various stance types,

indicating improved proficiency in qualifying and assimilating external voices for better academic writing.

Castillo-Cuesta,(2021) examined the effect of using digital storytelling on writing skills among pre-services EFL instructors. The researcher used quasi-experimental design. The tools were questionnaire and pre-post writing test. The findings indicated the experimental group students outperformed those in the control group concerning vocabulary aspects of writing and grammar. Moreover, they were engaged in various writing activities.

Moybeka (2023) asserted in his study the effectiveness of using the Contextual Learning Theory (CLT) in improving the writing skills among EFL student's teachers. Students' descriptive text writing skills were enhanced by the use of the contextual method, as was indicated through their writing outcomes, interest, and reaction to utilizing the contextual teaching and learning approach to learn how to write descriptive texts.

Marghany,(2023) explored the effect of using artificial intelligence (AI) in improving   FL essay writing skills. The participants were 100 English-majoring senior students, divided into a control and experimental group. The experimental group students were trained using AI-based Grammarly instruction. The results showed improved performance in the experimental group, suggesting the incorporation of AI-based Grammarly instruction in FL essay teaching.

Waziana,(2024) examined the effect of AI chatbots on freshman EFL students in Indonesia. It revealed that among the most popular chatbots were ChatGPT, Gemini, Perplexity, Bing Chat, Ernie, Character AI, Discord Bot, Wren, and Ginger. A majority of learners indicated substantial enhancements in vocabulary, syntactic variation, and overall writing proficiency. Results demonstrate that AI chatbots could assist EFL students boost their writing skills.

Accordingly, it is important to engage learners in various learning environment that contains many interesting and innovative activities to actively participate in the writing process. The following section sheds the light on online academic engagement and its relationship to writing skills.

Online Academic Engagement:

Online learning has improved vividly at all stages of tutoring for different causes: amongst them to expand accessibility, to well support individual essentials, and to overwhelmed contact obstacles (Seaman et al. 2018). The concept of student engagement is commonly used in research, often definitely interrelated with appreciated scholastic results containing accomplishment and gratification (Trowler, 2010).

Fredricks et al. (2004) identified three core dimensions to engagement: affective, behavioral, and cognitive. Moreover, Christenson et al., (2012) asserted that the affective engagement is the display of emotions and attitudes towards, instructors, peers and the course materials and activities. While behavioral engagement was recognized by the surface-level, physical behaviors required to complete course learning activities or tasks while indicators of cognitive engagement would be evidence of a deeper intellectual vitality being employed. In the same vein, indication of a student's mental energy focused on asking interrogations, taking notes, all these would be evidence of cognitive engagement.

Academic engagement can be defined as the energy utilized towards dynamic immersion with course learning accomplishments and categorize three fundamental dimensions: facilitators, indicators, and outcomes of student academic engagement (Ben-Eliyahu et al. 2018; Halverson and Graham 2019).
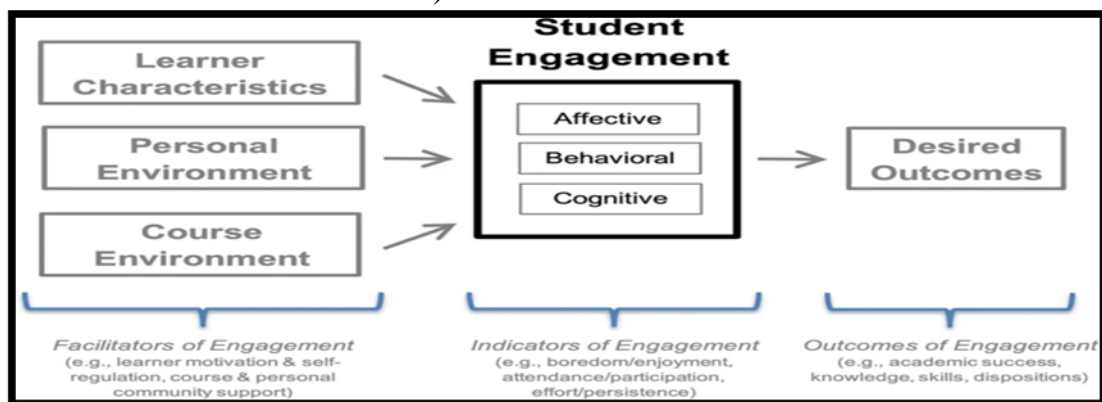

Figure 1: Over-all model of student engagement distinctive facilitators, pointers, and outcomes Adapted from Halverson and Graham 2019, p. 147

The previous figure is a theoretical outline for appreciative learner engagement. It highpoints the multifaceted interactions among the numerous aspects that subsidize to apprentice engagement. It similarly affords a strong summary of the preferred consequences of engagement, such as enhanced academic performance and the improvement of affirmative attitudes to learning. Scholars who can successfully accomplish their time and learning schemes are more expected to be engaged. By understanding these aspects and their interrelationships, instructors can construct learning atmospheres that nurture scholar engagement and stimulate positive learning results.

Online academic engagement is the level of involvement and participation of students in online learning environments. It covers a variety of activities, including the dynamic engagement in discussions within online forums and discussion boards. Tasks and courses should be submitted with time limit to be completed on time. Scholars can utilize online resources and tools, interacting with learning materials in virtual group projects (Borup,et.al., 2020).

Previous studies have been accomplished to reveal the relationship between online academic engagement and writing skills. For example, He,et.al ,(2023) examined the impact of perceived teacher emotional support on the online English academic engagement of Chinese EFL learners, considering the mediating roles of online academic burnout and academic self-efficacy. The research involved 450 Chinese students who completed an online questionnaire and participated in semi-structured interviews. The findings indicated that perceived teacher emotional support and academic self-efficacy positively influence online English academic engagement.
Rad, et.al, (2024) conducted a mixed-method study, which involved 46 students at the upper-intermediate level. The student group was divided into two groups: One group was the control group, while the other was the experimental group, each comprising 23 students. By using Wordtune, an AI-based application, the experimental group was able to significantly improve their writing outcomes, engagement, and feedback literacy when compared to the control group.

2.3. Connectivism Learning Theory (CLT):

Connectivism is an unconventional theory for education that makes instruction more effective, interactive, and student-centered by incorporating current events and innovations in technology. It seriously impacts language learning, in particular when teaching English as a foreign language, especially in regards to writing proficiency (Siemens, 2006). According to Goldie (2016), connectivism is regarded as one of the most well-known theories   for appreciative learning in the current technology context. Siemens (2017) claims that connectivism is an educational structure that highlights the implication of soft skills that students require to flourish in the modern numerical world. Furthermore, Corbett and Spinello (2020) highlighted that connectivism has been recommended as an innovative idea in education that is more in line with the rapidly growing technical expansions impacting learning and the features of digital information.

  Connectivism learning theory strongly emphasizes the impact of the digital era on education, with relevance to teaching and learning English as a Foreign Language. It boosts their capabilities to engage with others of different learning styles. Moreover, they can filter the appreciated information to the learning situation information valuable to a situation (Chandrappa, 2018). It is considered as a process of connecting with various information sources and social networking. It enables learners to evaluate learning in networked environments. Students in Connectivisim learning have the chance to use media and social information to assign the skill being practiced (Siemens et al., 2020).

Educators highlighted the role of investigating connectivism principles for affording visions into their application in teaching environment. It supports many approaches such as: student-centered, inquiry-based instruction that boosts team work and critical thinking. Siemens (2005:163) presented the following Principles of the Connectivism learning theory.

