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# ESP students' attitudes towards using digital dictionaries and AI-based tools in language learning

## Abstract

The importance of dictionaries in learning a foreign language is indisputable, and the emergence of digital dictionaries and artificial intelligence (AI) has noticeably influenced the way students learn a foreign language, providing fertile ground for implementing AI in education (AIED). This paper aims to examine the attitudes and experiences of English for Specific Purposes students in the use of digital dictionaries and AI-based tools. The students were anonymously surveyed during the winter semester of the 2023/2024 academic year on the types and frequency, reasons for using digital dictionaries, advantages and disadvantages of using digital dictionaries, as well as potential suggestions for improving digital dictionaries. They also provided their opinion on and experience in using AI tools in learning a foreign language and translations. The findings suggest that the students prefer using bilingual digital dictionaries for checking the meaning of unknown words, and they heavily rely on Google Translate as the most convenient option. The students recognise the potential of AIED, although they believe AI tools should only be used as supplementary material in language learning. On the other hand, AI-based translation tools can be used as primary translation tools. The study sheds light on the characteristic behaviour of ESP students regarding their digital dictionaries and AI-based tools used for language learning and translating. It points to the need of developing students' digital competence in the realm of digital dictionary use, as well as encourage them to embrace the technology's full potential.

**Keywords:** ESP students, attitudes, experience, digital dictionaries, AI-based tools

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## Introduction

The application of information technology in language teaching and learning has recently attracted considerable attention from language researchers (Lei et al., 2022, Shadiev et al., 2023; Shadiev & Young, 2020). Integrating technology in language classes can boost students' motivation, providing a personalised and interactive learning environment. Language educators have numerous digital tools at their disposal, so they need to make an educated choice and use the ones they feel most competent in.

Dictionaries have always been an indispensable means of acquiring new words and learning a foreign language. The digitalisation of education has created the requirements for transforming paper into digital dictionaries, which are superior due to their convenience, interactivity and quick update potential. The emergence of technology and digital tools have been reshaping foreign language teaching views, with foreign language teachers having to address the usage of digital resources and think of ways to incorporate them in classes. The advent of digitalisation fundamentally changed education, and with artificial intelligence (AI) continually penetrating all domains, teachers have to quickly embrace the dramatic growth of AI in education (AIED) (Hwang et al., 2020). AI-based adaptive learning platforms enable students to customise learning to their needs and preferences, and AI-powered applications provide students with real-time feedback on their grammar, style, structure and overall quality. Recent studies (Bonaccorsi, 2023; Chaudhry & Kazim, 2022; Rodway & Schepman, 2023) have proven the benefits of using digital tools and AIED, so their integration in classes is inevitable.

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Both teachers and students should quickly embrace this fact and start adapting to new forms of teaching and learning.

Despite the benefits of digital dictionaries and digital tools, prior research has not sufficiently delved into students' opinions of and experience in using them for language learning. Moreover, previous studies have not comprehensively examined the opinion of university students who major in computer science/engineering and will eventually be working in a field responsible for digitalisation, so this study will constitute a valuable contribution to the current body of literature. In addition to the narrow research scope, this research will study several digital dictionaries and AI tool-related issues, thus potentially paving the way for conducting future research in multiple directions.

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## Theoretical background

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Dictionary users can be divided into professional, non-professional and language learners, and the variables of native/second/foreign/special purposes language and language proficiency have been reported to affect dictionary usage. The study by Tahriri and Ariyan (2015) confirms some dated findings that monolingual dictionaries are a better choice for those more advanced, while bilingual dictionaries are a wiser choice for less experienced users. In comparison, language teachers encourage students to use monolingual dictionaries from the very beginning of language learning (Holi Ali, 2012). Recent studies on dictionary usage by English for Specific Purposes students (Glušac & Milić, 2020; Knežević et al., 2019) show that students prefer using bilingual dictionaries due to frequent translation tasks from their native language to English, and vice versa. ESP teachers, on the other hand, encourage monolingual dictionary usage, since they perceive them as higher quality resources than bilingual ones.

In a study by Wuttikrikunlaya and associates (2018), involving university students learning English, it was found that the first choice of students when doing written assignments are online bilingual dictionaries. The most popular is Google Translate (Bahri & Masadi, 2016; Bin Dahmash, 2020; Chompurach, 2021; Gumartifa et al., 2022; Tsai, 2022), even though students have mixed feelings about its accuracy, and some even reported to have felt like failures for using it (Cornel et al., 2016). Dictionaries are usually used for receptive (reading) or productive (writing/translating or less frequently speaking) purposes, even though they can be used for acquiring new vocabulary. Recent studies by Selcuk and Daniela (2022) and Waloyo et al. (2021) found that more experienced students use dictionaries for productivity, whereas novice students use them for receptive skills and vocabulary acquisition.

