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AI- Powered Applications for Enhancing Syntax Abilities: Perceptions of English Program Undergraduates at the University of Bisha

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Abstract:

This research examines the impact of Artificial Intelligence (AI) powered applications on enhancing syntactic knowledge among students in the English Program at the University of Bisha, KSA. The University of Bisha has been chosen specifically to represent the population sample in all universities of the Kingdom of Saudi Arabia. The core objective is to explore student perspectives on the effectiveness of AI-powered tools in facilitating their understanding and application of syntax in the English language. The findings offer compelling evidence of the positive influence of AI tools, not only in enhancing syntactic knowledge but also in bolstering student confidence and improving overall language usage. The results underscore the transformative potential of AI in educational settings, particularly in the context of language learning, by providing insights into how AI-powered tools can effectively augment traditional learning methodologies. This study contributes to the growing body of literature on AI in education, specifically highlighting its role in enhancing syntactic competence among EFL learners.

Key words: AI-powered tools; EFL learning; syntactic abilities.

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Introduction

The field of studying English as a foreign language (EFL) is undergoing rapid change with a growing emphasis on the integration of Artificial Intelligence (AI) tools. These tools offer innovative methods to enhance language learning and teaching. However, EFL learners often encounter challenges when it comes to mastering the intricacies of grammar, syntactic structures, and stylistic nuances. Insufficient comprehension of grammar rules among English language learners hampers their ability to communicate effectively and professionally. This limitation negatively impacts their proficiency in English language communication. Consequently, the introduction of AI-powered applications, such as Grammarly, Chat GPT, websites, etc. present a significant opportunity to explore their potential impact on EFL learning. The use of such tools not only aids in writing improvement (Fitria, 2021), but it has had a significant impact on improving grammatical accuracy and syntax in English as a Foreign Language (EFL). AI-powered apps diligently analyze texts and identify errors related to verb agreement, tense usage, and sentence structure. These aspects of grammar pose challenges for EFL learners due to the intricate nature of English grammar (Fahmi & Cahyono, 2021). Through providing instantaneous corrections and explanations, AI tools facilitate the immediate rectification of such errors, thereby assisting learners in developing a more intuitive grasp of grammar rules.

1.1 Statement of the Problem:

While there is anecdotal evidence suggesting that AI tools such as Grammarly, Chat GPT, websites, etc., can provide real-time grammar and style correction (Fahmi, Cahyono, 2021), (Alotaibi, 2022), (Alotaibi, 2023), (Giglio & Costa, 2023), (Armanda, Nugraheni, Wulan Sari and Imron, 2022), there is a limited systematic research on their roles in enhancing syntactic aspects of EFL learning, including grammatical accuracy, vocabulary improvement, and overall syntactic structure quality. Most of these studies focus on AI role in teaching, evaluating the students' writing assignments, correcting and checking grammar, and the automation of corrective feedback to improve their writing skill. However, none of which aims to explore the AI expected contribution in improving the syntaxt abilities of the students. Therefore, the role of AI in enhancyng the students' syntactic abilities will be explored through surveying the students' perspectives to gain insights into how AI-powered tools users perceive the enhancement of their syntactic abilities and knowledge in English language by utilizing AI-powered tools in EFL learning.

1.2 Research Objectives:

The main objective of this research is to explore the insights of English Program undergraduates at University of Bisha regarding the utilization of the AI- powered apps and websites for improving their syntactic abilities.

1.3 Research Questions:

The research paper aimed to address the following inquiry:

1. To what extent do EFL learners at Bisha University perceive the impact of AI-powered tools on their ability to form correct syntactic structures and enhance their syntactical knowledge?

2. To what extent do the EFL learners at Bisha University perceive positive and negative effects of using AI-powered apps for learning syntax?

3. Are there any significant differences in the perceptions of students regarding the use of AI-powered tools, regarding their academic year of study, GPA, or gender?

2. Review of Literature

2.1 The role of AI-powered tools in enhancing education and learning EFL.

The inclusion of artificial intelligence (AI) in educational environments has given rise to various AI-driven applications designed to enhance the teaching and learning process. These applications, including Chatbots, Robotic Assistants, Vidreader, Seeing AI, Classcraft, and 3D holograms, have been crafted to provide support to both educators and students within the educational system (Zhao & Nazir, 2022). AI-powered technologies are progressively being tailored for educational purposes with the aim of benefiting students' academic performance and overall learning outcomes (Chichekian & Benteux, 2022) and (Mohamed, & Alian, 2023). The adoption of AI for educational use has sparked an educational revolution, expanding AI's presence in the educational sector and extending beyond traditional educational technology to boost learning efficiency (Park & Kwon, 2023).

