BIDDING FAREWELL TO TRADITIONAL EFL GRAMMAR INSTRUCTION: AN AI-DRIVEN EVOLUTION

Silvana Neshkovska
Faculty of Education – Bitola, University St. Kliment Ohridski – Bitola, RN Macedonia
silvana.neskovska@uklo.edu.mk
Lela Ivanovska
Faculty of Information and Communication Technologies, University St. Kliment Ohridski – Bitola, RN Macedonia, lela.ivanovska@uklo.edu.mk

Abstract: While grammar remains a cornerstone of English language proficiency, many learners perceive it as the "heaviest block to lift" due to the extensive memorization of rules and exceptions, coupled with the difficulty of applying them effectively. This paper investigates how artificial intelligence is transforming traditional grammar instruction in English as a Foreign Language (EFL) classrooms. Through a review of relevant literature and the integration of AI tools—such as ChatGPT, Grammarly, and similar applications—we explore the pedagogical shift from conventional, rule-based methods to dynamic, learner-centered approaches. In addition, this study presents findings from an online survey administered via Google Forms among Macedonian university students, aiming to assess whether they perceive AI tools as reliable allies in enhancing grammatical accuracy and overall proficiency. Using both qualitative and quantitative analysis of the students' responses, the study also aims to examine potential differences in attitudes between students of English Language and Literature (ELL) and students from non-linguistic study programs enrolled in English for Specific Purposes (ESP) courses.

The findings suggest that AI tools can play a significant role in redefining grammar pedagogy. Notably, ELL students, while more inclined to use AI tools, express greater skepticism than their ESP peers—often citing concerns that excessive reliance on AI may hinder long-term language acquisition. However, both groups agree on the need for more training to use AI tools effectively and report that they primarily rely on ChatGPT for grammar support.
Keywords: Artificial Intelligence, AI tools, EFL learners, grammar

1. INTRODUCTION

Although grammar is an essential component of learning the English language (Kim, 2019; Selvi & Vaishnavi, 2024), memorizing a large number of grammar rules and their exceptions brings contentment only to a select group of language learners. In other words, despite the salience of grammar, the traditional language learning and teaching methods become the root cause why many contemporary learners, who are concurrently digital natives, feel disheartened to strive toward high levels of English proficiency. However, recently, the technology-driven era has revolutionized all spheres of human existence, including education and foreign language learning (Lalira et al., 2024). Thus, due to the modern AI-driven platforms and applications, learning English has never been in a more advantageous position before. Learners' progress does not depend solely on the traditional resources such as textbooks, workbooks, grammar books, and dictionaries (Kara, 2023). Instead, AI-driven tools are proving to be highly effective in supporting the development of core language skills—writing, reading, listening, and speaking—as well as grammar, which underpins all of them.

This paper provides an overview of recent research on the role of AI-powered platforms, software, and chatbots in transforming traditional grammar instruction and learning from a static, rule-focused task into a more dynamic and engaging aspect of language learning. It also presents findings from an online survey, conducted via Google Forms, among Macedonian university students. The aim is to evaluate whether Macedonian students perceive AI tools as reliable allies in enhancing grammatical accuracy and overall English language proficiency. Through both qualitative and quantitative analysis, the study further explores potential differences in attitudes between students of English Language and Literature (ELL) and students from non-linguistic study programs enrolled in English for Specific Purposes (ESP) courses. Given the fact that AI integration into the Macedonian educational context is in its nascent phase, the findings of this study provide timely and much-needed insights, especially in light of the rapid technological advancement that is currently unfolding.

2. THEORETICAL BACKGROUND
2.1 THE SALIENT AND CHALLENGING NATURE OF GRAMMAR IN EFL LEARNING

Generally speaking, grammar is considered the backbone of English language learning, and, hence, "mastering grammar is essential for effectively learning English as a foreign language" (Kim, 2019; Selvi & Vaishnavi, 2024,

Vera et al., 2024). Solid grammar knowledge is one of the main prerequisites for reaching proficiency in the other language skills: writing, reading, speaking, and listening (Vera et al., 2024). A strong command of grammar facilitates the accurate interpretation of messages and the production of well-structured and coherent sentences in students' listening and speaking tasks, respectively. On the other hand, when it comes to reading and writing tasks, grammar is fundamental for students to understand complex texts and express their ideas clearly and effectively (Vera et al., 2024). Overall, the importance of grammar stems from the fact that it provides the structure and rules that govern both how sentences are formed and how meanings are expressed. Without acknowledging the salience of grammar, English language learners may face difficulties communicating accurately and clearly (Vera et al., 2024). In fact, a solid grasp of grammar knowledge enhances not just students' fluency and their overall ability to communicate in English, but also their confidence in using the language and their motivation to keep improving their proficiency (Michigan State University, 2019; University of Cambridge, 2017, in Vera et al., 2024).