Artificial intelligence is a part of digital evolution involving Computer Assisted Language Learning (CALL) and its varieties. Language teachers frequently create an Intelligent Virtual Environment (IVE) and

utilise different digital tools, which have proven to be very efficient in language teaching and learning (Hwang et al, 2022; Silvestru et al., 2022). Studies report multiple benefits of IVE, such as enhancing vocabulary acquisition (Lai & Chen, 2021; Tai et al., 2020), students' willingness to communicate in English (Ebadi & Ebadijalal, 2020), and boosting motivation for language learning (Chen et al., 2020; York et al., 2021) due to reducing anxiety and peer pressure. Digital learning systems or Intelligent Tutoring Systems (ITSS) are designed to facilitate needs-based tutoring, and can help students, through self-regulated learning based on one's performance, to improve speaking (Mohammadzadeh & Sarkhosh, 2018), grammar (Jiang, 2022) or reading skills (Xu et al., 2019).

AI chatbots replicate human interaction in a written or spoken form, continuously updating their internal database. There is an ever-increasing body of literature reporting positive effects of using chatbots, and Kim and associates (2021) reported an improvement in students' intonation, stress and fluency. Chatbots increased students' motivation and made language classes more interesting and fun, as concluded by Belda-Medina and Calvo-Ferrer (2022), Hew et al. (2023), Mahmoud (2022) and Nghi et al. (2019). However, there are studies (Çakmak, 2022; Yin & Satar, 2020) that reported on negative students' attitudes toward using chatbots and increasing anxiety levels when speaking in foreign language classes.

This brief review of recent research into digital dictionary usage in language teaching and learning as well as the use of AI in various teaching and learning segments shows that the field is still under-researched. Contradictory findings point to room for conducting further research.

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## Methodology

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The paper aims to examine the students' opinions of and experience in using digital dictionaries and artificial intelligence tools. For collecting quantitative data, a questionnaire survey was designed in Google Forms. It consisted of 25 questions ranging from yes/no and multiple-choice to five-point rating scales and open-ended questions. The survey was divided in three parts – demographic information (the participants' gender, study year and the number of years studying English), experience in using digital dictionaries and opinion of/experience in using AI tools. The second part dealt with the issues of the types and frequency of digital dictionary usage, reasons for using digital dictionaries, advantages and disadvantages of using digital dictionaries as well as potential suggestions for improving digital dictionaries. The final questionnaire part covered the participants' opinions on using artificial intelligence tools in learning a foreign language, their personal experience in using such tools as well as their prediction on the effect AI tools might have on learning a foreign language and translation.

The questionnaire was administered in the winter semester of the academic year 2023/2024 and was

sent via e-mail to the Computer Engineering students studying at the Faculty of Electrical Engineering, Computer Science and Information Technology Osijek where the authors teach and/or study. Participation in the survey was anonymous and voluntary following the participants' verbal consent. 256 students (73%) participated in the survey, which is the weak point of this research since we cannot make generalisations based on the survey results. The data were analyzed using the software package SPSS Statistics 22.

**Participants**

Our method of recruiting students is a convenience sample. Even though the sample is not representative in a statistical sense, it is representative of the diversity in the underlying student population in terms of gender at the institution where the research was conducted. 71% of the male and 29% of the female students voluntarily participated in the survey, thus representing the population of Computer Engineering students studying at the aforementioned higher education institution. As shown in Figure 1, the participants study at all five levels (three first and two second-cycle degree levels) speaking in favour of the participants' diversity. However, the majority of the participants study in the third year of the undergraduate level, where one of the authors teaches and can easily (re)encourage them to participate, hence the reason for such participants' distribution.

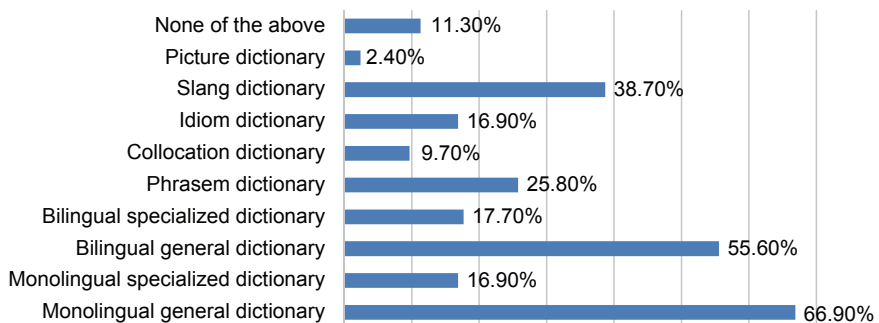
The majority of the participants study English for 11 to 15 or more than 15 years (32.3% and 62.9%, respectively), so they are quite experienced foreign language users who are at the intermediate and upper-intermediate level.