Additionally, AI enriches educational resources, alters teaching approaches, and ignites students' passion for learning (Zhang, 2023). AI-driven applications have made substantial contributions to the teaching and learning process, especially in the realm of English language instruction and pronunciation (Humardhiana, 2022). Furthermore, AI has been demonstrated to enhance human capabilities across learning, perception, and cognition, resulting in reduced errors and increased efficiency, speed, and precision for organizations (Chen et al., 2023).

Moreover, AI technologies provide effective support for online learning and teaching, encompassing personalized learning for students, the automation of instructors' routine tasks, and the facilitation of adaptive assessments (Seo et al., 2021). The potential of AI-powered applications in

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language learning has been acknowledged as an efficient means to assist learners in acquiring English as a Second Language (Moulieswaran & Kumar, 2023). Undoubtedly, the integration of AI-powered tools in education holds the potential to enhance employability by improving students' learning outcomes and reducing the workload of educators (Chaudhry & Kazim, 2021). It has shown promising prospects for enhancing the teaching and learning process, elevating educational resources, and personalizing learning experiences.

The development and deployment of AI technologies in educational environments have the capability to transform traditional teaching methodologies and contribute to enhanced learning results for students.

2.2 The role of AI-powered tools in enhancing syntax

Recent literature has expressed considerable interest in exploring how AI-driven tools impact the improvement of language structures, particularly within the domain of language learning. AI-driven tools have demonstrated their capacity to deliver customized learning experiences and instant feedback, thereby elevating language skills and educational outcomes (Vall & Araya, 2023). Moreover, the utilization of AI tools has been observed to bolster knowledge management procedures and performance within organizations, signifying AI's potential to enrich knowledge acquisition and retention (Leoni et al., 2022). Furthermore, the assessment of AI-powered language tools has been examined to gauge their effectiveness across various language tasks and recording media, underscoring AI's potential to enhance language evaluation procedures (Parsa et al., 2021).

The incorporation of Artificial Intelligence (AI), such as Grammarly shows a significant influence in improving grammatical precision in writing in English as a Foreign Language. AI-driven writing aids meticulously analyze written content, detecting issues related to verb agreement, tense utilization, and sentence organization (Alotaibi, 2023). These facets of English grammar are often challenging for EFL learners due to their intricacy (Fahmi, Cahyono, 2021). Similarly, Armanda, et al. (2022) demonstrated that most EFL students positively perceived Grammarly as an online tool for correcting grammar in article writing. Grammarly was found effective in identifying grammatical and stylistic errors, thereby aiding in English writing. His study highlighted both the advantages and disadvantages of using Grammarly as an AI-powered tool for enhancing EFL upon students' perspective who assured the beneficial role of AI-powered tools in facilitating article writing.

Such tools suggest synonyms and alternative word choices and contextually appropriate terms, encouraging learners to diversify their vocabulary and consequently elevate the sophistication of their writing (Parra, 2019).

Despite their effectiveness in detecting grammatical errors, providing explanations, and instilling learner confidence, there are concerns regarding the potential overreliance on AI and instances where meaning might unintentionally be altered (Alotaibi, 2023).

2.3 Limitations of the impact of AI-integration in syntax learning

While AI-powered tools have demonstrated potential in enhancing syntax learning, especially in language processing and grammar acquisition, their utilization presents both advantages and disadvantages. The benefits of incorporating AI in syntax learning encompass personalized learning experiences, immediate accessibility to AI assistants for on-the-spot assistance, and the potential for improved language processing and grammar acquisition. For instance, AI-powered tools can offer customized learning experiences, enabling students to learn at their own pace and according to their preferred learning styles (Harry, 2023). Additionally, the continuous availability of AI assistants allows learners to seek instant help and report difficulties without waiting for a response (Suresh et al., 2023).

Furthermore, AI has the potential to enhance language processing and grammar learning, particularly in bilingual and monolingual adults acquiring an additional language, by providing insights into syntactic processing through event-related potentials (ERPs) (Grey et al., 2017). It is helpful in increasing their awareness of common writing errors, boosting their confidence in writing, and improving their grammar and sentence structure (Alotaibi1, 2023).

