

AI AND WRITING SKILLS: STUDENTS' ATTITUDES TOWARDS USING AI TO ENHANCE THEIR WRITING BASED ON THE EXAMPLE OF ALGEBRA UNIVERSITY STUDENTS

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ABSTRACT

The advent of publicly available AI in the last years has resulted in a major paradigm shift. Its use is starting to pervade most fields and aspects of life – including the world of academia. This article explores how Algebra University students use AI for writing and their attitudes towards this use. The research was done in two parts. The first part comprised one of the students' required writing assignments. The students were encouraged to use AI, but with a caveat that the final version may not be more than 35% AI-generated. The second part of the research was a short anonymous questionnaire. The aim was to determine whether the students think that AI tools embetter their writing in terms of both language proficiency – a point of particular interest as most of the students are non-native speakers of English – and creativity. The article presents an analysis of the students' responses and supporting findings of other papers on AI's role in writing. While the results indicate that students believe AI to be helpful in general and that it enhances their writing skills, its role in and impact on creative writing still remain unclear and require further research into this complex topic.

KEY WORDS

artificial intelligence, writing skills, student attitudes, language proficiency, creativity

CLASSIFICATION

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INTRODUCTION

The development of artificial intelligence (AI) has become a major factor in the recent reshaping of educational paradigms, especially in language learning. Learning is becoming more personalized, student-centred, and self-regulated. With AI transforming education, we may expect learning environments to become more responsive and adaptable, tailoring instruction and language acquisition to the unique needs of teachers and students.

The advent of artificial intelligence-driven writing tools that can be accessed on mobile devices offers a new way to deal with the difficulties involved in mastering writing through conventional training techniques [1-3]. By providing automatic feedback on a range of writing-related topics, such as structure, coherence, syntax, and vocabulary, these AI-assisted writing tools enable more significant gains in writing ability. As AI technologies assist learners in recognising and correcting grammatical and lexical problems, as well as recommending alternative sentence patterns to improve the overall quality and structure of their writing, learners can accelerate their writing progress [4-6].

This study explores the perceived impact of AI-assisted tools on student writing, especially in terms of creativity, critical thinking and language proficiency. Of particular interest is how these tools affect students' writing abilities, particularly considering that a substantial portion of the participants are non-native speakers of English. By examining the interplay between AI technologies and student writing practices, this study seeks to shed light on both the potential benefits and challenges posed by AI in educational contexts.

LITERATURE REVIEW

THEORETICAL FRAMEWORK

This study is underpinned by the self-regulated learning (SRL) theory [7-11], which highlights the dynamic and interactive nature of the learning process, emphasizing learners' active engagement, self-awareness, and self-control. Broadly speaking, SRL theory is a framework that focuses on how individuals actively regulate their own learning process.

Zimmerman defines SRL as "the self-directive process by which learners transform their mental abilities into academic skills" [7; p.329]. This definition emphasizes the active and intentional nature of the learning process, highlighting learners' ability to monitor, control, and regulate their cognition, motivation, and behaviour. He proposes that learners employ various cognitive strategies, such as goal setting, planning, monitoring, etc. to regulate their learning process effectively [7]. According to Zimmerman, motivational beliefs and self-perceptions play a crucial role in shaping students' engagement, persistence, and achievement in academic tasks. He emphasizes the importance of self-efficacy beliefs, outcome expectations, task value, and goal orientation in motivating SRL behaviour [9].

Another pivotal researcher who has contributed significantly to the understanding of SRL through his research and theoretical framework is D.H. Schunk. Schunk emphasizes the importance of cognitive strategies and processes in SRL. He posits that learners actively engage in metacognitive processes, such as planning, monitoring, and regulating their cognition, to enhance their learning outcomes [10]. Central to Schunk's framework is the role of self-efficacy beliefs in motivating and regulating students' learning behaviour.

Both researchers propose that individuals' beliefs in their ability to succeed influence their goal setting, effort expenditure, and persistence in academic tasks [8]. They also emphasize the importance of setting specific, challenging goals and providing feedback on progress in facilitating SRL [11].

As main posits of SRL include metacognition (thinking about one's own thinking), motivation, autonomy and self-regulatory processes in learning based on feedback and adaptation, this offers a rich terrain to explore the connections between SRL and AI-assisted learning. The relationship between SRL and AI has been thoroughly explored in recent years, particularly by Chinese, Indonesian, Taiwanese and Korean researchers.

Firstly, SRL emphasizes metacognitive awareness, including monitoring and reflecting on one's own writing process. Feedback, whether from human instructors or AI systems, plays a central role in enhancing writing performance and motivation in the context of language learning [12-14]. Teacher feedback has long been the foundation of writing instruction in traditional methods since it provides insightful information about areas that need work. Like this, ChatGPT's real-time feedback mechanisms in AI-assisted learning give students ongoing direction and ideas for improving their writing abilities [15]. Therefore, AI tools can serve as metacognitive aids by providing instant feedback on writing style, grammar, and coherence.

Another key construct of SRL is motivation, which influences learners' persistence and effort in pursuing their writing goals. AI writing tools can enhance motivation by providing immediate feedback, reinforcement, and personalized support. Because AI solutions like ChatGPT are interactive, students may actively engage in the writing process, getting quick feedback and improving their writing abilities in real time. The increased level of involvement, enabled by the AI tool's reactivity, is a contributing factor to the noted enhancements in writing abilities and drive [16, 17].

Finally, SRL encourages learners to take ownership of their learning process and regulate their behaviour autonomously. AI writing tools can empower students to become self-regulated writers by providing them with tools and resources to support independent exploration and experimentation [18].

AI-ASSISTED TOOLS

AI can be defined as a system incorporating intelligent programs that collaborate with humans to perform various tasks [19]. AI can make wise judgements in learning environments that are comparable to those made by humans [20]. Researchers in applied linguistics have seen the potential of AI in language learning and teaching environments, with the goal of improving teaching strategies for language teachers and accelerating language learners' language acquisition [21-23].

One noteworthy AI-powered tool is ChatGPT, an AI-assisted chatbot created by OpenAI. Due to the findings of this study presented below, the study mostly discusses ChatGPT. With its extensive knowledge base, ChatGPT can produce words and sentences with correct grammar to help create written content that is logical and cohesive. The software understands human inquiries and gives appropriate responses. ChatGPT helps language learners with organisation, coherence, grammar, and vocabulary problems in their writing. It provides substitute recommendations for fixing grammatical errors in sentences and enhancing general writing ability [15]. AI-powered tools are helpful for a variety of academic essay writing tasks, including grammar checking, language correction, and proofreading [24, 25]. AI language models help students create material and offer recommendations for improved sentence patterns and vocabulary selections [26]. Huang and Tan [27] recognize ChatGPT for its potential in enhancing writing performance because this AI-powered tool facilitates the production of coherent and cohesive text by providing learners with immediate feedback and alternative grammatically correct sentences.

Although ChatGPT has the potential to be effectively utilized in diverse language learning courses to enhance learners' writing abilities, it has its limitations. According to Barrot [28], students can finish a writing assignment quickly and easily with ChatGPT. This raises questions regarding the loss of learning, particularly in the area of critical and creative thinking development. This is likely to happen when students depend too much on the technology for ease of use, especially when students are not trained to use ChatGPT and assess the information it provides. ChatGPT produces unique content that may evade detection by online plagiarism detectors, especially when reworded with QuillBot or other tools. Teachers might, therefore, find it challenging to tell the difference between the text produced by ChatGPT and the work done by their students [28].

It is extremely important to consider these and other limitations when using ChatGPT for different writing tasks. Huang and Tan [27] agree that frequent reliance on generated text from ChatGPT may hinder language learners' own writing abilities. Using the generated text without appropriate review and editing may lead to issues of plagiarism that should be carefully addressed [27]. Ethical considerations regarding data privacy and security must be addressed to protect students' intellectual property [29-31]. Students need to develop critical thinking skills to evaluate the quality and reliability of AI-generated content and avoid over-reliance on automated tools. Proper training and education on using AI technology effectively and responsibly are crucial [32, 33].

A recent study [34] introduces a novel approach that modifies the use of ChatGPT by providing guidance rather than direct answers. The findings reveal the potential of AI-powered tools to foster essential skills such as SRL and higher-order thinking. The results of the study indicate that a proper, trained use of AI-based tools results in a significant positive effect on students' cognitive and behavioural engagement, self-efficacy, critical thinking, problem-solving, creativity, and knowledge construction, compared to traditional ChatGPT use.

Recent studies on the topic of AI-assisted learning in English as a Foreign Language (EFL) classrooms have been conducted primarily in Asian countries, both from the perspective of teachers and learners. An extensive Indonesian study [35] examined various types of AI writing tools and their influence on the quality of student writing, focusing on content and organization, from the perspective of EFL teachers. The study found unanimous agreement among the teachers about the positive role of AI writing tools in enhancing the clarity and logical progression (content and organization) of students' writing. On the other hand, Darwin et al. [36] conducted a study on Indonesian university students' critical thinking in the EFL classroom AI era based on students' perceptions. The study concluded that AI can be an asset in the development of critical thinking skills, but with caveats that require careful management. However, a balanced approach that capitalizes on AI's strengths while being aware of its limitations is necessary for cultivating robust critical thinking abilities among EFL students [36].

RESEARCH IN CROATIA

The research of AI-assisted tools in language learning in European countries, particularly in Croatia, has just started. Croatian researchers focused so far on the general impact of AI-assisted tools in education and questioned whether AI is a friend or a foe in terms of ethical considerations. Mrnjauš et al. [37] explore the potential and (ethical) challenges of applying AI in education, its impact on teaching and the possibilities to replace teachers. The study concludes that AI tools benefit both students and teachers in enriching their learning and teaching experience, as well as creating personalized content and practical experiences.

In their small-scale study, Bašić et al. [38] posed a significant question whether or not ChatGPT as a writing assistant tool enhances students' essay-writing performance. The aim of their study

was to compare students' essay writing performance with or without employing ChatGPT-3 as a writing assistant tool. They compared essay scores, writing time, authenticity, and content similarity. This study found no evidence that using GPT as a writing tool improves essay quality since the control group outperformed the experimental group in most parameters. The authors concluded that these results can relieve some concerns about this tool's usage in academic writing. ChatGPT-assisted writing could depend on the previous knowledge and skills of the user, which might, in certain instances, lead to confusion in inexperienced users and result in poorer essay writing performance [38].

In his research about online exam integrity, Susnjak [39] found that ChatGPT is capable of exhibiting critical thinking skills and generating highly realistic text with minimal input, making it a potential threat to the integrity of online exams. The author concludes that returning to invigilated and oral exams could form part of the solution, as well as using advanced proctoring techniques and AI-text output detectors.