1) The learning process requires Combining particular nodes or resources of knowledge
2) Learning can be presented through using non-human devices.
3) Aptitude to learn more is more acute than what is presently acknowledged.

4) Promotion and sustaining connections is required to simplify constant knowledge.

5) Capacity to grasp associates among fields, thoughts, and perceptions is a fundamental skill.

6) Currency (precise, up-to-date knowledge) is the goal of all Connectivist learning accomplishments.

7) Decision-making is a learning progression. Electing what to acquire and the significance of received data is grasped through the lens of an ever-changing realism.

When teaching writing skills to ESL students, connectivism entails developing a personalized learning environment that meets their individual needs and interests. This increases motivation and engagement, particularly for students who face linguistic and cultural barriers (Siemens 2012). Moreover, Veselá (2020) argued that applying Connectivism principles in EFL instruction involves focusing on aspects not commonly addressed in conventional approaches like Communicative Language Teaching. It emphasized the importance of learning in real-world contexts, where learners can apply their knowledge and skills in meaningful and applicable ways. By incorporating real-world examples and scenarios into writing assignments, teachers can help ESL learners develop their writing skills in a way relevant to their lives and experiences (Dziubaniuk et al., 2023).

2.4. Artificial Intelligence (AI)

Artificial Intelligence (AI) has made a tremendous impact to the educational field. It has the advantage of helping both the instructors and the scholars to develop their teaching and learning skills (Malik, et.al., 2019). AI has been employed to achieve excessive goals in education, the acquisition of languages and interpersonal skills. AI maintains personalized, active, and energetic educational environments adjusted to students' preferences and desires. (Rusmiyanto,et.al.,2023). Moreover, it allocates a major role in enhancing the abilities of self-reflection, and increasing students' awareness of inquiries to create innovative responses.

John McCarthy introduced the term " artificial intelligence" about 1956. It refers to essential various styles of intelligent machines (McCarthy et al. 2006). AI-based technology in language schoolrooms permits scholars to check their writing, use online paraphrasing tools for effective paraphrasing, detect plagiarism, and correct word-matching procedures by rephrasing manuscript from varied resources, thus improving their writing skills and decreasing the necessity for machine-based systems (Ginting & Fithriani, 2022).

In addition, language learners can obtain tailored assessment of their writing, which can aid them identify and precise mistakes directly. AI tools for writing are commonly settled for reviewing written content and afford recommendations for numerous fundamentals of the writing, containing syntax, grammar, vocabulary, subject matter, and structure (Blackmore,et.al, 2023). Marzuki,et.al (2023), surveyed the influence of AI writing tools on student writing proficiency, specifically content and organization. Data was gathered through semi-structured interviews from four instructors across three universities. The findings indicated that incorporating AI techniques might enhance the writing quality produced by EFL apprentices.

Grammar checkers, writing assists, and essay-writing applications are just some of the increasingly common artificial intelligence-powered tools for writing in educational environments. These tools offer immediate assistance and support boost writing abilities, saving time and effort, especially among learners of inadequate English competency (Jeanjaroonsri, 2023). Sumakul,et.al.,(2022) aimed in his research to find out the learners who used the artificial intelligence applications in their educational process. Semi-structured interviews were carried out with eight EFL students at an Indonesian organization who had employed a software program with artificial intelligence in their writing instruction. The outcomes indicated that the students showed positive feelings about the use of the AI app. The participants appreciated their participation in the treatment, and the AI program encouraged them with their writing skills.

Grammarly, founded in 2008 by Alex Sheychenko and Max Lytvyn, is a writing assistant that enables manipulators to revise and correct grammar and spelling in their papers, boosting vocabulary usage and decreasing errors. It regulates to individual necessities and increases writing self-confidence. Grammarly is an application that offers accommodating

feedback on writing, fixing passive voice, conduct word-choice errors, inconsistencies, and purifying jargon or formality levels. It helps with extensive audience writing and checks lexis to advocate the precise word deprived of unnecessary examination. It recognizes and corrects misspelt words alongside irregular verb conjugations, incorrect noun usage, and prepositional problems. All of these features are free for users (Fahmi, & Cahyono, 2021).

The study of Miranty, et.al. (2021) examined the benefits and drawbacks of Grammarly for English Education Department students in Indonesia. Eighty scholars joined the study, alienated into two groups: a control group and an experimental group. The researcher focused on improving writing skills among second grade senior high school students using Grammarly. The app helped in identifying and fixing errors, enhancing their writing abilities. The study suggested that students should be confident in conveying their ideas and teachers should pay more attention to their writing errors. The participants found Grammarly beneficial and renowned it might decrease grading time.

   Maulidina and Wibowo, (2022) asserted that ,Grammarly is a tool that can aid in the acquisition of English writing skill. It permits operators to devour their texts examined and revised for syntactic mistakes. Therefore, it also is known as a writing helper. Grammarly checks to category aspects like grammar, deviations of a verb, alteration of spelling, adjustment of preposition, and punctuation mistakes. Besides revising grammar, it might similarly support manipulators in increasing their grammar information so as to comprise text without worry of attainment of errors.

Inayah and Apoko, (2024) used Grammarly in their study and asserted that it is a convenient device for enhancing writing skills among students. It was indicated that 63% of students found Grammarly beneficial, and 72% approved that Grammarly comment meaningfully developed their writing superiority. Participants respected the comprehensive criticism and the simplicity of usage. Nonetheless, some innovative features entail a rewarded premium payment, which may be an obstacle for some manipulators. Generally, Grammarly's incorporation in EFL writing instruction offers important assistances.

In addition to Grammarly, QuillBot, is a popular online paraphrasing tool used in writing classrooms. It uses artificial intelligence for paraphrasing, summarizing, grammar checking, and plagiarism detection (Kurniati & Fithriani, 2022). This electronic writing tool produces several rewrites of the initial phrases by retaining (AI) to determine connections attained using a written source. It is used for modifying the phrases instead of the clausal levels of the sentence construction. (Zhao, 2022). Moreover, this free online tool is used for improving the clarity of the written content (Nurmayanti & Suryadi, 2023).

QuillBot includes various features in the writing mood such as, the standard mode and the fluency mode. In standard mode, users can make the text sound natural and keeps the original meaning at the same time. The facility manner emphases the usage of appropriate English Grammar and normal style to keep the innovative meaning of the text (Amyatun & Kholis,2023). Trivette, (2020) indicated that QuillBot has many functions for maintaining the written text. The first function is the paraphrasing tool; this means to use other words to manipulate the original meaning of the text. The summarization function provides concise summaries to the text and use the original words of the document.

Nurmayanti and Suryadi, (2023) intended in their study to assess students' proficiency with QuillBot to write concise innovative scientific papers in English. The researchers used questionnaire to collect data. The participants were able to take benefit of the software and discover it useful to paraphrase text without shifting its denotation, according to survey results succumbed through google forms. Bakri,et.al. (2024) asserted in their research to find Business Management students perceptions regarding the use of QuillBot as a writing tool for English writing skill improvement. The research instruments consisted of two aspects: questionnaire and interview. The questionnaire was closed-ended questions. Also, semi-structured interview questions were maintained through questionnaire replies. The entire participants are 40 business administration scholars. The outcomes indicated that AI has the capability to boost writing skills by supporting an idea generation and quality of the text in higher education.

Based on what has been discussed of review of literature, it can be confirmed that writing skills are very important for students in their research, communication and the learning environment as a whole. Thus,

the current research examined the effect of integrating quillBot and Grammarly in enhancing students' writing skills and online academic engagement.