**Instrument**

The survey was created in Google Docs due to easier distribution and data processing. The survey results were uploaded in the software for statistical analysis SPSS where the normality and homogeneity tests were conducted to fulfill the statistical assumptions. Kolmogorov-Smirnov and Levene's test pointed to an uneven data distribution, which resulted in using the non-parametric and descriptive statistics tests. The open-ended comments were analysed using a recursive reading of all comments.

**Figure 2**

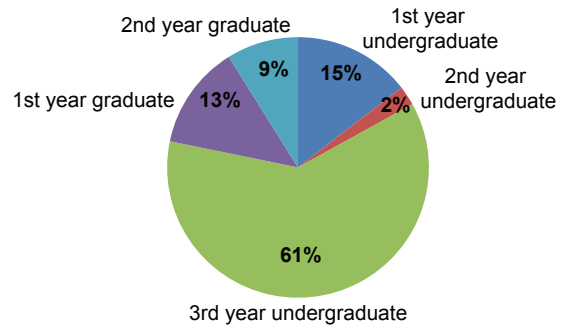
*Dictionary types*



*Source: authors' own work.*

**Figure 1**

*Participants' study levels*



*Source: authors' own work.*

**Research questions**

The study was conducted with the aim to tackle the following research questions:

1. Which digital dictionaries do ESP students use?
2. What are the reasons for using digital dictionaries?
3. What are the advantages and disadvantages of using digital dictionaries?
4. How will AI affect language learning and translation?
5. Are there any differences in the attitudes of the participants based on their gender or language proficiency?

**Results and discussion**

The results are presented in two subsections, namely digital dictionaries and AI tools. Each section contains our statistical analysis results and related empirical research tackling specific issues because we find this paper structuring more efficient.

**Digital dictionaries**

The participants use the dictionary types as presented in Figure 2.

The results show that picture, idiom and collocation dictionaries are not very frequently used. Since the participants are university students who are not English language majors, this result does not come as a surprise and is in line with Alhatmi's (2019) findings.

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A low percentage is recorded in the use of specialised mono/bilingual dictionaries, which is surprising given the fact that the participants study computer engineering and presumably need a specialised dictionary for their studies. Our results corroborate the findings of Knežević et al. (2021) conducted at 11 Serbian faculties. The authors found that the reasons for students' not using specialised dictionaries lies in them not being informed about the dictionaries' availability.

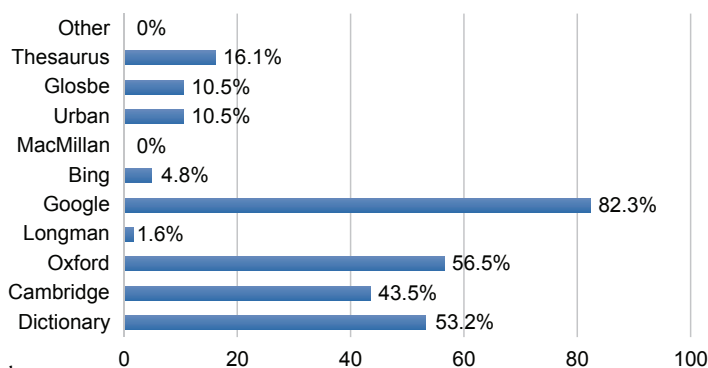
According to the data presented in Figure 3, it is clear that the participants prefer the most known dictionaries (Oxford, Cambridge and Dictionary). Similar to Pikilnyak et al.'s (2021), Niitemaa and Pietilä's (2018) and Tight's (2017) findings, our research has shown that the participants' most frequent digital dictionary choice is Google Translate probably because of its convenience and accessibility.

The participants were asked about the situations they use digital dictionaries in. Only 26.6% of the participants always use digital dictionaries when they read in a foreign language. This might mean that either the participants do not read challenging texts in English or their English is at a level they can grasp the meaning based on contextual information. The group who most frequently consult digital dictionaries when reading are the third-year undergraduate students (31.5%) who are obliged to do a final paper at the end of their third year, which might explain their willingness to read more in the English language and consequently use digital dictionaries. The students rarely (32.3%) or never