Recognizing the growing trend of using AI tools in education, particularly language models for generating natural text, such as ChatGPT, Klarin and Livaić [40] investigated both students' and teacher' attitudes at the Šibenik University of Applied Sciences. The results revealed that the majority of students and teachers at the Šibenik University of Applied Sciences are familiar with and use ChatGPT, and they rate the received responses as highly useful, but there are different opinions regarding trust in those responses. The researchers note that the majority of academic teachers do not encourage students to use ChatGPT and have not taught them about its usage [40].

Črček and Patekar [41] conducted a study among 201 students from private and public universities in Croatia with the aim to investigate the prevalence of use of ChatGPT among university students for written assignments, explore the ways students utilize the tool, and examine students' perspectives on the ethical aspects of its use. The results show that more than half of the participants use ChatGPT for written assignments, that most use it to generate ideas, while many use it to summarize, paraphrase, proofread, but also to write a part of the assignment for them. According to the participants, the most ethically acceptable use of ChatGPT is for generating ideas, while other uses are perceived by many as being unethical; this, however, has not prevented some students from engaging in behaviours they deem unethical. The authors conclude that universities and instructors need to take a decisive stand on artificial intelligence in education and provide clear guidelines to students regarding the ethical use of ChatGPT and emerging technologies [41].

PURPOSE OF THE STUDY

The primary objective of this study was to explore how EFL students at Algebra University students use AI for writing, as well as their attitudes towards this use. To this end, the following research questions were posed:

- RQ1:** What types of AI writing tools are used by EFL students?
- RQ2:** How do EFL students perceive the overall impact of AI writing tools on the development of their writing skills?
- RQ3:** How do EFL students perceive the impact of AI writing tools on the development of their critical thinking skills?
- RQ4:** What are EFL students' attitudes towards the use of AI writing tools in general?

By answering these questions, the study attempted to determine whether EFL students at Algebra University believe that AI tools enhance their writing, especially in terms of creativity, critical thinking and language proficiency. Considering this, the study also sought to shed some light on how AI could be effectively integrated to support the writing skill development among EFL students and thus contribute to research in EFL education and educational technology.

METHOD

The study was designed as a quantitative study [42], with the research done in two parts. The first part was one of the Algebra University students' required writing assignments, while the second part was a short anonymous questionnaire. More specifically, the mentioned writing assignment is a homework assignment that undergraduate students of Algebra University who take English are required to complete. The assignment is to write a job application cover letter in the English language. Before starting their homework assignment, students were given instructions on what a job application cover letter should look like and were not only allowed but even encouraged to use AI tools for the assignment. However, they were warned that the final version of their homework assignment that they submit may not be more than 35% AI-generated. This limitation was imposed to avoid submissions that were 100% AI-generated, as this would defeat both the purpose of the study and the assignment itself. Once all of the students had turned in their homework assignments and those assignments had been graded, the second part of the study research could be conducted. It was particularly important to wait with the second part of the research until all of the students' homework assignments were graded as this assured the students that their responses would be completely anonymous and could not in any way affect their grade. Thus, this created conditions for them to be honest in their responses.

As mentioned, the second part of the research was a short anonymous questionnaire. It took the form of an online Google Forms survey and allowed the participants to choose whether they wanted to complete the questionnaire in English or in Croatian, to preclude any misunderstandings. The questionnaire comprised four main sections. The initial section solicited participant demographic details such as gender, age, study programme, the language of study and self-assessment of proficiency in the English language based on the Common European Framework of Reference for Languages (CEFR) scale [43]. After the initial section, the participants were asked a key question which, depending on their response, allowed them to either proceed with filling in the questionnaire or would end the questionnaire for them. The question that they were asked was whether they had used AI-assisted tools for their homework assignment. Those participants who responded affirmatively then moved on to subsequent sections, which leveraged a Likert scale [44] to probe them about their familiarity with AI, the frequency of AI usage in writing, as well as their perceptions, beliefs and expectations regarding the use of AI in writing.

The method used to collect data was the convenience sampling method, a non-probability sampling method focused on gathering information from participants are "convenient" for researchers to access [45]. The link to the questionnaire was disseminated to the students of the following undergraduate study programmes at Algebra University that are conducted in Croatian: Visual Communications Design (3D Design), Visual Communication Design (2D Design), Digital Marketing, Multimedia Production, and Applied Computer Engineering (Software Engineering and System Engineering). The link to the survey was also disseminated to the students of the following undergraduate study programmes at Algebra University that are conducted in English: Visual Communications Design (3D Design), Digital Marketing, and Applied Computer Engineering (Software Engineering). The link to the questionnaire was sent to students via e-mail and shared with them via dedicated Microsoft Teams channels.

Once the student participants' responses were collected via the aforementioned Google Forms questionnaire, they were then imported from Google Forms into Microsoft Excel for in-depth data inspection and analysis. Following this, correlations were established based on the four main research questions mentioned above and then further examined. There was no need to use any tools other than Microsoft Excel due to a relatively small pool of samples and data collected.

FINDINGS

As mentioned before, the initial section of the questionnaire asked the participants to provide mostly demographic details. Having examined and analysed the participants' responses, the findings revealed the following about the demography of the EFL students at Algebra University who completed the questionnaire.

Figure 1 shows that a total of 221 participants took part in the study. Out of them, 136 (61,53%) participants stated they were female, 83 (37,55%) of them stated they were male, and 2 (0,90%) of them chose the option Other.

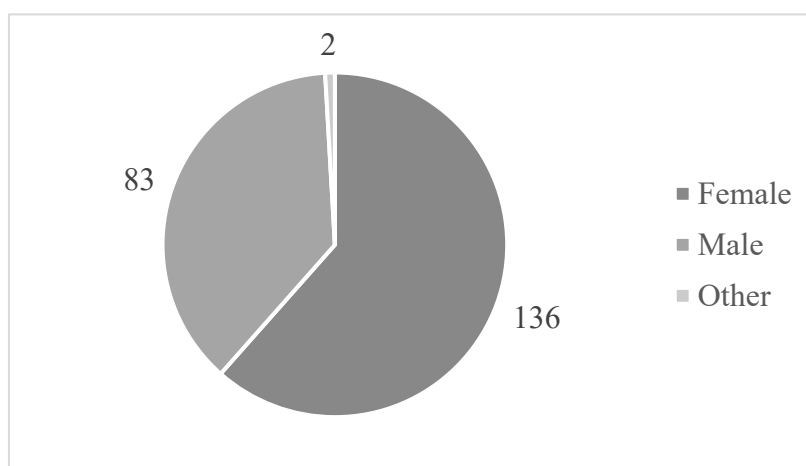


Figure 1. Gender distribution of the participants ($N = 221$).

In terms of age group distribution, Figure 2 shows that the majority of the participants, 197 (89,14%) of them, were in the age group of 18-24. The second largest age group was that of 25-34 with 21 (9,50%) participants in it. Only 2 (0,90%) participants were in the age group of 35-44, and only 1 (0,45%) was in the age group of 44+.

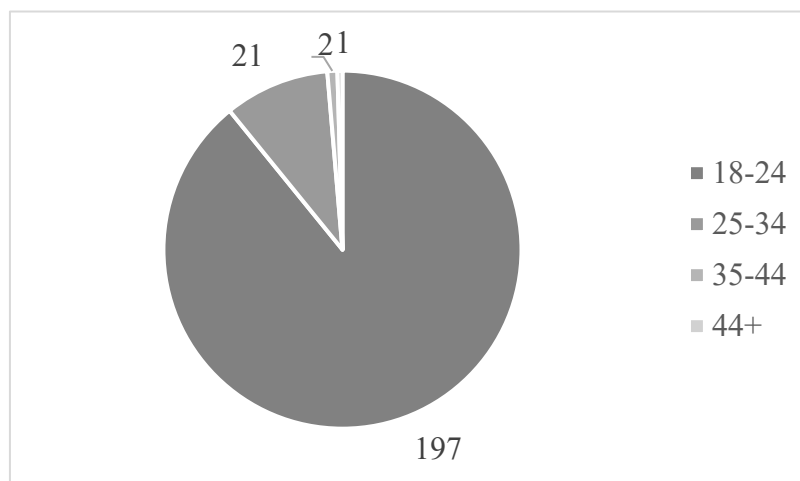


Figure 2. Age group distribution.

Figure 3 shows that the majority of the study participants, 193 (87,33%) of them, is enrolled in a study programme conducted in Croatian, while only 28 (12,67%) of them are enrolled in a study programme conducted in English.

After the questions about demographic details, etc. in the initial section, the participants were asked whether they had used AI-assisted tools for their homework assignment. Only those who responded affirmatively could proceed with filling in the questionnaire.

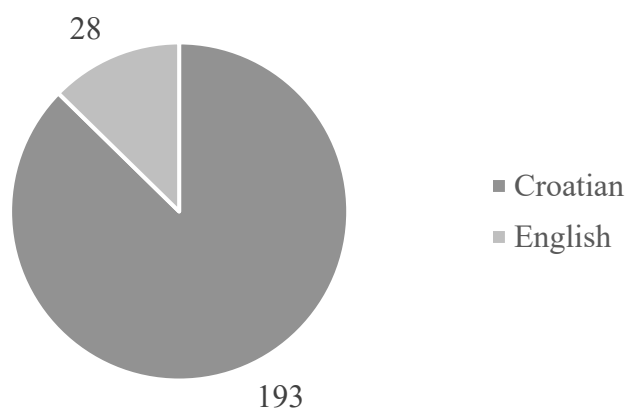


Figure 3. Study programme language distribution.

As shown in Figure 4, only 85 (38,46%) of the 221 participants said that they had used AI-assisted tools for their homework assignment. In terms of usage of AI-assisted tools by gender, the findings are as follows.

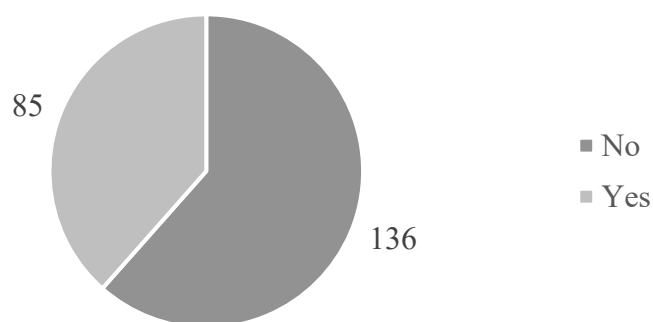


Figure 4. AI usage – total.

Figure 5 shows that a slightly higher percentage of male (41%) than female (37%) participants said that they had used AI-assisted tools for their homework assignment. It also shows that 50% of the participants who chose their gender as Other used AI-assisted tools for the assignment. However, since the sample of participants who chose this gender option was very small (2 participants or 0,90% of the whole sample), no conclusions can be drawn from this piece of information.