However, it is indisputable that many learners encounter persistent difficulties in mastering grammar rules (Kempen, 2004, Ghufron & Rosyida, 2018). Students normally learn grammar rules mechanically. Additionally, they have little conversational practice and exposure to real-life contexts (Selvi & Vaishnavi, 2024, Vera et al., 2024). Larsen Freeman (2000, p. 3) points out that "English grammar is one of the most complex and difficult to learn due to its numerous irregularities and exceptions", presented in the form of irregular verb tenses, complex sentence structures, etc. (in Vera et al., 2024). Additional obstacles include first-language interference and the use of outdated or ineffective teaching methods that fail to meet learners' diverse needs (Vera et. al., 2024). Traditional grammar instruction has often been dominated by debates over explicit (rule-based) vs. implicit (input-based) instruction, and deductive vs. inductive approaches (Celce-Murcia, 2001), while key elements such as individualization, feedback, and adaptability have rarely received the attention they deserve.

With the artificial intelligence (AI), however, grammar pedagogy seems to become more responsive, personalized, and engaging (Kuznietsova & Kulakova, 2024).

2.2 AI-DRIVEN CHANGES IN EFL GRAMMAR INSTRUCTION

The technologically-driven progress in language teaching and learning can be traced back to the 1960s with the advent of Computer-Assisted Language Learning (CALL) applications, which were intended to assist language learners in acquiring vocabulary and grammar. These initial programs have laid the groundwork for later advancements in language learning software that employs AI (Mudhsh et. al, 2025). Initially reliant on rule-based algorithms, AI has now evolved into advanced systems based on deep learning, neural networks, and advanced machine learning techniques. As a result, AI can learn very quickly from the vast amounts of data that is fed to it (Priya & Vijayalakshmi, 2024), which, ultimately, open opportunities for both students and educators (Priya & Vijayalakshmi, 2024).

AI-powered tools offer personalized learning experiences, adaptive feedback, and innovative instructional approaches that have the potential to fully transform grammar instruction (Kuznietsova & Kulakova, 2024; Vera et al., 2024). Among their most notable applications is grammar support: AI systems can detect and correct grammatical errors such as issues with subject-verb agreement, verb tense usage, word order, etc. (Vera et al., 2024). They also provide detailed explanations and examples, allowing learners to correct their errors and to internalize grammatical rules. The immediacy and personalization of such feedback promote long-term retention. Moreover, many AI platforms offer adaptive grammar practice through customized exercises, gamified tasks, and scenario-based learning that align with learners' proficiency levels (Mudhsh et al., 2025). Some AI tools can simulate real-life conversations where students can receive feedback in real time. This, in turn, creates a safe, engaging environment that fosters learners' accuracy and fluency (Qing, 2018, in Mudhsh et al., 2025). Kuznietsova and Kulakova (2024) further argue that AI can be very impactful as it can cultivate critical thinking, problem-solving abilities, and digital literacy. From the educators' standpoint, AI tools can be very beneficial as they can substantially alleviate the tracking of students' progress and offer insights that can be used to design differentiated instruction and curriculum design (Vera et al., 2024).

Nevertheless, it should not be overlooked that the growing reliance on AI in language learning overall raises some valid concerns. Overdependence on AI tools may seriously hinder the development of learners' critical thinking, creativity, and problem-solving skills (Priya & Vijayalakshmi, 2024; Lalira et al., 2024). Additional challenges include the potential for generating biased information, "hallucinations", inaccuracies in error detection, cost barriers, and concerns about learners' data privacy and ethical use (Porter & Grippa, 2020, in Mudhsh et al., 2025). Clearly, these are all aspects that need to be dealt with in the coming period so that the use of AI is both effective and ethically responsible. In response to these concerns, many scholars advocate for a balanced, hybrid approach that combines traditional grammar instruction with AI-enhanced support (Priya & Vijayalakshmi, 2024). Such an approach obliges educators to explain to students that AI tools should be used as a supplementary aid, not as a replacement for traditional instruction (Lalira et al., 2024).