3- Method :

This portion of the research tackled the research method that has been monitored in investigating the efficacy of using a program based on connectivism theory via artificial intelligence applications in enhancing EFL writing skills and online academic engagement of first year English language section, Faculty of Education, Benha university. The method comprises the subsequent aspects:

1) Participants of the study

2) Research design

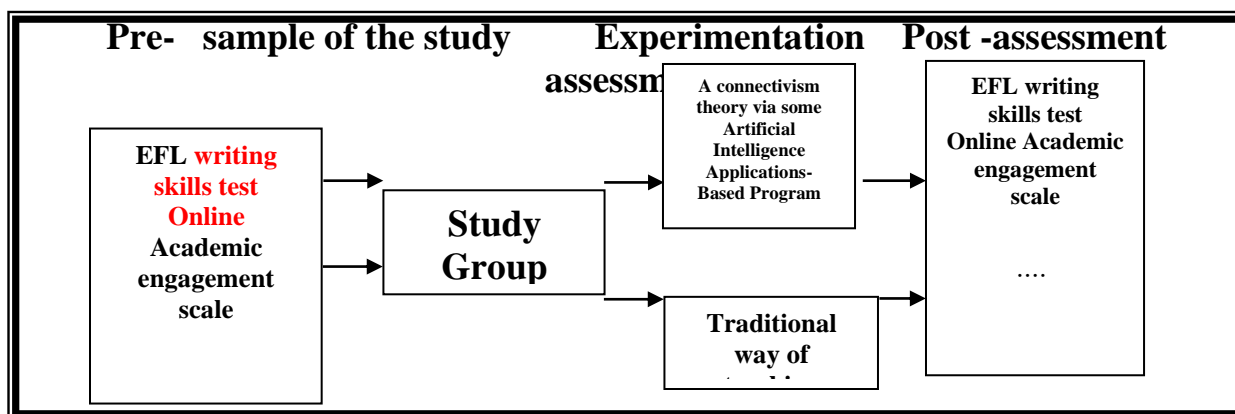3) Instruments and Materials of the research

1) Participants of the research:

The members of the present research consisted of 46 first year English language section students at the Faculty of Education, Benha University during the second semester of the academic year 2023-2024.

2) Design of the study:

The present research is generally quantitative and qualitative. Its design is quasi-experimental which is based on handling the independent variable and calculating its effectiveness on the dependent variable (Torchin, 2003:29). The descriptive approach was used to identify the important EFL writing skills adequate for first year, English section students at Faculty of Education, Benha University.. The experimental one group pre-test and post-test design was used to investigate the effectiveness of using a program based on connectivism theory via artificial intelligence applications in enhancing EFL writing skills and Online academic engagement among first year English language section students at Faculty of Education, Benha University. In addition, the quasi-experimental design was applied to find out the impact of the program for enhancing EFL writing skills and online academic engagement among first year English language section students at Faculty of Education, Benha University.

Figure (1): The experimental design of the study

3) Instruments and materials of the study:

This research designed a program based on the connectivism theory via artificial intelligence applications for developing EFL writing skills and Online academic engagement among first year English language section students at Faculty of Education, Benha University. The following tools and resources were designed by the current research researchers to fulfill the purpose of the research:

A. An EFL Writing skills checklist.
B. An EFL pre-post writing skills test and a rubric to correct it .
C. An EFL online academic engagement scale adapted from Dixon,(2015)
D. The connectivisim theory via artificial intelligence based program

A- The EFL Writing skills checklist.
Primarily the researchers examined: a) recent literature about EFL writing skills (Khadka, 2020; Conroy, 2010; Hadley, 2001; Harmer, 2004; Huot, 2004). At first, the researcher constructed an EFL writing checklist containing four main writing skills and fifteen writing sub-skills. The initially developed checklist was submitted to a panel of jury members for evaluating the correctness of the selected EFL writing skills for first-year English section students at the Faculty of Education The

reviewers have approved all the skills and sub-skills yet; they highly recommended that both the third and fourth and   writing main skills should be integrated in one main skill. Consequently, the EFL writing skills checklist was set in its final form, consisting of three main skills and eleven sub-skills **(Appendix C).**

B- The EFL Writing Test:(pre-post test)
The EFL   writing skills test was established by the present study researcher. The test has two main sections, each part was developed to measure one of the intended skills (content, coherence, organization and development and language use). The first part focused on assessing the organization and development of language use and the participants are required to **evaluate the situation** depicted in the images, **describing and analyzing** the **main features** of **teamwork and individual work**. This means participants should compare and contrast these two approaches to work, discussing their strengths, weaknesses, and how they might be applied in different contexts. They 'll need to consider factors like collaboration, responsibility, perspectives, communication, and autonomy. By analyzing these features, they can accomplish the evaluation of the situation presented in the images. The second question is designed to assess students' performance in content and coherent. They are asked to write an essay about a topic that they choose. Moreover, they should explain their opinions on the topic and give reasons to support their viewpoint.

Piloting and scoring the EFL Writing Skills Test:
The EFL writing skills test was managed to a pilot sample of 30 first-year English language section students at Benha University's Faculty of Education to investigate: (1) clarity of instructions; (2) suitability of the language level to the sample; (3) comprehensibility of test items; and (4) ensuring that students understood the questions and allocating the time required to respond to the test to different sections. There were no issues mentioned with clarity and comprehensibility. In terms of time allocation, the researcher calculated the mean amount of time it took the first and last learner to complete the test. Each phase took roughly 15 minutes (30 minutes total). The test was evaluated using a rubric created by the researcher. It was composed of three parts. Each of these three dimensions used a five-point scoring system, resulting in scores ranging

from eleven to fifty-five. The time of the test was measured by the following equation:

$$\text{Test time} = \frac{\text{The sum of the minutes consumed by each student}}{\text{The total number of students}}$$

Test time   =
30 minutes

Validity of the EFL Writing Skills Test :

To assess **face validity**, the EFL writing skills test was administered to seven TEFL jury members (Appendix A). They were asked to provide feedback on the test's clarity, difficulty level, and duration, as well as how far each item measures the skill being measured. The jury members reported that the test items were appropriate for the skills being evaluated. The test's suitability for the students' academic level was reported. The clarity of the test instructions and questions, as well as the presentation of the intended skills, were all reported. Appendix B has the final form.

Using the Statistical Package for Social Science software (SPSS) version 18, the correlation coefficient between the total score for each dimension of the two test parts and the test's overall total score was determined in order to estimate the **construct validity** of the EFL writing skills test. Table 1 shows the correlation coefficient and the significance level.

The internal consistency validity of the EFL writing skills test:

To assess the validity of the EFL writing skills test, two methods were used: calculating the internal consistency between the total score for each dimension and the overall score for the entire test.
- Calculating the Pearson Correlation Coefficient. The table below shows the correlation coefficient and significance level.

Table (1) Values of the Correlational Validity Coefficients for the sub-Skills Targeted by writing skills test and its main skills

(N = 30)

Test Dimensions	Correlation Coefficient	Level of Significance
Content	.86**	٠,٠١
Organization	.75**	٠,٠١
Development of language use	.79**	0.01

**correlation is significant at 0.01 level

Table (1) shows that the correlation coefficient for the entire EFL writing skills test was 0.01, which is statistically significant. As a result, the test was valid and internally consistent.