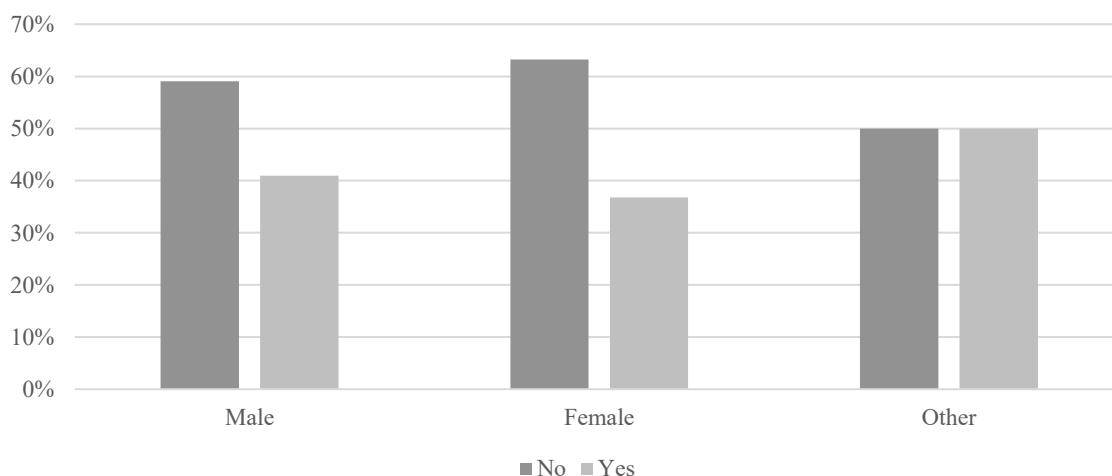


Figure 5. AI usage by gender.

It was also interesting to look into usage of AI-assisted tools by study programme and study programme language.

Figure 6 shows that a significantly larger percentage of student participants studying Software Engineering and System Engineering said that they had used AI-assisted tools for their homework assignment than student participants from other study programmes. The difference is especially notable when comparing participants studying Software Engineering and System Engineering and those studying 2D and 3D Design. Figure 6 also reveals a difference in the usage of AI-assisted tools between participants from the same study programme, but who study in a different language. The difference is most notable when looking at participants studying Software Engineering and System Engineering; 78% of the participants studying Software Engineering in Croatian admitted to using AI-assisted tools for the homework assignment, while only 33% of the participants studying Software Engineering in English also admitted to this. No students studying Multimedia Production in Croatian stated that they had used AI-assisted tools.

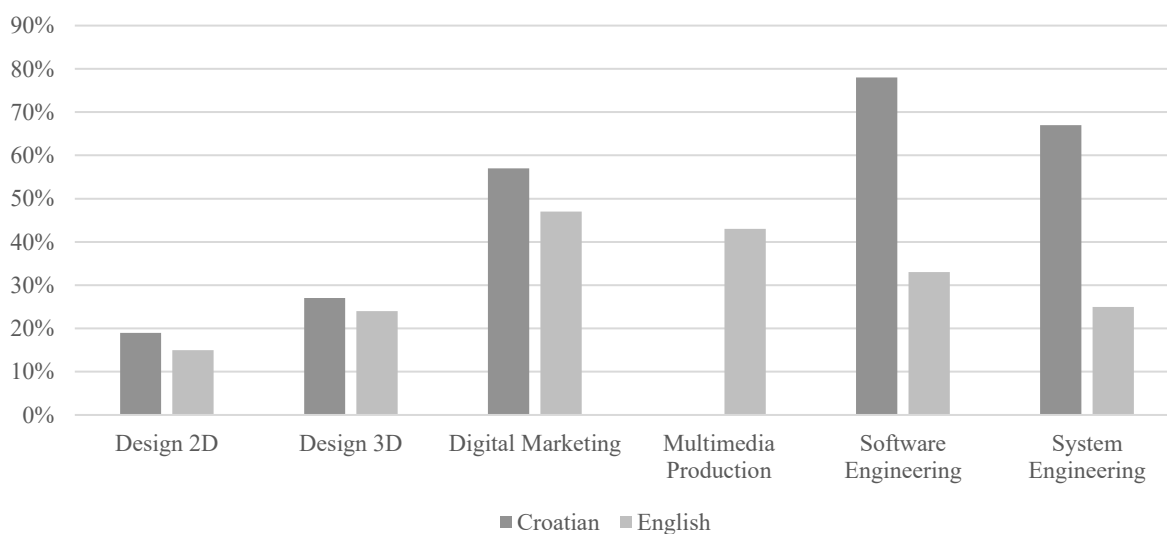


Figure 6. Students who used AI tools by study programme and study programme language.

Having examined the demographic information about the study participants to learn more about the sample, further analysis was done to answer the previously mentioned four main research questions.

The first of those four main research questions was what types of AI writing tools are used by EFL students. To try to answer this question, the following questions from the questionnaire were taken into consideration: Q8 about the specific tools used for text generation, Q12 about paraphrasing tools and Q16 about anti-plagiarism tools.

As shown in Figure 7, in response to Q8 about the specific tools used for text generation, in which the participants could choose more than one answer, most of the participants stated that they had used ChatGPT, either version 3.5 (66%) or 4 (39%), 11% of the participants stated that they had used Bing and even fewer participants, only 6% of them, had used Copy AI. None of the participants mentioned using any other AI-assisted tools in this question.

In Q12 participants were asked which paraphrasing tools they had used in addition to those for text generation, if any. They could choose between several popular paraphrasing tools, they could choose more than one of those tools, they could enter their own answer or they could choose “I did not use a paraphrasing tool” in case they had not used one. As shown in Figure 8, majority of the participants (75%) stated that they had not used a paraphrasing tool. Those participants that had used a paraphrasing tool seem to have had a slight preference for QuillBot, with 11% of them choosing that tool.

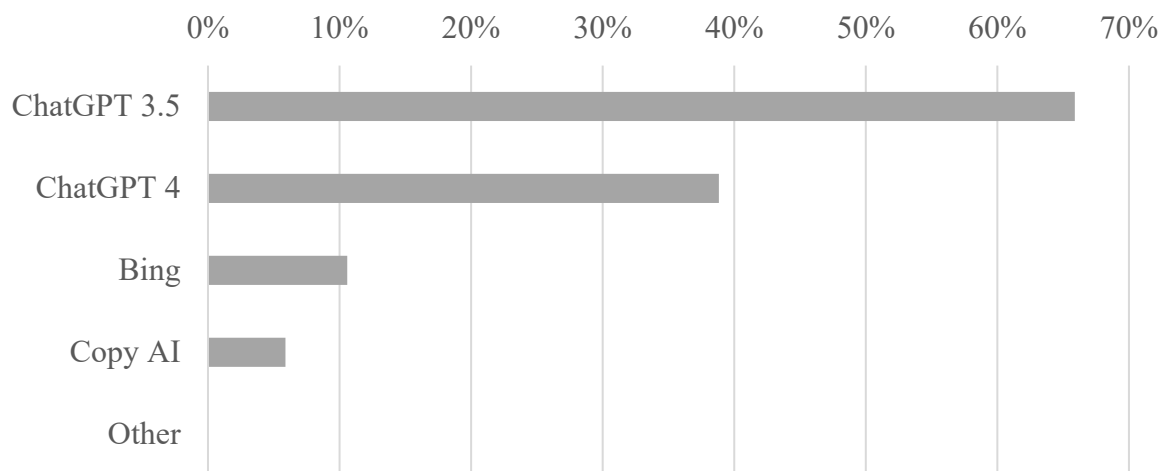


Figure 7. AI-assisted tool used.

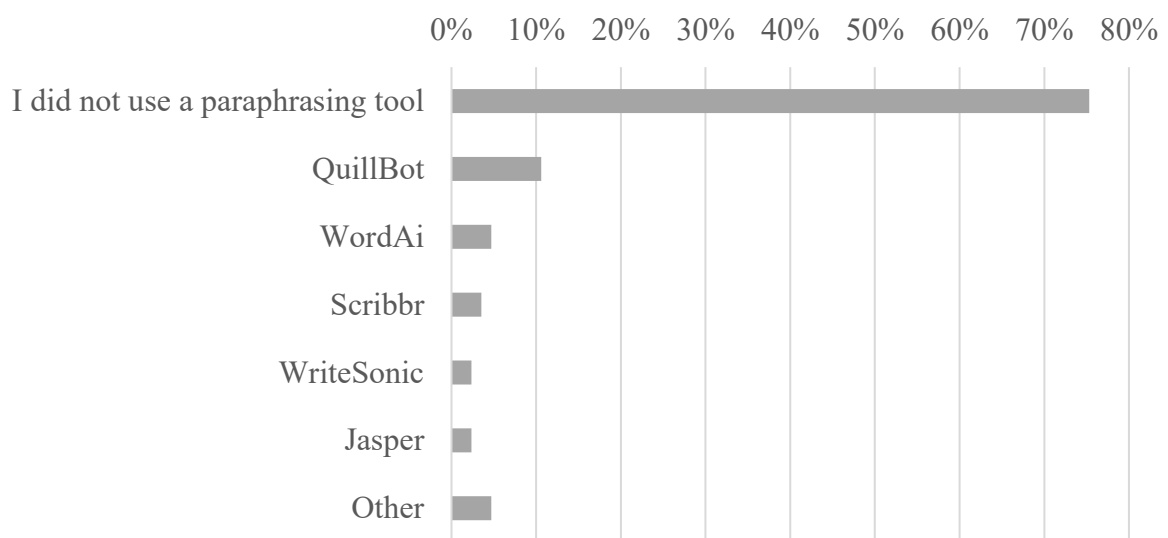


Figure 8. Tool used for paraphrasing.

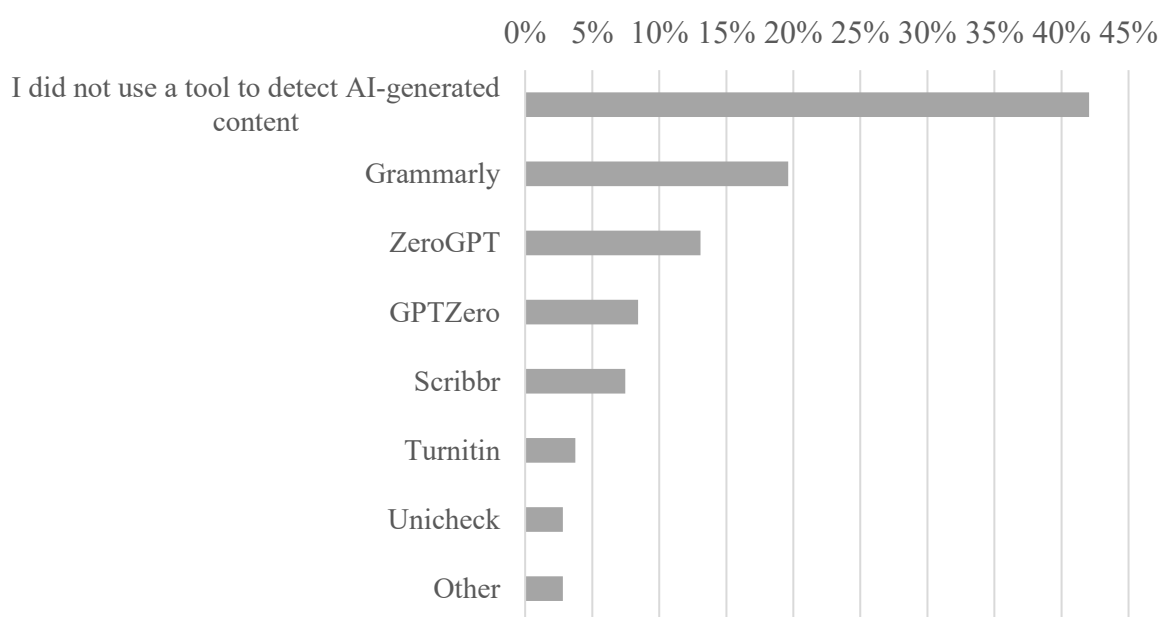


Figure 9. Tools used for anti-plagiarism.