2.3 A REVIEW OF STUDIES THAT INVESTIGATE SPECIFIC AI TOOLS USED FOR GRAMMAR INSTRUCTION

Despite the relatively recent integration of AI tools into grammar instruction, the number of studies that highlight their effectiveness is constantly growing. Kim (2019), for example, found that Korean university students practicing grammar with the AI chatbot *Replika* outperformed peers working solely with human partners. He argues that AI chatbots can lower learners' affective filters, which are often heightened in traditional classrooms.

Kessler et al. (2023) examined AI-powered apps like *Duolingo* and *Babbel*, emphasizing their gamified exercises that reinforce grammar and sentence structure through repetition. Other researchers—Koltovskaia (2020), Barrot (2021), and Almusharraf & Alotaibi (2022)—focused on platforms such as *Grammarly* and *Write & Improve*, which detect and suggest corrections for structural errors. Chang et al. (2021) confirmed *Grammarly*'s effectiveness in enhancing EFL students' grammar and writing through structured, real-time feedback. Fitria (2021 in Mudhsh, et. al, 2025) examined the impact of *Grammarly* on EFL students' writing. The study shows a significant increase in writing scores—from 34 to 77 out of 100—after using the tool, indicating notable progress in grammar and overall writing proficiency. Similarly, Umu Fadhilah (in Selvi & Vaishnavi, 2024) emphasized *Grammarly*'s ability to provide comprehensive error feedback, thus, promoting autonomous learning. Selvi & Vaishnavi (2024) attribute the tool's efficiency to the fact that it relies on syntactic parsing and tokenization, supported by large datasets and continuous learning from user interaction.

The Open AI's chatbot, ChatGPT is also frequently recognized for supporting grammar learning. Jahan et al. (2024) conducted a study with Pakistani English majors using essay tasks before and after a one-month ChatGPT intervention. Post-intervention results showed a 70–90% error reduction in areas such as subject-verb agreement, articles, and prepositions. Schmidt-Fajlik (2023) compared the use of *ChatGPT*, *Grammarly*, and *ProWritingAid* in the Japanese educational context, concluding that *ChatGPT* provided more detailed and clearer grammar explanations, supported by a user-friendly interface. Lalira et al. (2024) found that combining *Grammarly* and *ChatGPT* significantly improved students' grammar, especially among non-language majors with lower baseline skills, primarily due to their ability to provide personalized feedback, and automate error detection. These findings align with Chang et al. (2021) and Zhao (2024), who also noted that AI tools have a greater impact on learners with noticeable skill gaps. Kucuk (2024) highlighted *ChatGPT*'s value in offering level-appropriate feedback, enhancing both student learning and teaching materials.

Kuznietsova and Kulakova (2024) explored integrating AI-generated content into grammar lessons, using *ChatGPT 3.5* for planning tasks and tools like *Quizgecko*, *LearnCube*, *Taskade AI*, and *HomeworkAI* for generating tasks, quizzes, homework assignments, and managing virtual classrooms. They concluded that these tools save time and make learning more engaging and creative. Vera et al. (2024) listed additional AI tools useful for grammar correction such as *Ginger Software*, *Microsoft Editor*, and *Writefull*. For adaptive grammar practice, they highlighted *Duolingo*, *Babbel*, *Languagenut*, and *Imedia*, all of which tailor exercises to individual progress. Selvi & Vaishnavi (2024) compared *Grammarly*, *QuillBot*, *Speak and Improve*, and *Deep English*, showing that combining grammar correction tools with conversational chatbots significantly improve students' grammar knowledge, as all participants in their study demonstrated reduced errors after using these AI tools.

All of the aforementioned studies highlight mainly the positive impact of AI tools on students' grammar learning.

3. RESEARCH METHODOLOGY

Given that the use of AI technologies in grammar instruction is still a largely underexplored area in the Macedonian educational context, this study aims to shed light on Macedonian university students' experiences with and attitudes toward AI in learning English grammar. To this end, an online survey was conducted among students at the University "St. Kliment Ohridski" – Bitola.