- Reliability of The EFL writing Skills Test :

The test-retest method was applied by the researchers to determine the reliability of the EFL writing skills test. Thirty first-year English language section students from the Faculty of Education at Benha University were randomly selected for participation in the test. Two weeks later, the same group was given the test once more. The Pearson correlation coefficient between the two administrations in each aspect of the test as well as the test as a whole is presented in table (2).

Table(2):Reliability of the EFL writing skills test
(N=30)

Skills		Correlation
EFL Writing Skills	Content	0.879**
	Organization	0.912**
	Development and language use	0.813**
Total EFL Writing Skills		**0.954****

**. Correlation is significant at the 0.01 level

Accordingly, as the previous table shows, the values of the correlation coefficients are high and all of them are significant at (0.01). This means that the test is highly reliable.

C - The Online Academic Engagement Scale:

The researcher adapted Dixon (2015) online academic engagement Scale. One useful instrument for evaluating student immersion in online courses is the Online academic Engagement Scale (OAE). The OAE, created by Marcia Dixson in 2015, evaluates four vital traits of engagement: performance, participation, emotions, and skills. The OAE proposals valuable visions into how scholars are engaging with and benefitting from online learning proficiencies by assessing these variables. Mentors can employ this information for the improvement of overall learning outcomes, progress course design, and raise student satisfaction (**Appendix C**).

The aforementioned scale asked participants to evaluate their academic engagement with online learning. There is not a correct response to any statement. The best answer depends on what they observe. Items are statements to which students respond (1=never, 2=sometimes, and 3=almost always).

The 20 items in the scale were divided into sub-items that surveyed student's academic engagement in online learning. Five items concentrated on the performance, five focused on the skills assimilated in online learning, five dedicated to the emotions towards online learning, and five focused on *participations in online sessions*.

The online academic engagement scale was administered to all 46 participants before and after the intervention in order to monitor modifications in students' academic engagement through treatment-related online sessions.

The Validity of the Online Academic Engagement Scale:

The online Academic Engagement Scale was submitted to seven EFL Jury members to assess its validity, item clarity, and applicability to the students' level and background. Some non-student-related items have been changed. The jury members confirmed that the scale elements were acceptable.

- **Internal consistency validity of Online Academic Engagement Scale:**

The internal consistency of the online academic engagement scale was strong-minded by scheming the consistency between the total score of each item of the scale and the total score of the scale as a whole. It was measured by using the Pearson Correlation Coefficient. The correlation coefficient and the significance level are presented in table (3) as follows:

Table(3): The Correlation between the score of each item in the online academic engagement scale and the total score of the whole scale

Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation
1	0.647**	6	0.454*	11	0.783**	16	0.644**
2	0.625**	7	0.602**	12	0.752**	17	0.554**
3	0.817**	8	0.564**	13	0.727**	18	0.687**
4	0.589**	9	0.577**	14	0.654**	19	0.612**
5	0.421*	10	0.451*	15	0.583**	20	0.453*

*. Correlation is significant at the 0.05 level & **. Correlation is significant at the 0.01 level

The Reliability of the Online Academic Engagement Scale:

During the first semester of the academic year (2023–2024), the scale was validated on a random sample of first year English language section Faculty of Education, Benha University (n = 30). Then, the scale was managed again to the same group after two weeks. The Pearson correlation coefficient between the two administrations was .902 which is statistically significant at 0.01. This means that the scale is consistent.

Experimentation

Pre-administration

After drawing the participants of the research, the EFL writing skills and the online academic engagement scale were pre-administered to them on

February 25 nd, 2024 through the second semester of the 2023/2024 academic year at Faculty of Education, Benha University.

The Program:

The research participants received a treatment based on the connectivisim theory via artificial intelligence applications to help them improve their EFL writing skills and engage in online academic activities. The experimental treatment was carried out during the practical hours of the active methods of teaching course, which was taught to first-year English language section students at Benha University's faculty of education.

a- Objectives:

The **program** was developed to enhance EFL writing skills and online academic engagement among first year students enrolled in English language section ,Faculty of Education at Benha University.

To help the participants accomplish the objectives set by the program, the researchers applied several types of assignments and activities during the sessions. At the end of the course, participants will be capable of:

- Memorizing the importance of connectivism theory principles and the artificial intelligence applications –Based Program in general and in language learning in particular.
- Producing a well-developed paragraph with appropriate and precise word choice
- using organizational features appropriately for the genre of the text.
- using grammar correctly and sentence structure.
- Fostering freshmen students' online academic engagement.

b- Content of the Program:

The program included EFL writing skills and online-academic engagement activities and tasks that were suitable for first year students, English section, Faculty of Education, at Benha University and adopted from several bases such as : Craig,(2012); Disney - (٢٠١٤); Everett, (2005); Harmer,(2007) and Temizkan, (2011).

C- Description of the program:

There were seventeen sessions in the program of research. The first two were orientation instructions addressing the sub-skills of EFL writing

skills, the artificial intelligence applications (QuillBot and Grammarly) employed in the program, and the significance of achieving the online academic engagement to the study sample. During the instructional rest periods, the EFL writing skills (content, organization, development, and language use) were exercised. In addition, there were three revision sessions. As a sort of formative assessment for the program, each revision session was conducted and delivered following the last phase of skill training **(See Appendix D).**

Implementing the Program:
The treatment was implemented during the second semester of the 2023/2024 academic year, through certain steps as follows:

-The first session of the experiment was a sixty-minute orientation session designed to familiarize participants with EFL writing skills and online academic interaction. They were also given an introduction about the artificial intelligence applications, which they will be trained. They were trained on how to use QuillBot and Grammarly for paraphrasing, checking grammar and summarization to enhance their writing skills and academic engagement through online sessions of the treatment. QuillBot is a prominent application that serves as a paraphrase tool. It presents an opportunity by supporting with paraphrasing when professors and pupils do not have the skill to paraphrase writing manually.
- The remaining sessions of the study were devoted to instructing the participants using an artificial intelligence applications-based program. The experiment lasted about eight weeks. The program contained 17 sessions. The treatment is mainly premeditated to be an instructional course on behalf of enhancing some EFL writing skills and online academic engagement of EFL Freshmen scholars. Each session followed the same phases (objectives, materials, teacher's role, student' role, warming-up activities, procedures of the session and the assessment. There were face-to face sessions and online ones through Microsoft teams.
-By the end of the treatment, there was a shift in the first-year students' perspectives gradually on the importance of EFL writing skills and the need to improve their online learning engagement in order to succeed in all of their academic assignments. They also showed a greater eagerness to participate in extracurricular activities. The program's goal was to

improve participants' online academic engagement and one or two EFL writing subskills during each session.

Post- administration
After implementing the program that was based on the connectivism theory via artificial intelligence applications, Post administration of the study instruments was conducted to investigate the effect of using the suggested program on enhancing the EFL writing skills and online academic engagement among freshmen students.

6- Findings of the study:
To assess the efficacy of the program, the members were pre- and post-tested on the EFL writing skills and online academic engagement scale. For likening the initial and the final mean scores of the participants in the overall EFL writing skills and online academic engagement to discover whether there was statistically significant difference among them in the pre- and the post-assessment, the researchers used the one sample T-test, as it is the appropriate design of the study conduct. The findings of the study are assumed below with the hypotheses of the study as follows:

- Verifying The first hypothesis:
The first hypothesis states that There is a statistically significant difference between the mean scores of the participants in the pre- and post-assessment of overall EFL writing skills in favor of the post-assessment.

For analysis this hypothesis, the Paired-samples t-test was used to compare the mean scores of the participants in EFL overall writing skills on the pre- and the post administration of EFL writing test. Table (3) presents the mean scores, standard deviation and level of the significance in the pre- and post-assessment of the EFL writing skills.