The last question from the questionnaire pertaining to the first main research question was Q16, where participants were asked whether they had used any tool to detect AI-generated content and if so, which one. The participants could again choose more than one answer. As evident from Figure 9, most of the participants, 42% of them, stated that they had not used a tool to detect AI-generated content. Out of those that stated they had used such a tool, 20% said that they had used Grammarly and 13% that they used ZeroGPT, while the percentage of the participants who chose other tools was under 10%.

The second main research question focused on how EFL students perceive the overall impact of AI writing tools on the development of their writing skills. To try to answer this question, the following questions from the questionnaire were looked into: Q9 about the satisfaction rate with the generated result, Q10 about reasons for satisfaction, Q11 about reasons for changing generated text, Q13 about the extent to which generated text was edited, Q14 about the reasons for changes, Q15 about the specific changes made, and Q17 about creativity development. To allow further analysis and gain a deeper insight, correlations were then made between some of these questions and Q6 about the participants' self-assessment of their English language skills, as shown further in the text.

In Q9 about the satisfaction rate with the generated result, participants were offered a 7-point Likert scale to rate their satisfaction. Figure 10 shows that only a small percentage of the participants was either totally satisfied (2%) or totally dissatisfied (4%). The remainder of the participants rated their satisfaction somewhere on the scale between quite satisfied and quite dissatisfied, with more of them feeling quite satisfied (20%) or more satisfied than dissatisfied (31%) than those who felt more dissatisfied than satisfied (19%) or quite dissatisfied (7%).

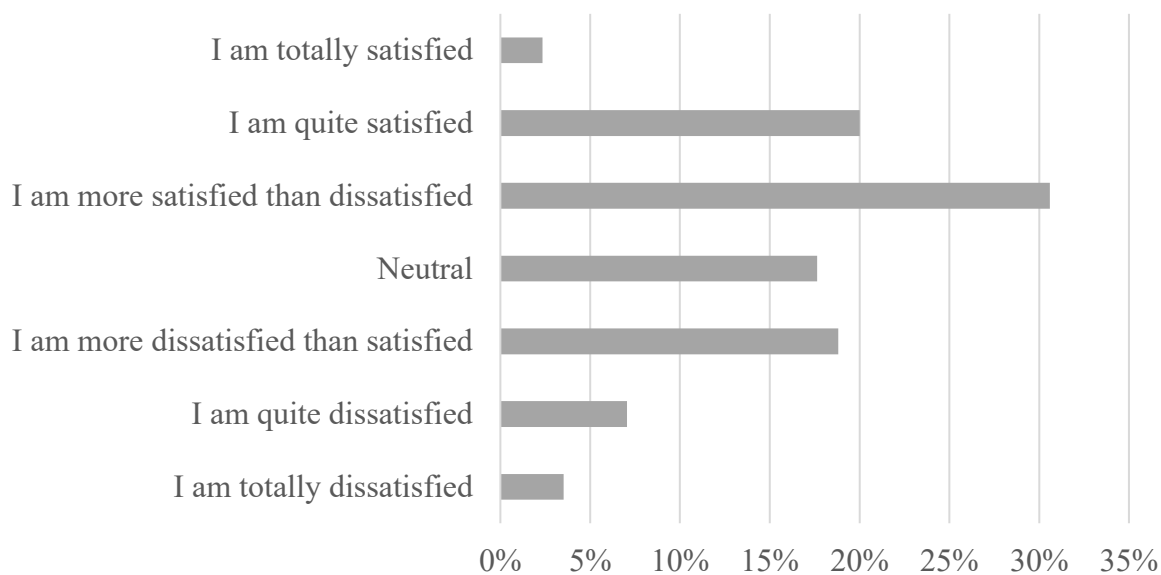


Figure 10. Satisfaction with the generated result.

Not surprisingly, speed of generation was the top reason for satisfaction of most of the participants, 35% of them, as shown in Figure 11, while 28% of the participants were satisfied because the AI tool had generated what they had requested.

When asked about the reasons for changing the generated text in Q14 of the questionnaire, many participants chose not revealing the use of AI (34%) and a lack of creativity (31%) over other reasons or not changing anything.

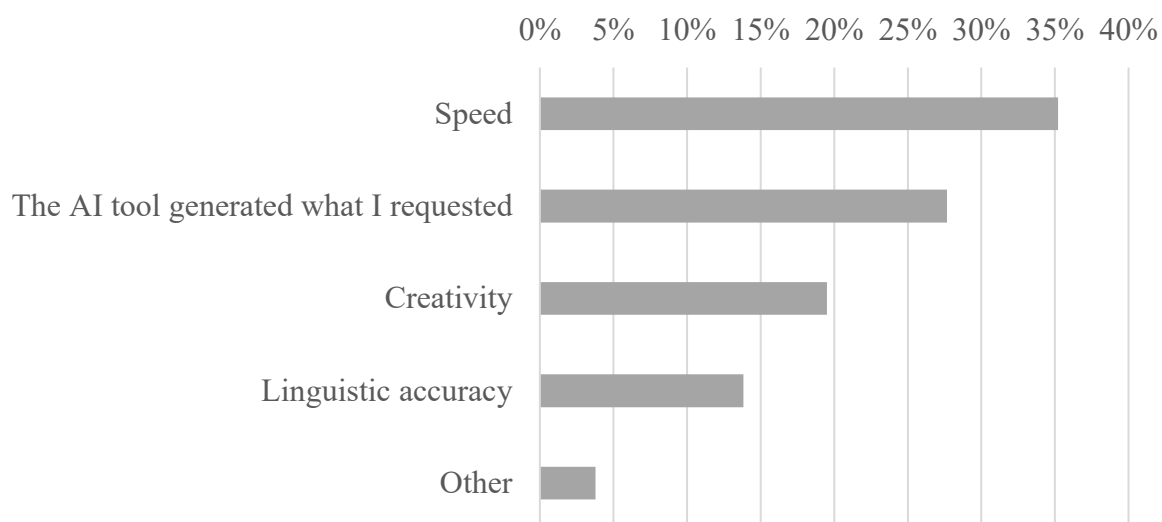


Figure 11. Reasons for satisfaction.

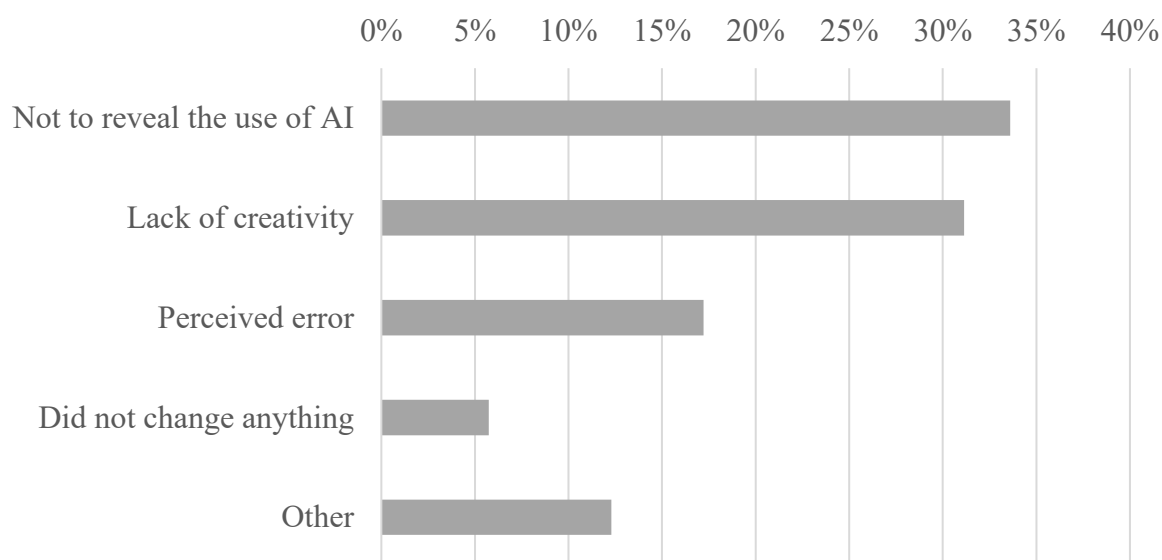


Figure 12. Reasons for changing the generated text.

As mentioned, for further analysis, it was also interesting to look into correlations between Q6 about the participants' self-assessment of their English language skills and Q11 about reasons for changing generated text, Q13 about the extent to which generated text was edited, Q14 about the reasons for changes, Q15 about the specific changes made.

Figure 13 shows the distribution of the student participants who used AI-assisted tools for their homework assignment between the different levels of proficiency in English. Most of the students self-assessed their English language skills between levels B1 and C1, while very few self-assessed their English language skills as levels A1, A2 and C2. This information should be kept in mind when looking at further figures.