Nonetheless, the integration of AI in EFL learning comes with certain drawbacks. One of the primary disadvantages is the limited empirical foundation for assertions regarding bilingual advantages in language learning, especially in grammar acquisition, due to the relatively narrow research in this domain (Grey et al., 2017).

Additionally, concerns arise about potential systematic biases in data collection that can impact the types of patterns AI recognizes or the predictions it may generate, potentially leading to biased language learning outcomes (Hashimoto et al., 2018). Moreover, there is a need for methodological advancements to capture, process, and analyze multimodal data for examining and supporting learning regulation through human-AI collaboration (Järvelä et al., 2023). Furthermore, the utilization of AI in syntax learning may have limitations concerning moment-by-moment learning curves and self-regulated learning techniques (Molenaar et al., 2021).

By reviewing a number of papers investigating the influence of AI on English language learning, it is evident that the existing studies predominantly concentrate on the general aspects of language learning rather than delving into the specifics of syntax enhancement or syntactic abilities (Grey et al., 2017), (Suresh et al., 2023), (Harry, 2023), (Vall & Araya, 2023), (Alotaibi1, 2023),etc.,

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there is a noticeable gap in research regarding how AI can specifically aid in improving learners' knowledge of syntax. Furthermore, there is a lack of exploration into students' perceptions of AI's role in learning syntax, particularly its positive influences or potential negative implications. While previous studies have provided valuable insights into the broader scope of language learning facilitated by AI, they fall short in addressing the nuanced aspects of syntax, a critical component of language mastery. This gap highlights the need for more targeted research in this area, which could yield significant educational benefits by focusing on the specific ways AI can enhance syntactic understanding and abilities in language learners. Such research would not only contribute to a more comprehensive understanding of AI's role in language learning but also offer practical implications for developing more effective AI-driven language learning tools that cater to the intricate aspects of syntax.

This conclusion is consistent with the outcomes of prior studies in this field, including those conducted by Humardhiana (2022), Chen et al. (2023), Moulieswaran & S (2023), and Chaudhry & Kazim (2021). Armanda et al. (2022), Alotaibi1 (2023), Alotaibi (2022).

3. Methodology

The study uses a descriptive quantitative method to examine the insights of EFL students in English program at University of Bisha regarding the use of AI-Powered tools for enhancing their grammatical and syntactic abilities.

3.1 Participants

This study was undertaken within the English Department at the University of Bisha, located in Saudi Arabia in the beginning of the first semester, 2023-2024. The participants for this study comprised 55 students enrolled in the English Program, with a gender distribution of 13 males (23.6%) and 42 females (76.4%). The age range of the participants spanned from 19 to 23 years. The breakdown by academic year was as follows: Year 1 had 1 student, Year 2 had 8 students, Year 3 had 9 students, and Year 4 had the most with 37 students (as illustrated in Figure 1).

Figure (1): The number of the students participated in the study of different levels (Male –female)
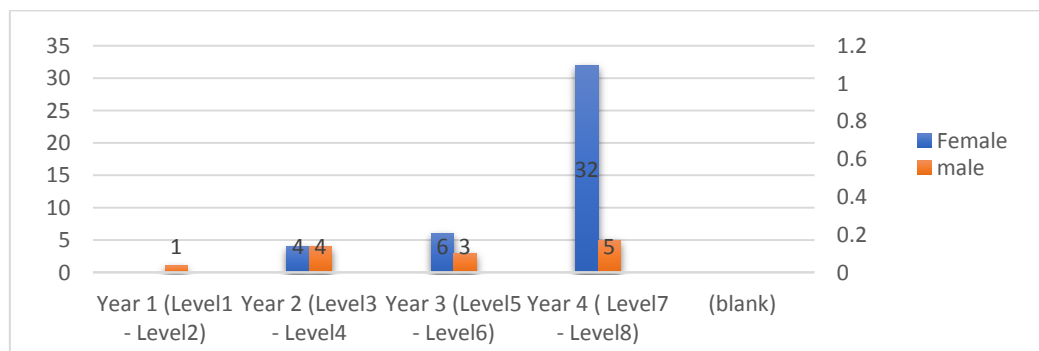
3.2 Instruments

The researchers developed a close-ended questionnaire of 30 items, as detailed in Appendix 1. The first part of the survey solicited basic information such as gender, age, and GPA. The second part was of three dimensions: (a) the participants perceived the role of AI-Powered Apps in enhancing their syntactic abilities to form correct grammatical structures, (b) the advantages offered by AI-Powered apps in enhancing learning syntax, and (c) the disadvantages of AI-Powered apps in learning syntax. The questionnaire was designed on a Likert scale with five options: Strongly Agree (SA), Agree (A), Neutral (N), Disagree (D), and Strongly Disagree (SD). The questionnaire was reviewed by expert referees to assess its construct validity, specifically its comprehensibility, the accuracy of language, the clarity of the questions. The researchers considered all comments and incorporated them into the final version of the questionnaire. The researchers selected google form to administer the questionnaire for its easiness and user-friendly interface. The students filled out the questionnaire online.