The survey, which was administered via Google Forms, was open for student participation throughout the month of April 2025. It included twenty closed-ended and one open-ended question, divided into four separate sections. The first section collected general demographic data, including participants' age, gender and study program (English Language and Literature vs. non-linguistic study programs, within which students attend or have attended English for Specific Purposes [ESP] courses). The second section addressed students' experiences with AI tools in the context of EFL grammar learning and their attitudes toward such tools. The third section examined students' beliefs about the broader implications of using AI for language learning. The final section featured an open-ended question inviting students to express their likes and dislikes regarding the use of AI technologies.

Via a qualitative and quantitative analysis of the obtained data, the study aimed to determine whether Macedonian students from the EFL study program demonstrate different experiences, attitudes, and beliefs compared to their ESP peers. This distinction is important, as EFL students engage more deeply with English grammar in their academic training, whereas ESP students focus more on practical communication and field-specific terminology.

4. RESULTS
4.1 GENERAL DEMOGRAPHIC DATA OF THE INFORMANTS
The study was conducted at the University "St. Kliment Ohridski" – Bitola and involved a total of **113 undergraduate students** aged between 18 and 23 years, mostly in their first year of university studies. Among them, **58 were female** and **42 were male students**, enrolled in different study programs. Specifically, **66 participants were students of English Language and Literature (ELL),** while **47 were studying non-linguistic study programs within which they attended English for Specific Purposes (ESP) courses**.

This demographic composition enabled us to compare the responses of students from a linguistically and pedagogically oriented discipline (ELL) with those from a more context-specific, applied fields (ESP).

4.2 STUDENTS' EXPERIENCE WITH AND ATTITUDE TOWARD AI TOOLS
The first set of questions in this section were designed to assess students' disposition towards learning grammar. The results obtained indicate that the majority of students hold a **positive attitude toward learning grammar**. An overwhelming **98.2% of the respondents a**cknowledge the importance of grammar in mastering the English language. Additionally, **83% of students express enjoyment** in learning grammar rules, and **61.6% disagree with the notion that grammar is boring**. These findings suggest that grammar remains a valued and respected component of English language instruction among students in higher education.

As to how students learn grammar rules, most students report that they continue to rely on traditional methods for learning grammar. These methods include the use of workbooks with grammar exercises (57.5%), contextual learning strategies (53%), and grammar books (26.5%) (Chart 1).

Chart 1. How do you usually learn grammar rules?
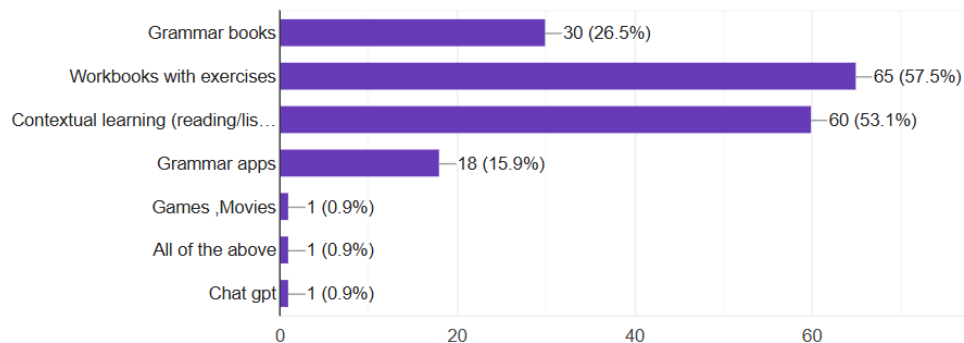
Source: Authors