Figure 14 shows the correlation between Q6 about the participants' self-assessment of their English language skills and Q14 about the reasons for changes. All of the participants at level A1 stated that they had changed the generated text due to the lack of creativity in it. However, it should be noted that only 1% of the participants who used AI for homework self-assessed themselves to be at level A1, Figure 13. Participants at level A2 stated that they had either changed the generated text due to the lack of creativity in it or not to reveal the use of AI tools in their homework; however, only 2% of the participants who used AI for homework self-assessed

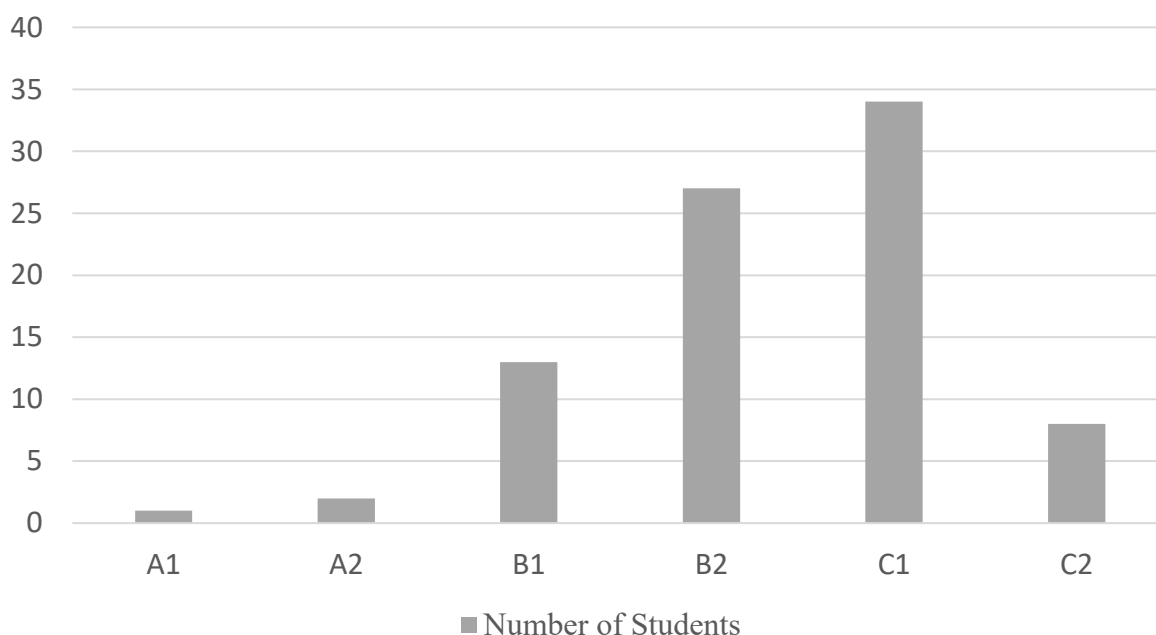


Figure 13. English language skills self-assessment of students who used AI tools.

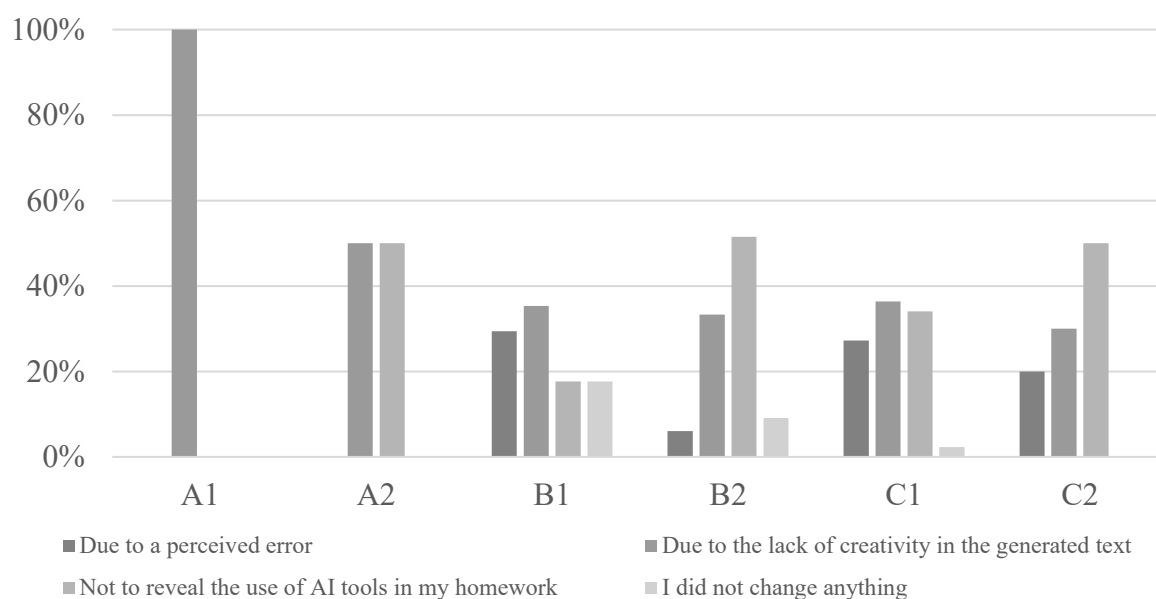


Figure 14. Reasons for changing the generated text correlated with students' self-assessment of their English language skills.

themselves to be at level A2 (see Figure 13). The distribution of the participants between the four reasons for changing the generated text varies between levels B1 and C1, with a high percentage of the participants at levels B2 and C2 choosing not revealing the use of AI tools as a reason for changing the generated text. For the participants at level C1, the highest percentage of the participants stated that they had changed the generated text due to its lack of creativity. It is also noticeable that a very similar percentage (around 30%) of the participants chose the lack of creativity across levels B1 to C2 and that the lack of creativity seems to have been more important to the participants than changing the text due to a perceived error. The percentage of the participants who stated that they had not changed anything in the generated text falls from level B1 to C1, with participants at level C2 reporting that they had not changed anything.

The participants were also asked which changes they had made to the generated text. As shown in Figure 15, top three reasons seem to have been form (28%), vocabulary (25%) and word order (23%).

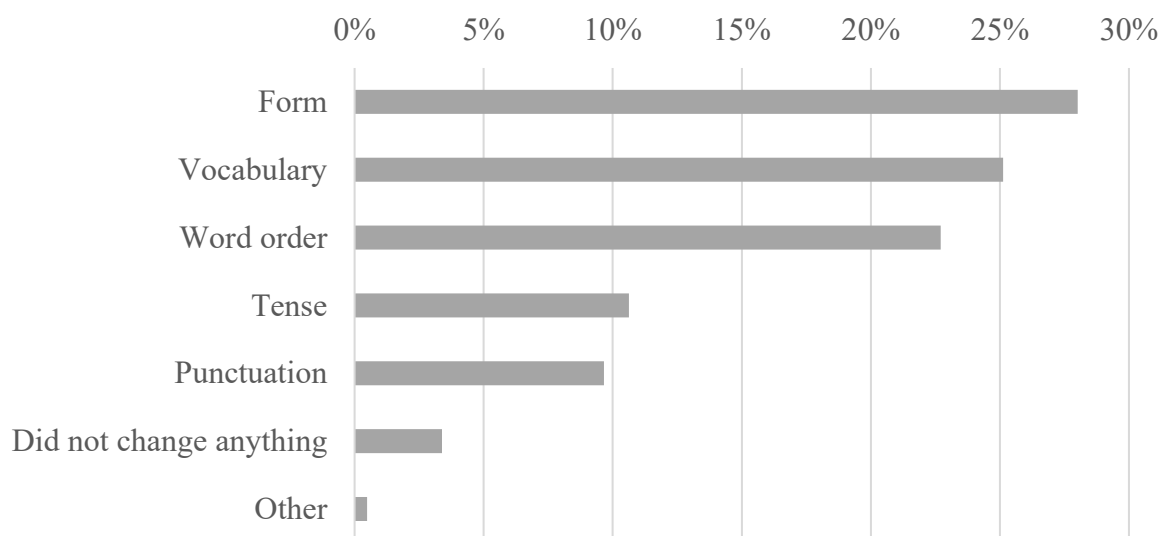


Figure 15. Which changes were made.

Figure 16 shows the correlation between what was changed in the generated text and the student participants' self-assessment of their English language skills. The participants at levels A1 and A2 did not report making any changes to the punctuation or content. The participants between levels B1 and C2 reported changes in punctuation, with the highest percentage of those changes made by participants at level C2. Only some of the participants at levels B1 to C1 reported not changing anything, and very few (1%) of the participants at level C1 reported changing content. The participants at level C2 did not report not making any changes. The distribution of the participants between what was changed in the generated text varies between levels B1 and C2, but they seem to have been more concerned with word order, form and vocabulary rather than punctuation and tense.

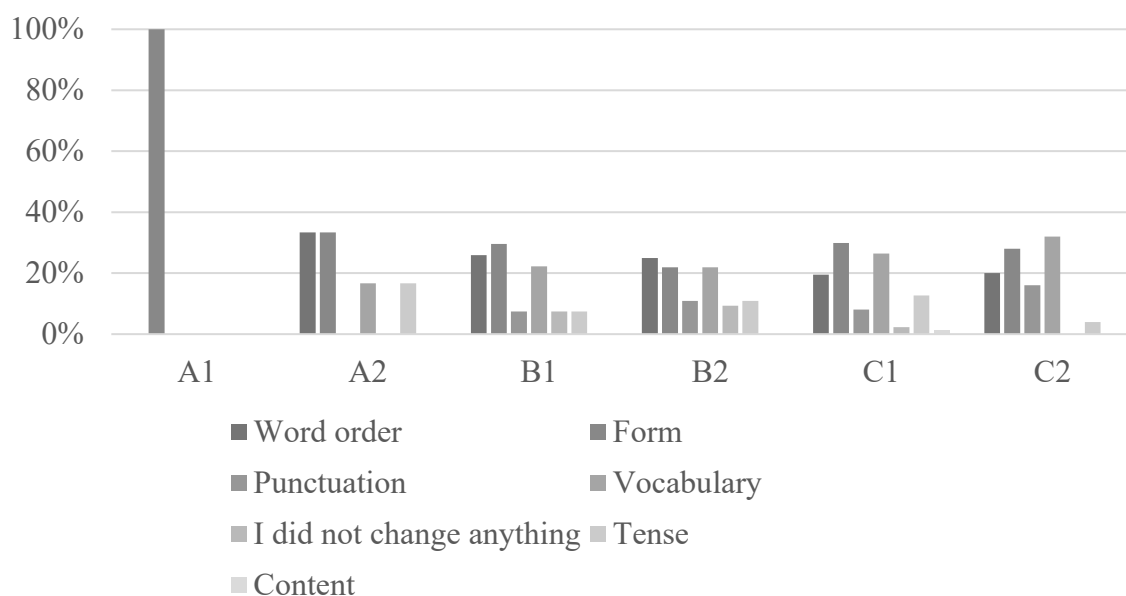


Figure 16. What was changed in the generated text correlated with students' self-assessment of their English language skills.

In Q11 of the questionnaire, the participants were asked to estimate the number of times they changed the generated text (the prompt), Figure 17. Their responses were then correlated with the student participants' self-assessment of their English language skills. Among the participants at levels B1 to C1, most of them reported changing the generated text between two and more than five times, with the percentage of those who reported changing it more than five times steadily growing between levels B1 and C1.