Table (3) : T-test differences between the participants' mean scores in the pre- and post-assessment of EFL writing skills .

Skill	Assessment	N.	Mean	S.D.	T-Value	D.F	Sig.	$\eta2$
Overall Writing skills	Pre-	46	20.8913	3.15685				
	Post-	46	42.2391	2.60926	32.260	45	0.01	0.971

This table shows that the mean scores are **20.89** for the pre-assessment and **42.23** for the post-assessment. The standard deviation (S.D.) is **3.156** for the pre-assessment and **2.609** for the post-assessment. As shown in the Table (3) the first hypothesis was accepted**. ",** where t= **32. 260**, p<0.01 which is statistically significant at 0.01. Moreover, the η2 supports the effect size levels of the treatment on the overall writing skills and

4.1.2. The second hypothesis:

The second hypothesis states that " there is a statistically significant difference between the mean score of the research participants in the content sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post- assessment.

For testing this hypothesis, the Paired-samples t-test was used to compare the mean scores of the participants in content sub-skill of writing skills on the pre- and the post administration of EFL writing test. Table (4) presents the mean scores, standard deviation and level of the significance in the pre- and post-assessment of the EFL writing skills in the content sub-skill.

Table (4) : T-test differences between the participants' mean scores in the pre- and post-assessment of content writing skills .

Sub-Skill	Assessment	N.	Mean	S.D.	T-Value	D.F	Sig.	η2
Content Writing sub-skill	Pre-	46	5.0870	1.68426	17.849	45	0.01	0.941
	Post-	46	11.2391	1.50827				

This table shows that the mean scores are **5.087** for the pre-assessment and **11.2391** for the post-assessment. The standard deviation (S.D.) is **1.684** for the pre-assessment and **1.508** for the post-assessment. As shown in the Table (4) the second hypothesis was accepted**. ",** where t= **17.849**, p<0.01 which is statistically significant at 0.01. Moreover, the η2 supports the effect size levels of the treatment on the content writing sub-skill.

4.1.2. The third hypothesis:

The third hypothesis states that " There is a statistically significant difference between the mean score of the research participants in the

organization sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post- assessment."

For testing this hypothesis, the Paired-samples T-test was used to compare the mean scores of the participants in the organization sub-skills on the pre- and the post administration of EFL writing test. Table (5) presents the mean scores, standard deviation and level of the significance in the pre- and post-assessment of the organization sub-skill of writing.

Table (5) : T-test differences between the participants' mean scores in the pre- and post-assessment of the organization sub-skills

Sub-Skills	Assessment	N.	Mean	S.D.	T-Value	D.F	Sig.	$\eta2$
Organization writing sub-skills	**Pre-**	**46**	7.8696	1.65474				
	Post-	**46**	15.0217	1.71903	**19.177**	**45**	**0.01**	**0.982**

This table shows that the mean scores are **7.869** for the pre-assessment and **15.021** for the post-assessment. The standard deviation (S.D.) is **1.654** for the pre-assessment and **1.719** for the post-assessment. As shown in the Table (5) the third hypothesis was accepted**.** ", where t= **19.177**, p<0.01 which is statistically significant at 0.01. Moreover, the $\eta2$ supports the effect size levels of the treatment on the organization sub-skills of writing.

4.1.2. The fourth hypothesis:

The fourth hypothesis states that " there is a statistically significant difference between the mean score of the research participants in the development and language use sub-skill on the pre-and post-administrations of the EFL writing skills test in favor of the post-assessment.
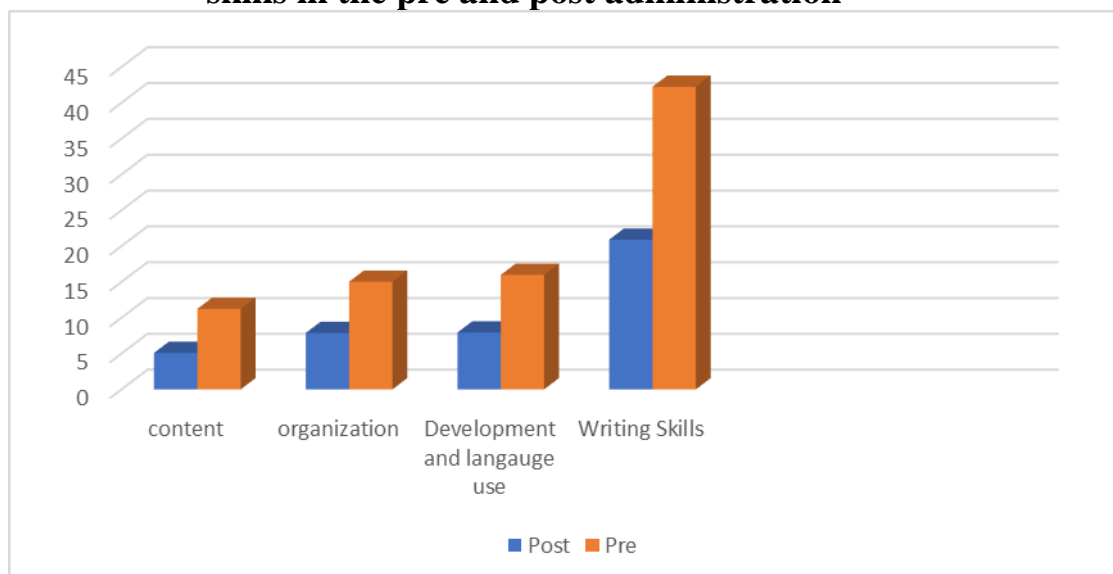
For testing this hypothesis, the Paired-samples T-test was used to compare the mean scores of the participants in the development and language use sub- skills on the pre- and the post administration of EFL writing test. Table (6) presents the mean scores, standard deviation and level of the significance in the pre- and post-assessment of the organization sub-skill of writing.

Table (6) : T-test differences between the participants' mean scores in the pre- and post-assessment of the development and language use sub-skills

Sub-Skills	Assessment	N.	Mean	S.D.	T-Value	D.F	Sig.	η2
Development and language use sub-skills	Pre-	46	7.9348	2.04833				
	Post-	46	15.9783	1.45280	21.061	45	0.01	0.962

This table shows that the mean scores are **7.934**   for the pre-assessment and **15.978** for the post-assessment. The standard deviation (S.D.) is **2.0483** for the pre-assessment and **1.452** for the post-assessment. As shown in the Table (6) the fourth hypothesis was accepted**.** ", where t= **21.061**, p<0.01 which is statistically significant at 0.01. Moreover, the η2 supports the effect size levels of the treatment on the development and language use sub-skills of writing. Thus, there is a highly significant effect of the experimental treatment on the development of the overall writing skills and its sub-skills. This finding is illustrated in the following statistical representation:

Figure(1) The Statistical Representation mean score of the research participants   in EFL overall EFL writing skills and sub-skills in the pre and post administration

4.1.2. The fifth hypothesis:

The fifth hypothesis states that " there is a statistically significant difference between the participants' mean scores in the pre- and post-assessment of online academic engagement in favor of the post-assessment.

For testing this hypothesis, the Paired-samples t-test was used to compare the mean scores of the participants in the online academic engagement on the pre- and the post administration of the online academic engagement scale. Table (7) presents the mean scores, standard deviation and level of the significance in the pre- and post-assessment of the online academic engagement scale.