After data collection, an SPSS package version 25 was used for doing the further statistical data analysis. In assessing the reliability of the questionnaire as a tool for collecting the data, we utilized Cronbach's Alpha, a statistical measure commonly used in social sciences and psychology. The value of Cronbach's Alpha for this questionnaire was found to be 0.841. This is a highly satisfactory result, as a Cronbach's Alpha value above 0.7 is generally considered acceptable in most social science research situations. Therefore, this high value of 0.841 indicates that the questionnaire has good internal consistency and reliability. It suggests that the items in this administered questionnaire are closely related as a group, providing a robust measure of the underlying construct.

The items of the questionnaire were analyzed statistically by calculating the average means and standard deviation and for obtaining the interpretations of the responses and ANOVA statistics for checking significance of differences in learners' perceptions.

4. Results and Discussion

After data collection, the results are analyzed to obtain the students' insights and opinions towards using the AI-powered tools for enhancing their grammar and syntactical abilities. More specifically, it was designed to investigate the perceptions of EFL students regarding the impact of AI-powered applications on the syntax knowledge, particularly in the context of learning English. To address this issue, three questions were formulated. The results revealed that most students agreed that AI-based applications had a beneficial effect on their comprehensive syntax knowledge, with a mean score of 3.9 and a standard deviation of 0.52696. On the other hand, when it came to the purported

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negative impact of using AI-based applications, the students' overall response was neutral, with a mean score of 3.47 and a standard deviation of 0.81824.Table (1).

Table (1): Positive and negative effects of AI-based application on syntax Abilities

	N	Mean	Std. Deviation
The Positive Effect	55	3.8691	0.52696
The Negative Effect	55	3.4727	0.81824

The questionnaire was designed to probe different aspects of syntax. As indicated in Table (2), the most positively influenced syntactical skills were the ability to write simple and compound sentences, and the recognition of parts of speech. Conversely, the least influenced syntactical skills included the ability to write complex sentences, convert active sentences to passive and vice versa, use the correct tense, identify areas of weakness in syntactic abilities that require enhancement, use connectors, write correct imperative sentences, boost confidence in analyzing syntactic structures, write correct interrogative sentences, and write correct negative sentences.

Table (2): Syntactical areas positively affected by using AI-based applications

	N	Mean	Std. Deviation
Recognizing parts of speech	55	4.0000	0.76980
Using proper tense.	55	3.7818	0.89631
Applying proper connectors.	55	3.8182	0.74761
Writing correct simple sentences.	55	4.0909	0.96748
Writing correct compound sentences.	55	4.1091	0.71162
Writing correct complex sentences.	55	3.6727	0.96330
Transferring active sentence into passive and vice versa.	55	3.6727	0.90379
Writing correct interrogative sentences.	55	3.8545	0.91121
Writing correct imperatives sentences.	55	3.8364	0.73946
Writing correct negative sentences.	55	3.9091	0.77633
Improve confidence to analyze syntactic structures.	55	3.8364	0.81112
Getting insights into areas of weakness in the syntactic abilities that need improvement.	55	3.8000	1.02560
Getting insights into areas of strength on certain areas of the syntactic abilities.	55	3.6909	1.10341
Experiencing interactive learning scenarios similar to real-life language use.	55	3.9273	0.97856
Overcome challenges in learning syntax.	55	4.0364	0.79264

The research's second question focused on the potential of AI-powered applications to improve the creation of correct syntactic structures and enhance syntactical knowledge. The respondents expressed agreement, as evidenced by a mean score of 3.87 and a standard deviation of 0.54644. This

indicates that the students support the idea that AI-based applications could enhance their ability to write correct syntactic structures. Regarding the benefits of AI-powered applications in enhancing the syntactical knowledge of English as a Foreign Language (EFL) students, the results showed agreement with a mean score of 3.858 and a standard deviation of 0.7350, as shown in Table (3).