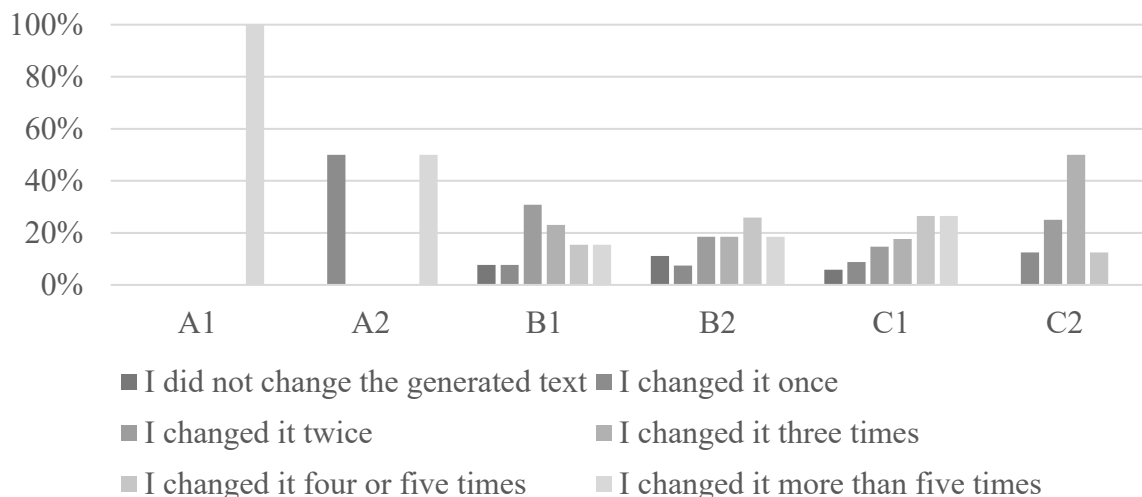


Figure 17. Number of times the generated text was changed correlated with students' self-assessment of their English language skills.

In Q13 of the questionnaire, the participants were asked to what extent they had to edit the generated text. Their responses, shown in Figure 18, were then correlated with the student participants' self-assessment of their English language skills. The highest percentage of the participants who reported editing the generated text 25-49% was from the group of participants at level B1. The highest percentage of the participants who reported editing the generated text was from group C2. The participants at level C2 did not report not making any edits, and they also did not report making 75-100% edits. This percentage of edits was only reported by the participants at levels B2 and C1. The percentage of the participants who reported making 1-24% edits varied between levels B1 to C2, but was present at all of these levels.

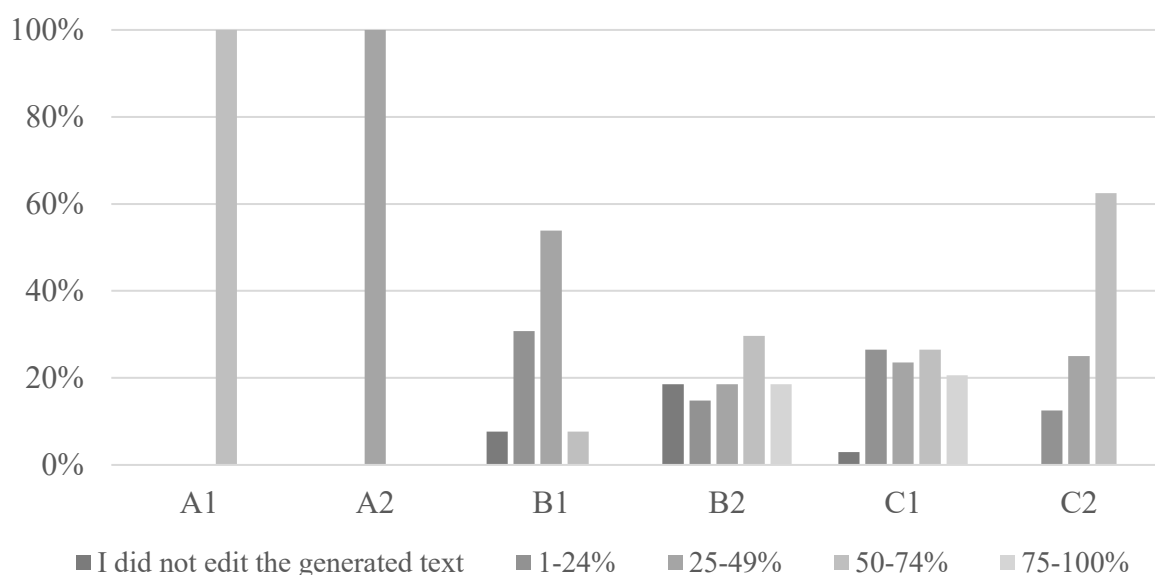


Figure 18. Percentage of text edited after generation correlated with students' self-assessment of their English language skills.

In Q17 of the questionnaire, the participants were asked how much they agree or disagree with a number of statements about using AI tools. A 5-point Likert scale was used in this question, with 1 meaning “I fully disagree” and 5 meaning “I fully agree”. In response to the statement “I develop my creativity when using AI tools”, the largest percentage of the participants (36%) chose 3 – neither fully agree nor disagree, Figure 19. The difference between those participants who stated that they fully disagree (8%) or somewhat disagree (24%) and those who stated that they fully agree (16%) or somewhat agree (15%) was very small.

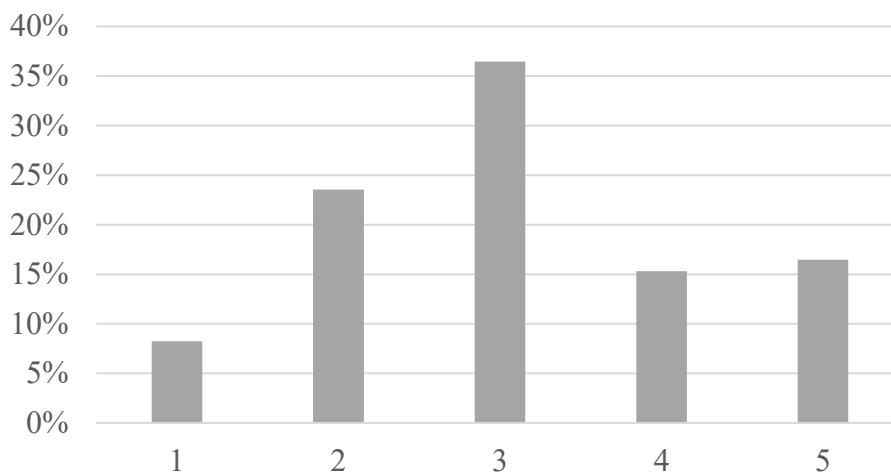


Figure 19. Creativity development.

The third main research question focused on how the EFL students perceive the impact of AI writing tools on the development of their critical thinking skills. To try to answer this question, the following questions from the questionnaire were looked into: Q17, statements about developing critical thinking skills with AI tools, use of AI to generate different versions of text, adjustments to AI prompts leading to better results.

In response to the statement “I develop my critical thinking skills when using AI tools” in Q17 of the questionnaire, the largest percentage of the participants (32%) chose 3 – neither fully agree nor disagree, Figure 20. The difference between those participants who stated that they fully disagree (8%) or somewhat disagree (27%) and those who stated that they fully agree (15%) or somewhat agree (18%) with the statement about critical thinking was very small.

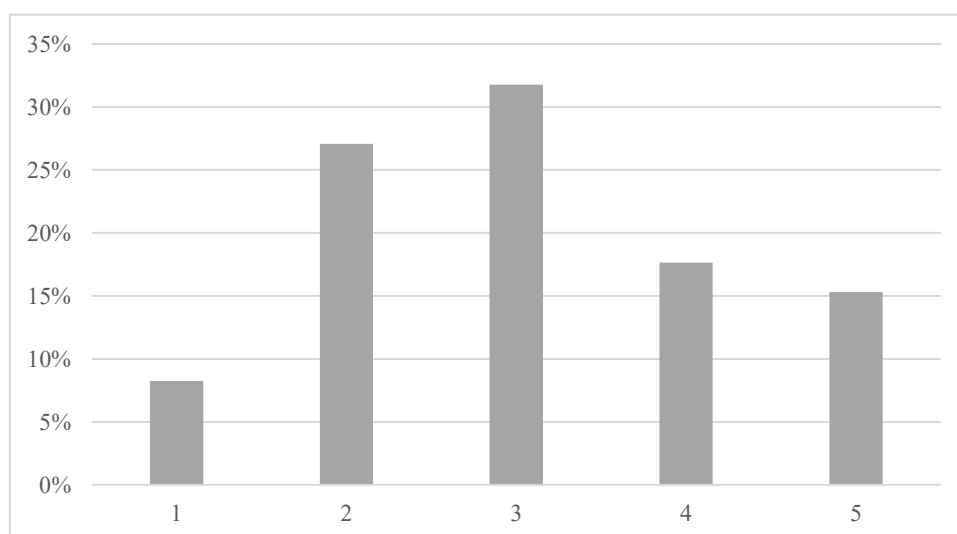


Figure 20. Critical thinking development.

As shown in Figure 21, in response to the statement “I use AI tools to get different versions of a certain text” in Q17 of the questionnaire, the largest percentage of the participants (32%) stated that they fully agree. The combined percentage of the participants who stated that they either fully agree (32%) or somewhat agree (28%) with the statement is much higher than the combined percentage of those participants who fully (4%) or somewhat disagreed (7%) with the mentioned statement.

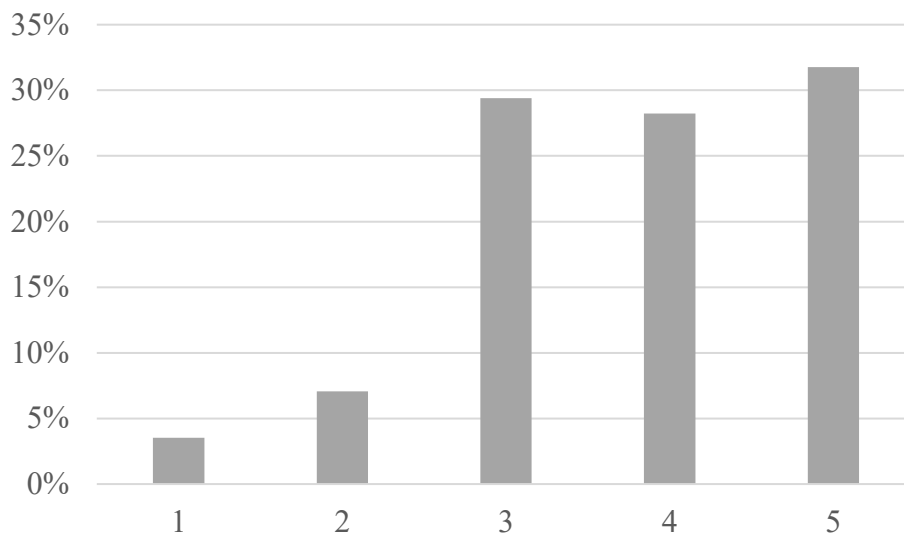


Figure 21. Use of AI to generate different versions of text.

Finally, in response to the statement “AI learns through my adjustments to the questions, and therefore produces better results” in Q17, the combined percentage of the participants who stated that they either fully agree (28%) or somewhat agree (35%) with the statement is much higher than the combined percentage of those participants who fully (2%) or somewhat disagreed (8%) with the mentioned statement, Figure 22.