However, a significant proportion of students (63.7%) also report using AI tools as part of their learning process. The most commonly used tool among the students is ChatGPT (76.1%). Grammarly (25%) comes second among students, while a considerably smaller number of students claim to have experimented with Quillbot (5.7%), Gemini (1.1%), and Deep Seek (1.1%) and others in the context of learning EFL grammar (Chart 2).
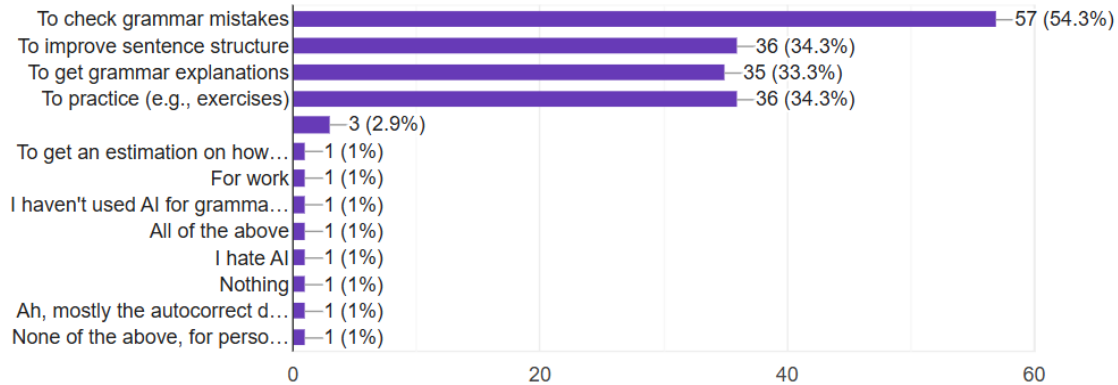
Chart 2. What AI tools have you used?
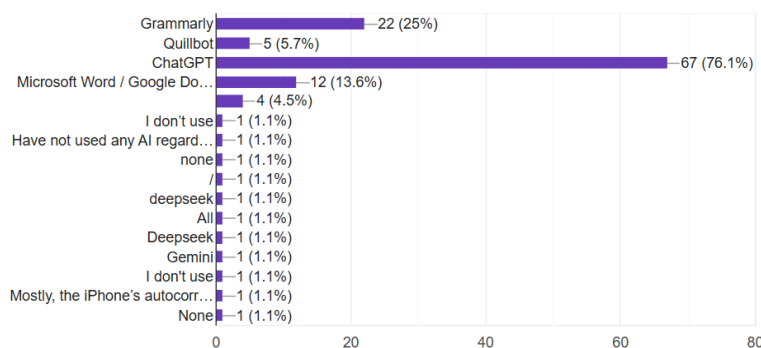
Source: Authors

As to the frequency with which they employ AI tool for learning grammar, students' opinions seem to be divided, with just 8% claiming that they use AI always. The survey also reveals that students primarily use AI tools to check grammar mistakes (54%), to improve sentence structure (34%), to understand grammar explanations (33.3%), and to do practice exercises (34.3%) (Chart 3).

Chart 3. What do you use AI tools for?

To check grammar mistakes	57 (54.3%)
To improve sentence structure	36 (34.3%)
To get grammar explanations	35 (33.3%)
To practice (e.g., exercises)	36 (34.3%)
	3 (2.9%)
To get an estimation on how…	1 (1%)
For work	1 (1%)
I haven't used AI for gramma…	1 (1%)
All of the above	1 (1%)
I hate AI	1 (1%)
Nothing	1 (1%)
Ah, mostly the autocorrect d…	1 (1%)
None of the above, for perso…	1 (1%)

Source: Authors

Furthermore, in their responses students' answers also reveal that they use AI tools mainly to address grammar topics such as verb tenses (37.5%), and that they resort to AI when they need assistance for their homework assignments and essays (36.4%), and for exam preparation (32.7%). When asked about the overall helpfulness of AI tools in learning grammar, 28.8% of students rate them as moderately helpful. This finding suggests that while AI is appreciated by students in general, it is still not seen as a comprehensive replacement for traditional methods.

4.3 STUDENTS' BELIEFS AND CONCERNS ABOUT AI TOOLS

This section of the survey discloses that students generally view AI tools as valuable support mechanisms in their grammar learning process, but not without reservations. While 84.1% report understanding the corrections provided by AI, 83.8% state that they have not actually learned new grammar rules through AI. This lends further support to the finding that Macedonian students, still perceive AI as a supplementary tool.

In terms of trust, 50% of the students state that they sometimes double-check AI-generated responses, which again indicates a degree of caution on their part. Despite this, 59.5% of the students report feeling more confident in using English due to AI tools, and that they recommend them to other English language learners (75.2%). Controversially, a significant portion of students express concern over the fact that AI might reduce their ability to learn grammar naturally. Additionally, 52% note that they have not received sufficient guidance from their teachers or institutions on how to use AI tools effectively, and 56.9% express a desire for more formal instruction.