Table (7): T-test differences between the participants' mean scores in the pre- and post-assessment of the online academic engagement scale

Sub-Skills	Assessment	N.	Mean	S.D.	T-Value	D.F	Sig.	$\eta2$
Online academic engagement	**Pre-**	**46**	29.8478	6.19666				
	Post-	**46**	49.7391	4.95058	**20.673**	**45**	**0.01**	**0.933**

This table shows that the mean scores are **29.847** for the pre-assessment and **49.739** for the post-assessment. The standard deviation (S.D.) is **6.196** for the pre-assessment and **4.950** for the post-assessment. As shown in the Table (7) the fifth hypothesis was accepted**.** ", where t= **20.673** p<0.01 which is statistically significant at 0.01. Moreover, the $\eta2$ supports the effect size levels of the treatment on the development of online academic engagement. This finding is illustrated in the following statistical representation:

Figure (2) The Statistical Representation mean score of the research participants in online academic engagement in the pre and post administration
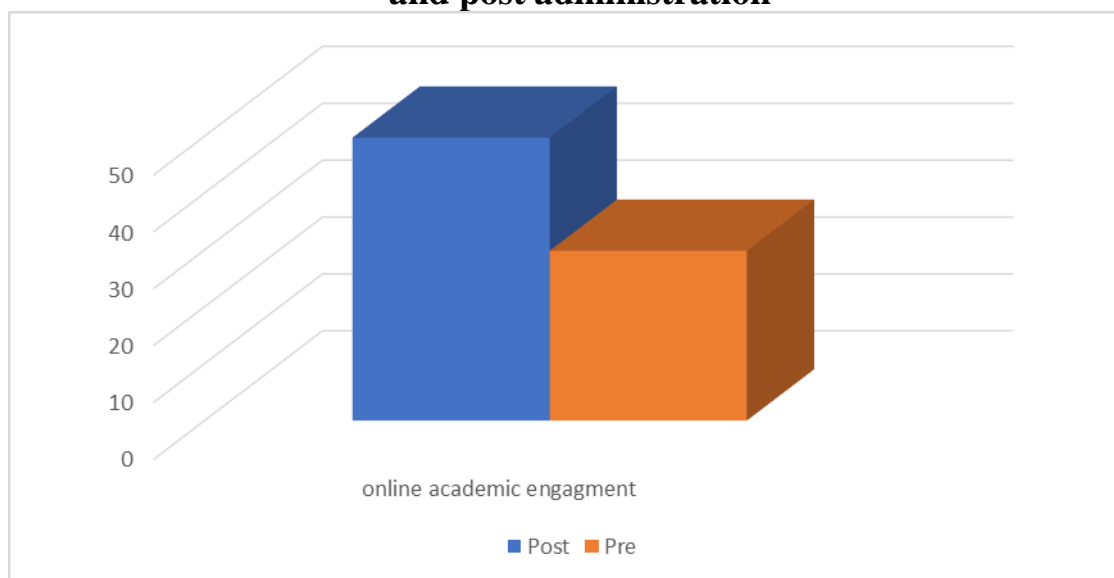
7- Discussion and Interpretation of the Research Findings:

This section is disturbed with the explanation and debate of the previously mentioned findings tackled in the previous section of the research. The findings are interpreted and discussed in the light of the research hypotheses.

Concerning the research hypotheses, the findings discovered that there was a statistically significant difference between the mean scores of the participants in the pre- and post-assessment of overall EFL writing skills in favor of the post-assessment.This means that the participants achieved more improvement in their writing skills (content, organization and development of language use).

The program has proved to be effective in enhancing the participants' EFL writing skills. This result can be attributed to the practical manipulation of connectivism principles and AI (Apps). The results indicate that the connectivism and the principles of this theory enhanced the organization of ideas and overall coherence of the subjects' writing. The participants demonstrated substantial enhancements in the organization and structure of their written productivity. The treatment focus on collaborative learning seems to support a more systematic

presentation the ideas, culminating in a more cohesive and rationally ordered composition. The collaborative element of the treatment was obvious in the better structuring of written output. Group work and peer discussions encouraged students to structured their ideas with greater precision, which led to a flow that was obvious in the structure of their compositions that was consistent with (Dziubaniuk,et.al.,2023 , Leow, & Neo, 2023).

The usage of technologies factor enhanced the aspects of digital fluency for developing participants' writing skills. The AI tools shift the class from traditional teacher-centered one to collaborative project. The research accumulated that the principles of connectivism theory affect positively on students' writing ability and open their mind for the usage of the new AI apps in learning the language skills

Throughout the session training, the research's findings indicted that the treatment had a useful effect on participants' language usage. They showed better grammatical perception. Moreover, collaborative tasks and interactions with others in the sessions of the program enabled the participants to receive feedback on grammar, resulting in a more polished and accurate use of language.

Additionally, the treatment principles focused on learners' autonomy and collaboration that allowed them to express themselves greater openly. Participants were more grammatically correct and evocative, demonstrating that it boosted their capacity to clearly express their thoughts, that was consistent with Alam, (2023).

The findings may be attributed also to QuillBot and grammarly apps that support collaborative learning. These apps were used through the sessions to communicate, brainstorm, and also giving opinions. The participants gained some ideas for writing an essay after they shared and discussed together with their peers in a flow manner of language accurately to show the reasonable sequence of related ideas.

Using the QuillBot app enables the participants to analyze the text and paraphrase it through using synonyms or equations. They used another way as changing the order of words in sentences or changing the order of words such as (adverb,verb,and adjective. Participants choose from standard, fluency and creative use of language. This way enables them to boost their clarity and meaning of words. This was consistent with (Gohar,2024; Ha,2023)

Based on the students' scores from all tests, the content aspect had improved. It was shown by the ability students in enhancing their writing skills and online academic engagement. During the program sessions (practicing quillbot and grammarly) , the participants worked together to revise with colleagues they chose for themselves. All of the participants were pleased with the collaborative methodology of the apps and how it affected their ability to write in English. Several students stated that collaboration improved the revising process simpler and more accurate, inspired them more when their partners noticed their writing skills, and boosted their confidence in writing. Participants also stated that having a partner allowed them to feel better regarding the procedure better separate out the trainer's suggestions., and lowered their stress level, that was consistent with (Arnold, 2023;Woo, et.al.,2023)

Using grammarly goes beyond traditional grammar check through the sessions. The researcher model how to use it for offering style suggestions to develop the overall content and cohesion in their writing. It is practiced through the session how to (identify common mistakes such as: subject –verb agreement, punctuation and verb-tense usage, this was consistent with the literature of (Calma ,et.al,2022;Marzuki,et.al,2023; Arisandi& Sudarajat,2023)

8- Conclusion:

The outcomes of the present research asserted that the participants' writing skills were developed and their online academic engagement was enhanced through the implementation of the suggested program. The implications from the findings of this study support that Grammarly and QuillBot are useful tools that make online learning environment possible. The research was a shift for transforming the teacher-centered class environment to a connectivism learning environment and AI apps.

 Implementing the principles of connectivism theory engaged students of the study in critical thinking and increased the sense of self-directed in learning. They joined writing groups using online apps such as Quillbot and engaged in a collaborative discussion. Moreover, they can write different genres of writing on various topics and this enrich their writing performance. One of the most important principles of this theory, they learn from online resources or tools. They practiced the writing sub-skills such as, word choice, style and organization. Students gained feedback on their writing from other groups and from the researcher in

the sessions. Providing feedback enhances their clarity, accuracy and learn from their mistakes how to be good writer.