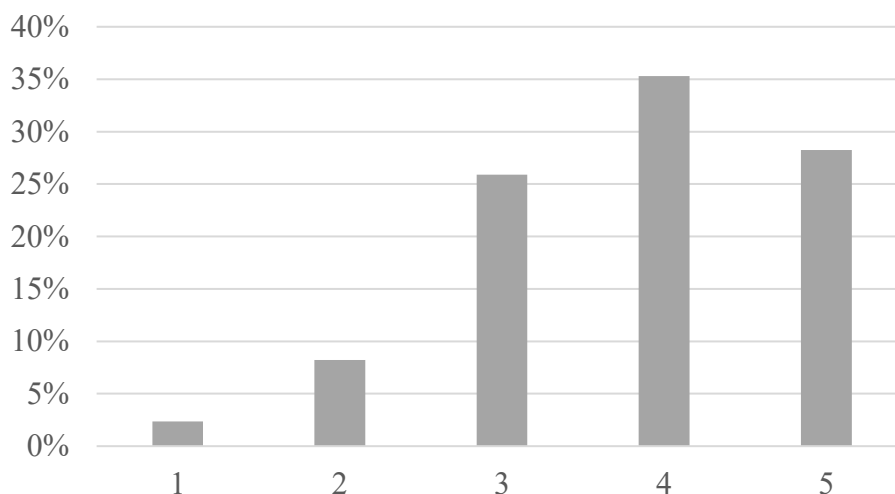


Figure 22. AI learns through my adjustments to the questions, and therefore produces better results.

The fourth and final main research question focused on the attitudes of EFL students towards the use of AI writing tools in general. To try to answer this question, the following question from the questionnaire was looked into: Q17, statements about AI tools saving time, belief in accuracy and quality of generated text, change of approach to doing homework, belief that AI should be allowed in all tasks, and AI tools as the future of education.

As shown in Figure 23, in response to the statement “AI save time when generating text for certain tasks” in Q17 of the questionnaire, majority of the participants (58%) stated that they fully agree.

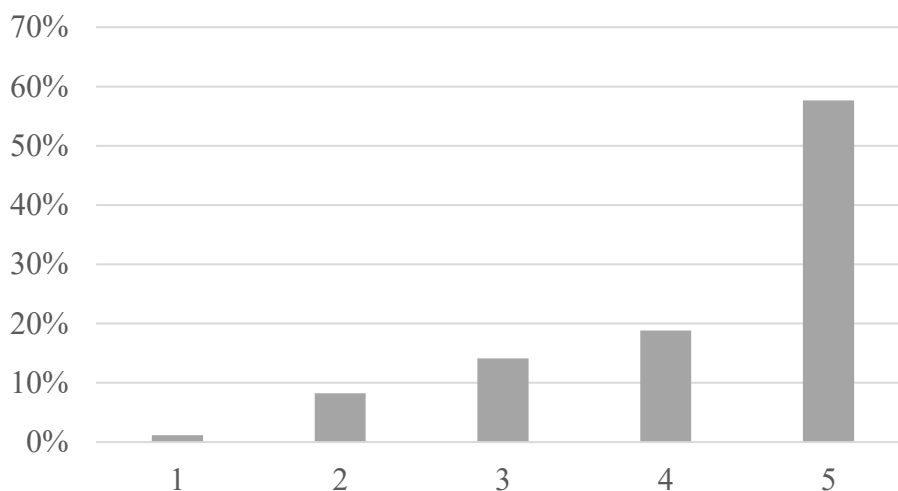


Figure 23. Time efficiency (AI saves time when generating text).

In response to the statement “I believe that the text generated using AI tools is of high quality and accurate” in Q17 of the questionnaire, the largest percentage of the participants (41%) stated that they neither agree nor disagree with the statement, Figure 24. The combined percentage of those who fully agreed (12%) or somewhat agreed (22%) with the statement is higher than the combined percentage of those participants who fully disagreed (9%) or somewhat disagreed (15%) with the statement.

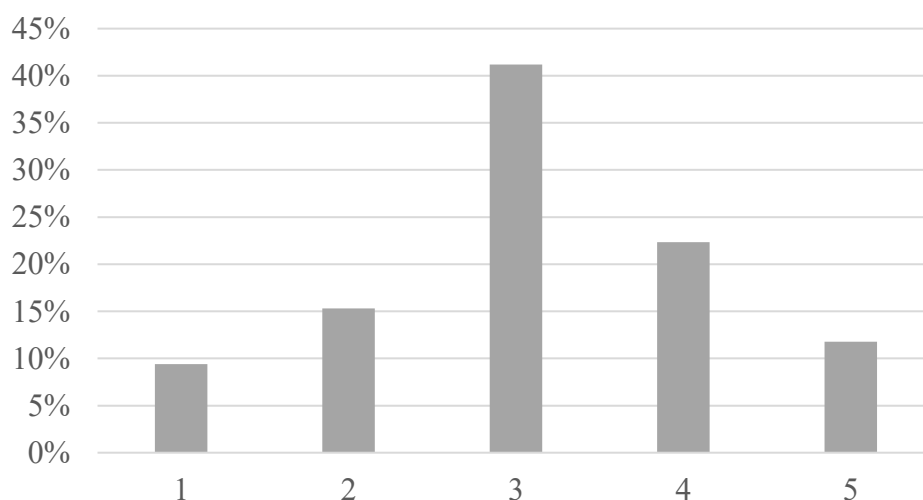


Figure 24. Belief in high quality and accuracy.

In response to the statement “Using AI tools has significantly changed my approach to doing homework and other tasks” in Q17 of the questionnaire, the largest percentage of the participants (34%) stated that they neither agree nor disagree with the statement, Figure 25. The combined percentage of those who fully agreed (22%) or somewhat agreed (24%) with the statement is much higher than the combined percentage of those participants who fully disagreed (7%) or somewhat disagreed (13%) with the statement.

As shown in Figure 26, more than half of the participants (55%) agreed with the statement “I believe that the use of AI tools should be allowed in all tasks that we are given at Algebra University” in Q17 of the questionnaire. Only 22% of the participants did not agree with this.

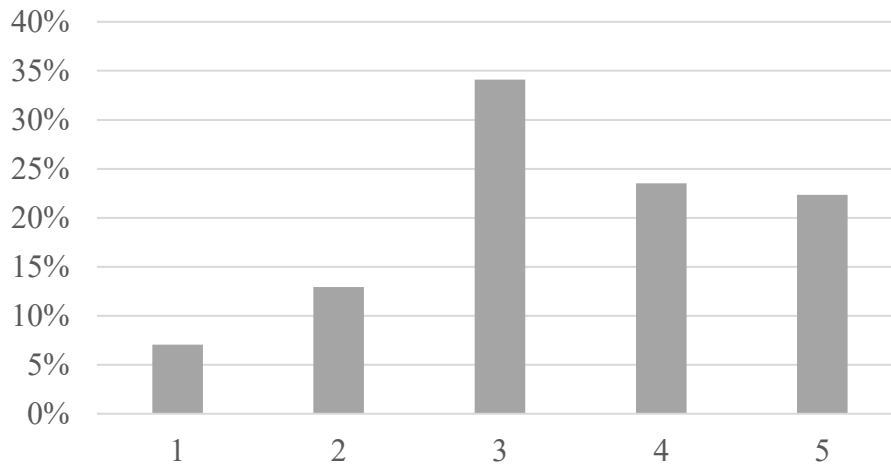


Figure 25. Change of approach to writing homework.

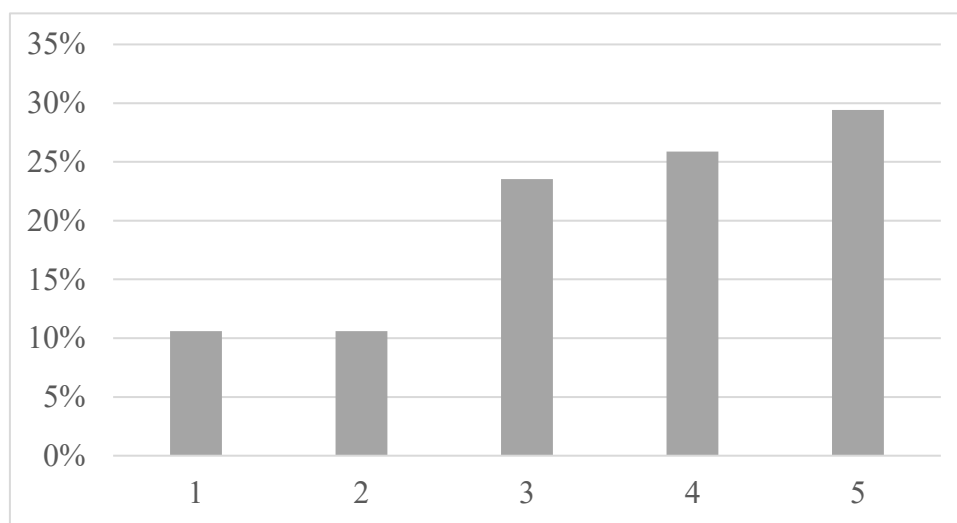


Figure 26. Should AI be allowed in all tasks.

As shown in Figure 27, more than half of the participants, 61% of them, agreed with the statement “I believe that the use of AI tools is the future of education”, which seems to be in line with Figure 26, where more than half of the participants agreed that AI tools should be allowed in all tasks they are given at Algebra University.

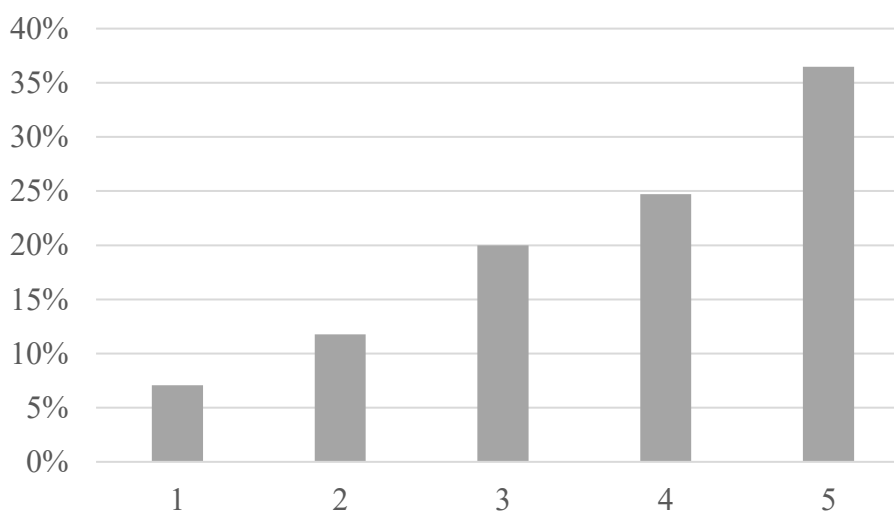


Figure 27. The future of education.