In the last section, 57 students in response to the open-ended question highlighted both the advantages and disadvantages of using AI. Their positive comments emphasize the tools' ease of access, time-saving features, adaptability to different levels, and clear explanations. Negative feedback include concerns about the inaccuracy of the AI-generated answers and explanations, the lack of human interaction, and the risk of becoming overly reliant on copy-paste solutions, thus hindering their active engagement and critical thinking.

4.4 COMPARISON BETWEEN ELL AND ESP STUDENTS

A particularly noteworthy component of the analysis of students' responses in the survey was the comparison between ELL students and ESP students, which revealed distinct patterns in the usage of AI tools.

As depicted in Table 1 below, which features only the most frequently selected answers by students, ELL students are found to use AI tools more, both among those who gave affirmative answer to this question (in group – 62.5%) and among all the students who participated in the survey (overall – 39.8%). Their background in linguistics and language studies may explain their greater comfort with exploring AI-generated grammar explanations and corrections. ChatGPT is chosen as the most popular AI tool by both ELL and ESP students (in group – 50%, overall – 18.6%). Also, regarding the frequency of use of AI tools in the context of grammar, results show that ELL students are more prone to using them more frequently than their ESP peers by choosing the 'sometimes' option (in group – 72.7%, overall – 21.2% %), and the 'often' option (in group – 59.1%, overall – 11.5%).

As can be seen in Table 1, the results reveal that a greater percentage of the ELL students find AI tools 'moderately helpful' (in group – 62.5%, overall – 17.7%); more ELL students have learned new grammar rules with their

assistance (in group – 56.9%, overall – 46.9%) and more ELL students understand the grammar corrections suggested by AI without difficulties (in group – 58.9%, overall – 46.9%) in comparison to ESP students. Surprisingly, however, at the same time, ELL students demonstrate a greater dose of doubt in utilizing AI in learning grammar by choosing the options 'sometimes' (in group – 55.4%, overall – 27.4%) and 'Yes' (in group – 71.9%, overall – 20.4%) more than their colleagues from the non-linguistic study programs.

Table 1. Comparison of the ELL and ESP students' experience with AI tools

	Have you ever used AI tools to learn grammar?		What AI tools have you used?		How often do you use AI tools for learning grammar?		To what extent do AI tools help you improve your grammar?		Do you have doubts about the accuracy of AI explanations and corrections?		Have you learned new grammar rules by using AI tools?		Do you understand the corrections made by AI tools?	
The most frequent answer/s	Yes 63.7%		ChatGPT 37.1%		Sometimes 29.2% Often 19.5%		Moderately 32%		Sometimes 49.6% Yes 28.3%		No 82.3%		Yes 79.6%	
	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP
in group %	62.5	37.5	50	50	72.7 / 59.1	27.27 / 40.91	62.5	37.5	55.4 / 71.9	44.6 / 28.1	56.9	43.1	58.9	41.1
overall %	39.8	23.9	18.6	18.6	21.2 / 11.5	7.9 / 7.9	17.7	10.6	27.4 / 20.4	22.1 / 7.9	46.9	35.4	46.9	32.7

Source: Authors

Table 2 showcases the differences in the ELL and ESP students' attitudes towards using AI tools for learning grammar. Although ELL students seem to be more confident in English due to AI (in group – 60.6%, overall – 35.4%), they seem more concerned about AI's ability to hinder their natural propensity to master the language (in group – 56.3%, overall – 23.9%). Also, they are more vocal about the lack of formal guidance on how to use AI efficiently from teachers and institutions (in group – 58.6%, overall – 30.1%). Interestingly, both groups agree that more training on proper use of AI is needed (in group – 50%, overall – 27.4%). Lastly, unlike their ESP counterparts, ELL students also have more pronounced attitude towards the use of AI both in class and outside the classroom for assignments (in group – 52.6%, overall – 36.3%), and have a firmer position as to recommending AI for learning grammar to other learners (in group – 54.1%, overall – 40.7%).