Students were engaged in the writing process as a result of using the AI apps (grammarly and QuillBot). QuillBot and grammarly helped the participants to minimize errors in writing. They were able to paraphrase sentences, find punctuation errors and this was conducted by using the free version of the apps. Grammarly, in the same vein, enabled the participants to determine their errors and to reformulate them, which subconsciously increased their grammatical competence. Moreover, theses apps provided the participants with style suggestions in writing that affiliated with the proposed tone and spectators. This flexibility donated to the inclusive efficiency of the treatment in increasing writing skills and their engagement in online learning.

9- Recommendations of the study:

The results of the research offer a number of recommendations for classroom teachers
looking to improve their writing instruction, as follows:

> 1-English language teachers should be trained on using different other types of artificial intelligence tools for developing EFL writing skills.
> 2-Undergraduate and postgraduate students should be trained on the principles of connectivism learning theory to enhance their competency in language learning.
> 3-University students should be encouraged to use AI applications (e.g., Grammarly and QuillBot enhance their writing skills and other language skills.
> 4- EFL student teachers should exercise different artificial intelligence tools.
> 5- Curriculum designers should take into their account the importance of embedding artificial intelligence apps in the syllables of various phases.

10- Suggestions for further Research:

Within the constraints of the current study as well as the data gained, the subsequent issues have been recommended as areas of additional research:

- ➢ 1-Enhancing student teachers' phonological awareness with an artificial intelligence applications-based program
- ➢ 2- Using artificial intelligence applications to develop communicative competence skills among secondary school students.
- ➢ 3- Developing other language skills among EFL student teachers such as listening through different applications of artificial intelligence.
- ➢ 4- Employing artificial intelligence for assisting in-service teachers enhance their EFL descriptive writing skills.
- ➢ 5-Using DeepL writing artificial intelligence app for enhancing EFL expository writing skills.
- ➢ 6-Fostering EFL student teachers' narrative writing skills through using Scribbr AI assisting writing tool.

References

Abdelqader,Y.(2024). *The effectiveness of a Brain-Based learning program in developing Al-Azhar EFL University students argumentative writing skills,* Unpublished master thesis, Ainshams University.

Alam, M. A. (2023). Connectivism learning theory and connectivist approach in teaching and learning: a review of literature. *Bhartiyam International Journal Of Education & Research*, *12*(2).

Amyatun, R. L., & Kholis, A. (2023). Can Artificial Intelligence (AI) like QuillBot AI Assist Students' Writing Skills? Assisting Learning to Write Texts using AI. ELE Reviews: *English Language Education Reviews, 3*(2), 135-154.

Arisandi, V., & Sudarajat, A. (2023). Revisiting "grammarly" in higher education (a literature review). *Journal of Innovation Research and Knowledge, 2*(8), 3351-3356.

Bakri, I., Wulandari, M. F., & Rut, W. M. (2024). QuillBot integration in the learning of English writing skills (Perception of business management students). *International Journal of Research on English Teaching and Applied Linguistics*, *5*(1), 53-58.

Batanero, J. M. F., Rueda, M. M., Cerero, J. F., & Gravan, P. R. (2021). Impact of ICT on writing and reading skills: a systematic review (2010-2020). Texto Livre, 14(2), e34055.

Ben-Eliyahu, A., Moore, D., Dorph, R., & Schunn, C. D. (2018). Investigating the multidimensionality of engagement: Afective, behavioral, and cognitive engagement across science activities and 828 J. Borup et al. 1 3 contexts. *Contemporary Educational Psychology, 53*(1), 87–105. https://doi.org/10.1016/j.cedps ych.2018.01.002.

Blackmore, B., Thorp, M., Chen, A. T. Y., Morreale, F., Burmester, B., Bahmanteymouri, E., & Bartlett, M. (2023). Hidden humans: exploring

perceptions of user-work and training artificial intelligence in Aotearoa New Zealand. *Kōtuitui: New Zealand Journal of Social Sciences Online*, *18*(4), 443-456.

Borup, J., Graham, C. R., West, R. E., Archambault, L., & Spring, K. J. (2020). Academic communities of engagement: An expansive lens for examining support structures in blended and online learning. *Educational Technology Research and Development*, *68*, 807-832.

Calma, A., Cotronei-Baird, V., & Chia, A. (2022). Grammarly: An instructional intervention for writing enhancement in management education. *The International Journal of Management Education*, *20*(3), 100704.

Castillo-Cuesta, L., Quinonez-Beltran, A., Cabrera-Solano, P., Ochoa-Cueva, C., & Gonzalez-Torres, P. (2021). Using Digital Storytelling as a Strategy for Enhancing EFL Writing Skills. *International Journal of Emerging Technologies in Learning*, *16*(13).

Chandrappa, P. K. (2018). Connectivism as a learning theory for the digital age. *Adhyayan*, 8(1), 37-47.https://doi.org/10.11.258357/Adyn-16

Christenson, S. L., Reschly, A. L., & Wylie, C. (Eds.). (2012). *Handbook of Research on Student Engagement*. New York, NY, US: Springer Science & Business Media.

Dixson, M. D. (2015). Measuring student engagement in the online course: The Online Student Engagement Scale (OSE). *Online Learning*, *19*(4) http://dx.doi.org/10.24059/olj.v19i4.561

Dziubaniuk, O., Ivanova-Gongne, M., & Nyholm, M. (2023). Learning and teaching sustainable business in the digital era: a connectivism theory approach. *International Journal of Educational Technology in Higher Education*, *20*(1), 20

Elshazly,M.(2024). *Suggested program based on the process Genre approach for developing EFL creative writing skills and academic engagement among secondary school students,* Unpublished master thesis ,Faculty of Education, Helwan University.

Fahmi, M. A., & Cahyono, B. Y. (2021). EFL students' perception on the use of Grammarly and teacher feedback. *JEES (Journal of English Educators Society)*, *6*(1), 18-25.

Fathi, J., Derakhshan, A., and Safdari, M. (2020). The impact of portfolio-based writing instruction on writing performance and anxiety of EFL students. *Pol. Psychol. Bull.* 51, 226–235. doi: 10.24425/ppb.2020.134729

Fouladchang, M. (2018). The motivational outcomes of connectivism theory in EFL. *Modern Journal of Language Teaching Methods (MJLTM)*, *8*(2), 101-112.

Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: potential of the concept, state of the evidence. *Review of Educational Research*, 74 (1), 59-109

Ginting, R. S., & Fithriani, R. (2022). Peer and automated writing evaluation (AWE): Indonesian EFL college students' preference for essay evaluation. *LLT Journal: A Journal on Language and Language Teaching,* *25*(2), 461-473. https://e-journal.usd.ac.id/index.php/LLT/article/view/4879

Gohar, R. H. A. (2024). Using AI-Powered Design Thinking to Foster Student Teachers' EFL Creative Writing Skills and Engagement. *Mansoura Faculty of education*, *125*(2), 57-99.

Goldie, J. G. S. (2016). Connectivism: A knowledge learning theory for the digital age?. *Medical teacher*, 38(10), 1064-1069.

Halverson, L. R., & Graham, C. R. (2019). Learner engagement in blended learning environments: A conceptual framework. *Online Learning., 23(2), 145–178. https://doi.org/10.24059/olj.v23i2.1481*.