It is even more interesting to look at the responses to the statement “I believe that the use of AI tools is the future of education” in correlation to the participants’ study programmes. As evident from Figure 28, all of the System Engineering students fully agree with the aforementioned statement, all of the Multimedia Production students either fully agree (33%) or somewhat agree (67%) and more than half of the Software Engineering students (64%) and Digital Marketing students (54%) agree with the statement. No students of 2D and 3D Design fully agree with the statement; they seem to be a bit more reserved towards it, with 67% of 3D Design students and 57% of 2D Design students somewhat agreeing that AI tools are the future of education.

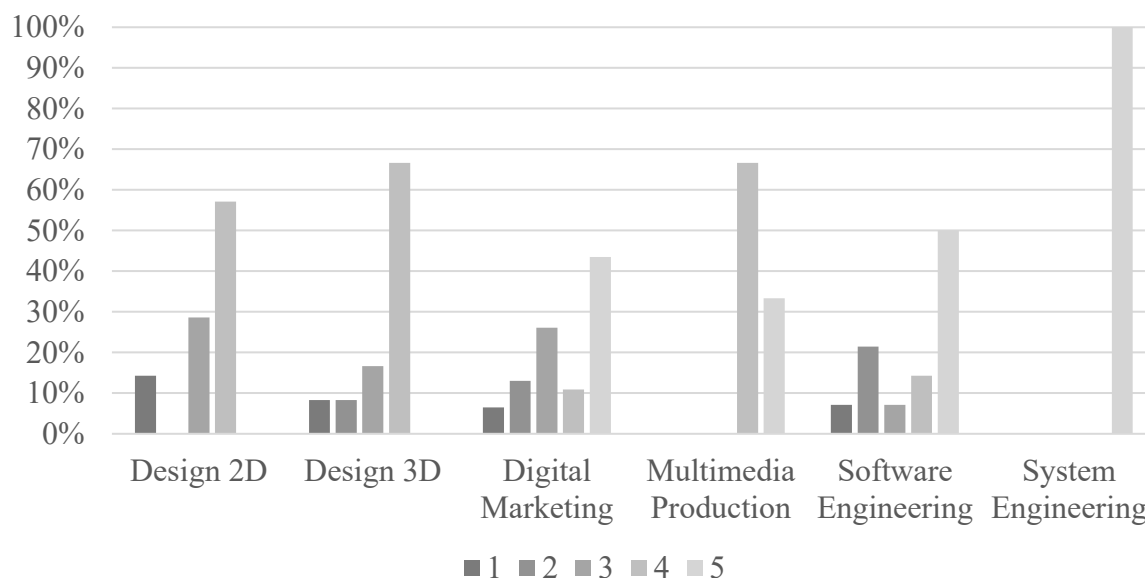


Figure 28. Students who believe AI tools are the future of education by study programme.

DISCUSSION

This section will interpret and discuss the findings of the study research. A total of 221 participants took part in the survey, largely female participants in the age group of 18-24, the majority of whom are studying in the Croatian language. Out of 221 participants, 85 of them (38,46%) stated that they had used AI-assisted tools for their written homework assignment in the English language course. This group of 85 participants represents the final sample the study research was based on. This sample group consists of a slightly more males than females, studying the following study programmes in English or Croatian: 2D Design, 3D Design, Digital Marketing, Multimedia Production, Software Engineering, System Engineering. The majority of participants who used AI-tools in their homework assignment were Software Engineering students studying in the Croatian language (78%) and their self-evaluation of English language proficiency based on CEFR scale is between level B1 and C1, with most students assessing their proficiency at level C1 and B2.

The study first aimed to find out what types of AI writing tools are used by the participants. The findings show that the majority of participants used ChatGPT (3.5 or 4.0) for text generation of their written homework assignment. Some other AI-tools mentioned by the minority of participants were Bing (11%) and Copy AI (6%). None of the participants mentioned using any other AI-assisted tools to generate their homework assignment, which suggests that Chat GPT is the most widespread and well-known AI tool used among students. Interestingly enough, the majority of participants (75%) did not use any AI anti-plagiarism tools, which might suggest that students are not very concerned with ethical repercussions of using AI-assisted tools. Those participants who have used anti-plagiarism tools used mainly Grammarly, ZeroGPT and GPTZero, while a small number of them used other AI-tools, such

as Scibbr, TurnItin and Unicheck. This suggests a need to take a decisive stand on artificial intelligence in education and provide clear guidelines to students regarding the ethical use of ChatGPT and emerging technologies, as already called for by Črček and Patekar [41].

To address a more specific point about the perceived influence of AI writing tools on the development of the participants' writing skills, the study examines the participants' interaction with AI-assisted tools in correlation with their self-assessment of language proficiency. When asked about the general satisfaction with the first AI-generated result, most participants stated that they were more satisfied than dissatisfied with it, the major reasons for their satisfaction being speed and effectiveness. When asked to estimate the number of times they intervened in the AI-generated result (e.g. by changing the ChatGPT prompt), most participants at levels B1 to C1 reported changing the generated text between two and more than five times, with the percentage of those who reported changing it more than five times steadily growing between levels B1 and C1. As Bašić et al. [38] stated, ChatGPT-assisted writing could depend on the previous knowledge and skills of the user. The findings of this study indicate that students whose self-assessed language proficiency is higher tend to view AI-assisted tools as an interactive tool which can actively engage them in the writing process. This might indicate that the students' increased level of involvement was due to AI's reactivity and quick feedback. Although the latter is beyond the scope of this study, this would be in line with research of Huang et al. [18], which relies on SRL theory and stipulates that AI writing tools empower students to become self-regulated writers and provides them with the opportunity to work at their own pace and receive immediate, tailored feedback, allowing for a more individualized learning journey.

When asked which changes they had made to the generated text, most of the participants stated the changes in the form of the text, vocabulary and word order, while some stated grammatical tense and punctuation. Lower-level participants (A1 and A2) did not report making any changes to the punctuation or content. However, the participants between levels B1 and C2 reported some changes in punctuation, but were more concerned with word order, form and vocabulary, rather than punctuation and tense. CEFR level descriptors for self-assessment in writing [46] state that B1 students can write simple connected text on topics, B2 students can write clear, detailed texts and C1 students can write about complex subjects and select appropriate styles. In order to further develop their writing skill, all students work on their vocabulary and word order (paraphrasing), as well as the overall form of writing, so it is not surprising that these were the parameters that B1-C1 level students chose for changing their prompts and receiving AI-generated feedback on the same.

As previous research suggests, AI tools have an impact on both critical and creative thinking skills development [28]. Therefore, this study also aimed to find out whether participants perceived that using AI-writing tools helps develop their creativity. The largest number of participants were neutral in their answers (they neither agreed nor disagreed), so no significant conclusions can be drawn in that respect. Similarly, when asked to rate how AI-tools impact the development of their critical thinking skills, the majority of participants were unsure. However, when asked about the number of times they changed the generated text (the prompt), most of them reported changing the generated text between two and more than five times. One might argue that the fact that most of the participants tend to generate more than one version of text when using AI-assisted tools speaks about their achieved (although perhaps unintended) critical skills development. Furthermore, these findings imply that the majority of participants have shown that they understand that AI learns through their adjustments to the prompts and therefore produces better results based on these better prompts, which also indicates that participants are aware of the fact that they need to use their critical thinking skills to tackle AI-generated content.

Finally, the aim of this study was to learn about EFL students' attitudes towards the use of AI writing tools in general. While the findings show that most of the participants use AI-tools because of time efficiency, the participants are not sure whether the text is of high quality. Most of them had a neutral belief in high quality and accuracy of AI-generated text, which suggests that students cannot rely on AI-assisted tools only, without a teacher's input or better guidance on how to use AI-assisted tools for writing. These findings are in line with recent Klarin and Livić research [40], which confirmed that students rate the received responses as highly useful, with different opinions regarding trust in those responses.

Moreover, the study findings have confirmed that most participants agree that AI-assisted tools might require a new approach to writing homework and doing other EFL-related writing tasks. More than half of the participants agreed with the statement that the usage of AI tools should be allowed in all given tasks, indicating that they wish for changes in the current approach to teaching and learning.

As many as 61% of the participants believe that the use of AI tools is the future of education. Correlating the stated belief and the participants' study programmes indicates that the participants studying System and Software Engineering are more prone to believing that AI is the future of education, whereas 2D and 3D Design students are a bit more reluctant. This difference in attitude between students of different study programmes might have to do with their outlook on how AI tools might affect their future professions, but this is beyond the scope of this study.

The main limitation of this study is the reliance on self-reported data, which might have introduced bias. Furthermore, the sample was relatively small, and since the convenience sampling method was used, the ratios of participants from different study programmes were not even and neither were the ratios of participants studying in English and Croatian. Another important limitation to consider is that the research was limited to the students who had to do the homework assignment.

To address these issues, future research should diversify participant selection across different Croatian and perhaps even European universities. To gain a more comprehensive view of the impact of AI-assisted tools on the writing skills, especially creative writing skills, of EFL students, input from both students and lecturers should be taken into consideration. Using other research methods might also provide deeper insights into this complex topic.

CONCLUSION

This study researched how Algebra University students, most of whom are EFL students, use AI-assisted tools for writing a homework assignment they were given as part of their English language coursework and their attitudes towards this use. The study, consisting of the homework assignment and a short anonymous questionnaire about it, explored the perceived impact of AI-assisted tools on student writing, especially in terms of creativity, critical thinking and language proficiency.

In terms of the tools used, the study findings show that the participants used mainly ChatGPT, but that only a minority used AI anti-plagiarism tools, indicating a lack of significant concern about ethical considerations and plagiarism. This suggests a need for a decisive stand about AI in education and clear guidelines about ethical use of AI tools, as already recognised by other studies.

To look into the impact of AI writing tools on the development of the participants' writing skills, the study examined the participants' interaction with AI-assisted tools in correlation with their self-assessment of language proficiency. The findings indicate that students whose self-assessed language proficiency is higher tend to view AI-assisted tools as an interactive tool which can actively engage them in the writing process. However, further research is still

required to both gain a more comprehensive view of the impact of AI-assisted tools on the writing skills, especially creative writing skills, of EFL students, as well as to determine how AI can be effectively integrated to support writing skill development.

No significant conclusions can be drawn in terms of the impact of AI writing tools on creativity as the participants' responses were neutral. And while the participants' responses to a direct question about critical thinking also did not provide any clear indications, the findings do imply that most of the participants understand that AI learns through their adjustments to the prompts, which indicates that they are aware that they need to use critical thinking to tackle AI-generated content.

The findings further indicate that students believe AI to be helpful, at least in terms of time efficiency and effectiveness. This is corroborated by the finding that they believe that the use of AI tools is the future of education and should be allowed in all tasks at their university.

This study has limitations such as reliance on self-reported data, small sample size, uneven ratios of participants from different study programmes and studying in English and Croatian, etc. Further research should consider the input from both students and lecturers and use other research methods, which might also provide more insight into this complex topic.

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