Table 2 Comparison of the ELL and ESP students' attitude towards AI tools

	Do you feel more confident in English when using AI grammar tools?		Do you believe that relying on AI tools can reduce your ability to learn grammar naturally?		Have you received any guidance from your teachers and institution about using AI tools?		Do you like more training and guidance on how to use AI tools effectively for grammar learning?		Do you think it is acceptable to use AI tools in English classes or for assignments?		Would you recommend AI tools to other English learners?	
The most frequent answer	Yes 58.4%		Yes 42.5%		No 51.3%		Yes 54.9%		Yes 69.03%		Yes 75.2%	
	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP	ELL	ESP
in group %	60.6	39.4	56.3	43.8	58.6	41.4	50	50	52.6	47.4	54.1	45.9
overall %	35.4	23.01	23.9	18.6	30.1	21.2	27.4	27.4	36.3	32.7	40.7	34.5

Source: Authors

These data suggest that while both groups appreciate the support AI can offer, ELL students are more likely to experiment and engage with AI in the context of learning grammar, despite their still unresolved dilemmas regarding some aspects of AI's usage.

5. CONCLUSION AND RECOMMENDATIONS

The study concludes that AI tools such as ChatGPT and Grammarly offer considerable potential as supportive resources in grammar instruction within ELL contexts. However, these tools are not yet being fully utilized, largely due to a lack of structured training for students and insufficient institutional support. While students acknowledge the value of AI technologies, they tend to view them more as complements to traditional learning methods rather than as standalone instructional solutions. Many express a clear interest in the integration of AI tools into formal grammar education, yet their attitudes reveal a degree of ambivalence and internal contradiction. On the one hand, students report that using AI tools helps them feel more confident as learners of English and that they understand the explanations provided by these tools. They are also familiar with various AI applications used in grammar learning and would recommend them to peers. On the other hand, their actual usage remains occasional, and most find AI only moderately helpful. Moreover, a significant number believe that AI may undermine their ability to truly learn grammar. This tension is further reflected in their desire for more training and guidance, alongside their continued reliance on traditional resources.

These findings are in line with previous research, which has praised AI tools for their ability to provide instant feedback and personalized learning experiences, but also highlighted limitations such as inaccuracy, lack of context, and concerns about fostering shallow learning practices.

Importantly, the study also reveals differences between students enrolled in different academic programs. ELL students are generally more confident and proactive in using AI for grammar-related tasks, likely due to their broader exposure to linguistic theory. In contrast, ESP students seem to be more reserved in using AI. These differences highlight the importance of developing discipline-specific strategies for AI integration.

Based on these findings, several recommendations are proposed for the Macedonian educational context. First, language instructors should develop the necessary digital competencies to integrate AI tools meaningfully into their teaching practice. Second, students should receive structured training on how to use AI tools critically and responsibly, with an emphasis on interpretation, analytical thinking, and independent engagement with content. Third, universities and educational departments should formulate and implement clear, research-informed policies and guidelines to govern an ethical and pedagogically sound use of AI tools, which would apply to both general ELL programs and specialized ESP study programs, ensuring relevance across different learning contexts.

In sum, AI holds promising potential in grammar instruction, but to harness its full potential, educators and institutions must rely on effective, guided implementation.

REFERENCES

Almusharraf, N., & Alotaibi, H. (2022). An error-analysis study from an EFL writing context: Human and automated essay scoring approaches. *Technology Knowledge and Learning*, *28*(3), 1015–1031. https://doi.org/10.1007/s10758-022-09592-z.

Barrot, J. S. (2021). Using automated written corrective feedback in the writing classrooms: Effects on L2 writing accuracy. *Computer Assisted Language Learning*, *36*(4), 584–607. https://doi.org/10.1080/09588221.2021.1936071.

Chang, T., Li, Y., Huang, H., & Whitfield, B. (2021). Exploring EFL students' writing performance and their acceptance of AI-based automated writing feedback. *ICEDS '21: Proceedings of the 2021 2nd International Conference on Education Development and Studies*. https://doi.org/10.1145/3459043.3459065.

Ghufron, M. A., & Rosyida, F. (2018). The role of Grammarly in assessing English as a foreign language (EFL) writing. *Lingua Cultura,* 12. 395. https://doi.org/10.21512/lc.v12i4.4582.