Ha, T. H. (2023). Using QuillBot for enhancing EFL learners' essay writing skills. *Educational Sciences,* 68(3), 41-50. https://vjol.info.vn/index.php/DHSP-GD/article/download/84079/72866/

He, L., Feng, L., & Ding, J. (2024). The Relationship between Perceived Teacher Emotional Support, Online Academic Burnout, Academic Self-Efficacy, and Online English Academic Engagement of Chinese EFL Learners. *Sustainability*, *16*(13), 5542

Hetata,A.(2024).*The effectiveness of using self-regulated learning activities in improving secondary school students' EFL writing skills*, Unpublished master thesis, Menofia University.

Ibnian, S.S.K. (2017). Writing Difficulties Encountered by Jordanian EFL Learners. *Asian Journal of Humanities and Social Studies, 5*(3), 197-206

Inayah, T. M., & Apoko, T. W. (2024). Exploring Students' Perspectives on the Use of Grammarly in Writing Analytical Exposition Text. JLE: Journal of Literate of English Education *Study Program*, *5*(1), 73-83.

Jeanjaroonsri, R. (2023). Thai EFL Learners' Use and Perceptions of Mobile Technologies for Writing. *Learn Journal: Language Education and Acquisition Research Network*, *16*(1), 169-193.

Kurniati. E. Y., & Fithriani. R. (2022). Post-graduate students' perceptions of *Quillbot* utilization in English academic writing class. *JELTL (Journal of English Language Teaching and Linguistics, 7*(3), 2503-1848.

Leow, F. T., & Neo, M. (2023). Critical factors for enhancing students' collaborative learning experiences in a project-based connectivism learning environment. *International Journal of Learning, Teaching and Educational Research,* 22(7), 388-410.

Malave Tomala, X. A. (2024). *Exploring connectivism in teaching English content subjects on high school students* (Bachelor's thesis, La Libertad, Universidad Estatal Península de Santa Elena, 2024).

Malik, G., Tayal, D. K., & Vij, S. (2019). An analysis of the role of artificial intelligence in education and teaching. In P. Sa, S. Bakshi, I. Hatzilygeroudis, & M. Sahoo (Eds.), *Recent findings in intelligent computing techniques: Proceedings of the 5th ICACNI 2017* (Vol. 1, pp. 407-417).

Marghany, M. M. (2023). Using artificial intelligence-based instruction to develop EFL higher education students' essay writing skills. *CDELT Occasional Papers in the Development of English Education*, *82*(1), 219-240.

Marzuki, Widiati, U., Rusdin, D., Darwin, & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education*, *10*(2), 2236469.

Maulidina, P., & Wibowo, H. (2022). The use of Grammarly tools to enrich student's writing ability. *Lingua*, *18*(2), 179-189.

McCarthy, J., Minsky, M. L., Rochester, N., & Shannon, C. E. (2006). A proposal for the Dartmouth Summer Research Project on artificial

intelligence, August 31, 1955. *AI Magazine*, *27*(4), 12–14. https://doi.org/10.1609/aimag.v27i4.1904

Miranty, D., Widiati, U., Cahyono, B. Y., & Sharif, T. I. S. T. (2021, December). The effectiveness of using Grammarly in teaching writing among Indonesian undergraduate EFL students. In *International seminar on language, education, and culture (ISoLEC 2021)* (pp. 41-45). Atlantis Press.

Mohamed,S.(2023). *Using some online collaborative learning applications for developing EFL writing skills and reducing writing apprehension of freshmen students at the Faculty of Education,* Unpublished master thesis, Faculty of Education, Benha University.

Moybeka, A. M., Bosco, F. H., Apalem, C. R., Chandra, D. A., & Efendi, E. (2023). Developing EFL students' writing ability through contextual teaching and learning (a classroom action research study). *Journal of English Culture, Language, Literature and Education*, *11*(1), 79-97.

Nurmayanti, N., & Suryadi, S. (2023). The effectiveness of using Quillbot in improving writing for students of English Education Study Program. *Jurnal Teknologi Pendidikan: Jurnal Penelitian Dan Pengembangan Pembelajaran*, *8*(1), 32-40.

Phuket, P.R.N. (2015). Understanding EFL Students' Errors in Writing. *Journal of Education and Practice, 6*(32), 99-106

Rad, H. S., Alipour, R., & Jafarpour, A. (2024). Using artificial intelligence to foster students' writing feedback literacy, engagement, and outcome: A case of Wordtune application. *Interactive Learning Environments*, *32*(9), 5020-5040.

Rusmiyanto, R., Huriati, N., Fitriani, N., Tyas, N. K., Rofi'i, A., & Sari, M. N. (2023). The role of artificial intelligence (AI) in developing English language learner's communication skills. *Journal on Education*, *6*(1), 750-757.

Seaman, J. E., Allen, I. E., & Seaman, J. (2018). Grade increase: Tracking distance education in the United States. Babson Survey Research Group. Retrieved February 10, 2023, from https://eric. ed.gov/?id=ED580852.

Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology & Distance Learning*. http://www.itdl.org/Journal/Jan_05/article01.htm.

Sirag, W.(2022).*A program based on systematic approach for developing EFL secondary stage students' writing skills and reducing writing apprehension* ,Unpublished master thesis, Faculty of graduate studies for Education, Cairo University.

Siemens, G. (2006). *Connectivism: Learning theory or pastime of the self-amused?* http://www.Elearnspace.org/Articles/Connectivism_self-amused.htm
Skinner, B. F. (1938).

Siemens, G. (2012,). Learning analytics: envisioning a research discipline and a domain of practice. In Proceedings of the 2nd international conference on learning analytics and knowledge (pp. 4-8).

Siemens, G. (2017). *Connectivism.* Foundations of learning and instructional design technology

Sulaiman, R., & Muhajir. (2019). The difficulties of writing scientific work at the English education students. *Journal of English Education*, *4*(1), 54-60.

Sumakul, D. T. Y., Hamied, F. A., & Sukyadi, D. (2022, February). Students' perceptions of the use of AI in a writing class. In *67th TEFLIN International Virtual Conference & the 9th ICOELT 2021 (TEFLIN ICOELT 2021)* (pp. 52-57). Atlantis Press.

Trivette, W. (2020). Upgrade your English writing skills. Winn Trivette II, MA.

Wang, Z. (2022). Computer-assisted EFL writing and evaluations based on artificial intelligence: a case from a college reading and writing course. *Library Hi Tech*, *40*(1), 80-97.

Waziana, W., Andewi, W., Hastomo, T., & Hasbi, M. (2024). Students' Perceptions about the Impact of AI Chatbots on their Vocabulary and Grammar in EFL Writing. *Register Journal*, *17*(2), 352-382.

Weigle, S. C. (2002). Assessing Writing. Cambridge: Cambridge University Press.

Woo, D. J., Susanto, H., Yeung, C. H., Guo, K., & Fung, A. K. Y. (2023). Exploring AI-Generated text in student writing: How does AI help?. *arXiv preprint arXiv:2304.02478*.

Zhang, L.; Zhang, L.J.(2021). Fostering Stance-Taking as a Sustainable Goal in Developing EFL Students' AcademicWriting Skills: Exploring the Effects of Explicit Instruction on AcademicWriting Skills and Stance Deployment. *Sustainability, 13*, 4270. https://doi.org/10.3390/su13084270

Zhao, X. (2022). Leveraging artificial intelligence (AI) technology for English writing: Introducing Wordtune as a digital writing assistant for EFL writers. *RELC Journal*. https://doi.org/10.1177/00336882221094089

Zhou, S. A., & Hiver, P. (2022). The effect of self-regulated writing strategies on students' L2 writing engagement and disengagement behaviors. *System*, *106*, 102768.