Table (3): Role of AI-powered applications in enhancing creating correct syntactic structures and enhancing their syntactical knowledge

	N	Mean	Std. Deviation
Enhancing creating correct syntactic structures.	55	3.8745	0.54644
Enhancing their syntactical knowledge	55	3.858182	0.735021

The third research question examined whether there were any statistical significant differences in learners' perceptions, either positive or negative, based on their gender, academic level, or GPA. The ANOVA method was employed for this purpose, but it did not reveal any significant differences. This outcome suggests that students, irrespective of their gender, academic level, and GPA, concur on the positive impact and maintain a neutral stance on the potential negative effects. They recognize the positive advantages of utilizing AI-based applications for enhancing their syntactic knowledge, yet they remain undecided about its possible negative impact.

Regarding reliance on AI tools for learning syntax, the study's outcomes are in accord with Alotaibi's (2023) research, which indicates that an overdependence on AI might negatively influence students' performance in syntax.

To support this study, it is recommended that the AI impact on enhancing syntax abilities will be investigated empirically and measured through pre-post tests to confirm its positive impact on enhancing syntax and to take into consideration the importance of such information in AI programing.

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5. Conclusion

This investigation examined the perceptions of AI-powered tools' users regarding the enhancement of their syntactic skills in English as a Foreign Language (EFL) learning under the influence of such tools. The findings substantiate the significant role of AI tools in EFL learning.

Furthermore, the study delineates several pivotal roles of AI-powered tools in the advancement of syntactic proficiency. These roles encompass the improvement of part-of-speech recognition in sentences and the enhancement in constructing simple and compound sentences, employing correct tenses, appropriate connectors, converting between active and passive structures, writing grammatically complex sentences, and forming negative, interrogative, or imperative sentences. Consequently, the research demonstrates that AI-based applications exert a beneficial influence on comprehensive syntactic knowledge, affirming the findings of previous research. This includes the positive perception of AI integration in syntax learning, echoing the results presented by

While recognizing the advantageous impact of AI-powered applications in assisting students to overcome syntactic challenges and in boosting confidence, the study does not uncover any detrimental effects impeding students' syntactic learning progression or raise concerns regarding privacy issues.

Additionally, the research study reveals that students, irrespective of gender, academic level, or Grade Point Average (GPA), uniformly recognize the positive influence of AI-based tools in enhancing their syntactic knowledge. They retain a neutral stance concerning the potential negative consequences of these tools. Despite acknowledging the advantages of AI applications in syntax improvement, they remain ambivalent about potential detrimental effects

المستخلص

تعزيز القدرات النحوية باستخدام تطبيقات مدعومة بالذكاء الاصطناعي : وجهة نظر طلاب برنامج اللغة الإنجليزية في جامعة بيشة

عائشة مقبل سعيد المنيعي

طه احمد حسن حزام

تناقش هذه الدراسة تأثير التطبيقات المدعومة بالذكاء الاصطناعي في تعزيز المعرفة النحوية بين الطلاب في برنامج اللغة الإنجليزية في جامعة بيشة، المملكة العربية السعودية. وتم اختيار جامعة بيشىة بالتحديد كممثلة لمجتمع العينة في كل جامعات المملكة العربية السعودية. والهدف الرئيسي من الدراسة هو استكشاف آراء الطلاب حول فعالية أدوات الذكاء الاصطناعي في تسهيل فهمهم وتطبيقهم للنحو في اللغة الإنجليزية. اظهرت النتائج دليلاً قاطعًا على التأثير الإيجابي لأدوات الذكاء الاصطناعي، ليس فقط في تعزيز المعرفة النحوية، ولكن أيضًا في تعزيز ثقة الطلاب وتحسين استخدام اللغة بشكل عام.

تؤكد النتائج على الإمكانات التحويلية للذكاء الاصطناعي في البيئات التعليمية، لا سيما في سياق تعلم اللغة، من خلال تقديم رؤى حول كيفية تعزيز الأدوات التي تعمل بالذكاء الاصطناعي لمنهجيات التعلم التقليدية بشكل فعال. تُسهم هذه الدراسة في المجموعة المتنامية من الأدبيات المتعلقة بالذكاء الاصطناعي في التعليم، وتسلط الضوء تحديدًا على دوره في تعزيز الكفاءة النحوية لدى متعلمي اللغة الإنجليزية كلغة أجنبية.