Jahan, J., Arif, L. B., & Mustafa, L. U. (2024). Enhancing Practical English Grammar Skills Through AI: A Study on the Impact of ChatGPT-Assisted Feedback on Student Writing Lecturer. CONTEMPORARY JOURNAL OF SOCIAL SCIENCE REVIEW Vol.02 No.04, pp. 217-229.

Kara, S. (2023). The Effects of Web 2.0 Tools on Foundation English Students Success Rates at A Private University in Iraq. *International Journal of Social Sciences & Educational Studies*, *10*(1), 22-36.

Kempen, G. (2004). Interactive visualization of syntactic structure assembly for grammar-intensive first- and second-language instruction. In: Delmonte et al. (Eds.).

Kessler, M., Loewen, S., Gonulal, T., (2023). Mobile-assisted language learning with Babbel and Duolingo: Comparing L2 learning gains and user experience. *Computer Assisted Language Learning, 1-25,* DOI:10.1080/09588221.2023.2215294.

Kim, Na-Young (2019). Study on the Use of Artificial Intelligence Chatbots for Improving English Grammar Skills. *Journal of Digital Convergence*, Vol. 17. No. 8, pp.37-46, ISSN 1738-1916, https://doi.org/10.14400/JDC.2019.17.8.037.

Koltovskaia, S. (2020). Student engagement with automated written corrective feedback (AWCF) provided by Grammarly: A multiple case study. *Assessing Writing*, *44*, 100450. https://doi.org/10.1016/j.asw.2020.100450.

Kucuk, T. (2024). ChatGPT Integrated Grammar Teaching and Learning in EFL Classes: A Study on Tishk International University Students in Erbil, Iraq. *Arab World English Journal (AWEJ)* Special Issue on ChatGPT, pp. 100-111. DOI: https://dx.doi.org/10.24093/awej/ChatGPT.6.

Kuznietsova, O. & Kulakova, I., (2024). Integration of AI Tools in Teaching Grammar. *Humanities Science Current Issues*, Vol. 75, No.2, pp. 225-230, ISSN 2308-4855 (Print), ISSN 2308-4863 (Online), UDC811.111`36:378.147.091.33:004.8, DOIhttps://doi.org/10.24919/2308-4863/75-2-35. Vera, A. E. I., Mesías, E. P. L., Paccha, M. D. L. A. (2024). Intelligent English Grammar: AI Strategies to Master the Rules. *CID - Centro de Investigación y Desarrollo*. ISBN: 978-99989-67-24-3. DOI: https://doi.org/10.37811/cli_w1060.

Lalira, E. J., Pangemanan, Y. A. T., Scipio, J. E., Lumi, S., Merentek, Th. Ch., Tumuju, V. N., (2024). Evaluating the Impact of AI Tools on Grammar Mastery: A Comparative Study of Learning Outcomes. VELES Journal, Vol. 8, No. 3, pp.701-713, E-ISSN 2579-7484, DOI: http://dx.doi.org/10.29408/veles.v8i3.27856.

Mudhsh, B. A, Muqaibal, M., H., Al-Maashani, S. & Al-Raimi, M. (2025). Utilization of Artificial Intelligence Tools in Fostering English Grammar and Vocabulary among Omani EFL Learners. *World Journal of English Language* Vol. 15, No. 5, pp. 51-62; Published by Sciedu Press 51 ISSN 1925-0703 E-ISSN 1925-0711, University of Technology and Applied Sciences, http://wjel.sciedupress.com.

Priya, C. &. Vijayalakshmi, R. (2024). Grammar Correction AI Tools for English Language Teachers in Higher Education. *International Journal of Innovative Research in Technology,* Volume 11, Issue 5, pp.380-384, ISSN: 2349-6002, IJIRT 168294 380.

Schmidt-Fajlik, R. (2023). ChatGPT as a Grammar Checker for Japanese English Language Learners: A Comparison with Grammarly and ProWritingAid. *AsiaCALL Online Journal* Vol. 14, No. 1, 2023, pp.105-119. ISSN 1936-9859; https://asiacall-acoj.org.

Selvi, V. T, & Vaishnavi. B., (2024). Comparison on Applications and Impact of AI in English Grammar Learning. *Recent Research Reviews Journal,* Volume 3, Issue 2, pp. 357-369, (ISSN: 2583-7079), https://irojournals.com/rrr.