الكلمات المفتاحية: أدوات مدعومة بالذكاء الاصطناعي؛ تعلم اللغة الإنجليزية كلغة أجنبية؛ قدرات نحوية

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Appendix (A)

Questionnaire

AI- Powered Applications for Enhancing Syntax Abilities: Perceptions of English Program Undergraduates at the University of Bisha

(Developed by Almineeai, A. & Hezam, T.)

Dear Participants,

Thank you for considering participation in this questionnaire. This study aims to explore perceptions regarding the impact of AI-powered applications on enhancing syntax knowledge among English Program Undergraduates at the University of Bisha.

Our objective is to evaluate the effectiveness of AI-powered applications, such as Grammarly, ChatGPT, Alexa, Siri, etc., in supporting the creation of grammatically correct sentence structures, and to explore the students' perceptions of how these tools influence their overall proficiency in syntax from your perspective.

Your insightful responses will contribute significantly to ongoing research on AI-powered tools in language learning, potentially influencing teaching and learning practices for the better. We kindly request your honest and thoughtful responses to the questions that follow. Rest assured, your responses will be treated with utmost confidentiality and will be analyzed collectively in an anonymous manner.

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English Program Undergraduates at the University of Bisha

Aeshah Muqbil Saeed Almineeai
Taha Ahmed Hasan Hezam

Participation in this survey is entirely voluntary, and you may withdraw at any stage. Please respond to each question based on your experiences with AI-powered applications or websites. If you have any queries or concerns, please do not hesitate to contact the researcher.

We appreciate your valuable time and contribution to this study.
Sincerely,

Aeshah Muqbil Saeed Almineeai, Taha Ahmed Hasan Hezam

Part 1) Demographic Information

Name

(optional)…………………………………………………………………………………………

Gender: male. ❑   Female❑

Academic level:

•   Year 1 (Level1 - Level2) ❑

•   Year 2 (Level3 - Level4) ❑

•   Year 3 (Level5 - Level6) ❑

•   Year 4 (Level7 - Level8) ❑

Your GPT:

•   4 – 5 ❑   3 - 3.9 ❑   2 - 2.9 ❑   less than 2 ❑

		Questions	Mean Scores	Standard Deviations
Part 2: The role of AI-Powered applications in enhancing creating correct syntactic structures	1	Using AI-powered applications in writing assignments or any language production, I can recognize parts of speech	4	0.7698
	2	Using AI-powered applications in writing assignments or any language production, I can use proper tense.	3.781	0.89631
	3	Using AI-powered applications in writing assignments or any language production, I can apply proper connectors.	3.818	0.74761
	4	Using AI-powered applications in writing assignments or any language production, I can write correct simple sentences.	4.090	0.96748
	5	Using AI-powered applications in writing assignments or any language production, I can	4.109	0.71162

		write correct compound sentences.		
	6	Using AI-powered applications in writing assignments or any language production, I can write correct complex sentences.	3.672	0.9633
	7	Using AI-powered applications in writing assignments or any language production, I can transfer active sentence into passive and vice versa.	3.672	0.90379
	8	Using AI-powered applications in writing assignments or any language production, I can write correct interrogative sentences.	3.854	0.91121
	9	Using AI-powered applications in writing assignments or any language production, I can write correct imperatives sentences.	3.836	0.73946
	10	Using AI-powered applications in writing assignments or any language production, I can write correct negative sentences.	3.909	0.77633
Part 3: The advantages of using AI-Powered applications in enhancing syntax knowledge.	11	I think using AI-powered applications improve my confidence to analyze syntactic structures.	3.836	0.81112
	12	I think using AI-powered applications offer insights into areas of weakness in my syntactic abilities that need improvement.	3.8	1.0256
	13	I think using AI-powered applications offer insights into areas of strength on certain areas of my syntactic abilities.	3.690	1.10341
	14	I think using AI-powered applications offer an opportunity to experience interactive learning scenarios similar to real-life language use.	3.927	0.97856
	15	I think using AI-powered applications help me overcome challenges in learning syntax.	4.036	0.79264
Part 4: The disadvantages of using AI-Powered applications in learning syntax.	16	I think using AI-powered applications negatively influences my progress in learning syntax.	3.090	1.12666
	17	I think using AI-powered applications might lead to a risk of over-reliance on AI in learning syntax.	3.909	1.0233
	18	I think using AI-powered applications threatens privacy/security of my data.	3.418	1.21245