(18.5%) use digital dictionaries when communicating in English. This is rather expected because pausing a conversation to check up a word would be unconventional and unnatural. In comparison, the students very frequently (38.7%) or always (8.9%) use digital dictionaries when writing in the English language. Even though it is not statistically significant ( $p = 0.865$ ), 60% of the students who are studying English between 6 and 10 years always use digital dictionaries when writing in English, which is expected since they are more insecure than their more experienced colleagues. When travelling abroad, only 10.5% of the students always use digital dictionaries, which might be due to the lack of the internet connection. 40% of those students are the least linguistically experienced ones, which is expected. Mann-Whitney test has pointed to a gender difference, i.e. the female students, who do not belong to the group of the least experienced language users, use digital dictionaries when abroad significantly more ( $Z = -2.356$ ,  $p = 0.018$ ) than the male students. This can be explained with the phenomenon of hypercorrectness attributed to women. It was first recorded in the 1970s and confirmed in many fields and studies ever since the most recent of which are Muqadas and Nawaz's (2022), Shafira's (2022) and Božić Lenard's (2023). The studies show that, regardless of the context, women are still hypercorrect in their usage of both grammar and vocabulary.

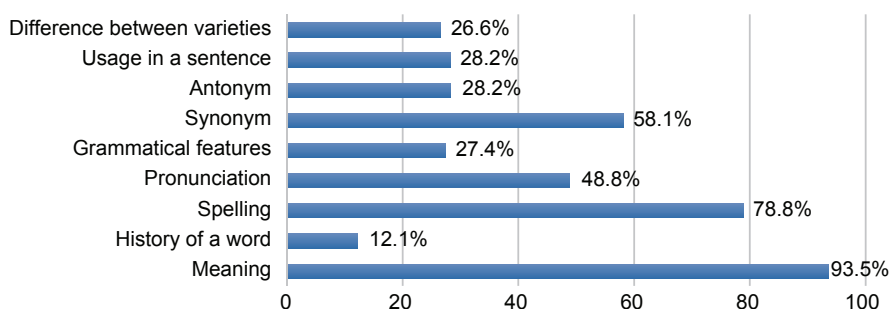
The data presented in Figure 4 list the reasons/activities the participants use digital dictionaries for.

**Figure 3**  
Used dictionaries



Source: authors' own work.

**Figure 4**  
Reasons for using digital dictionaries



Source: authors' own work.



As seen from the figure, the participants most frequently check the meaning of unfamiliar words probably when translating them to and from their native language. They are also interested in spelling as well as synonyms and pronunciation to a lesser extent. The least frequent usage involves the difference between the English language varieties (American vs British English), antonyms, contextual use and grammatical information about the words. The study done by Li and Dao (2019) involving Vietnamese students showed that they use digital dictionaries for the aforesaid activities more than the participants from our study. Our results suggest that the participants consult dictionaries for activities related to writing and speaking in the English language, i.e. the productive skills, which corroborates Knežević et al. (2021) findings. The Croatian students being similar to the Serbian ones and different from the Vietnamese in their usage of digital dictionaries might point to a cultural difference, which could be worth exploring.

As for the three main advantages of using digital dictionaries, the participants listed availability (79.8%), price (77.4%) and saving time (70.2%). Interestingly, only 14.5% of the participants opted for the reliability as one of the main three advantages of digital dictionaries. To compare, they listed the distracting nature of advertisements (62.1%), internet connection (58.9%) and limited free versions (41.1%) as the three main disadvantages, thus being in agreement with Tanjung and Daulay's (2023) and Le and Dao's (2019) research. The participants suggested designing offline dictionaries, blocking advertisements, improving free versions and providing more contextual examples.

### Artificial intelligence tools

The survey responses provide insights into the participants' opinions on the effect AI tools will have on different aspects of foreign language learning, using AI tools as a primary tool for foreign language learning and translating and the use of AI chatbots among university students.

The participants' replies regarding their prediction of negative effects AI tools will have on foreign language learning are evenly distributed – a third of the participants do not believe AI tools will have negative effects on foreign language learning, a third is uncertain and a third believes the effects will be negative. However, their responses on more specific issues related to language learning are not so evenly distributed. 31.5% of the participants believe that AI tools will have no and 41.9% think it will have a slight positive impact on pronunciation. In the most recent studies by Karlina et al. (2020), Kazu and Kuvvetli (2023) and Lee (2021) it was proven that AI tools for pronunciation instruction considerably boosted the students' word memory capacities. Also, Dillon and Wells (2021) and Spring and Tabuchi (2021) recorded the enthusiastic behaviour of students in using AI pronunciation-related tools and consequently their opinion on the positive impacts such tools would have. Our results contradict the aforementioned,

which might be explained with the lack of experience our participants have in using AI pronunciation-related tools. Also, the moderate usage of digital dictionaries for checking pronunciation, listed in Figure 4, and not listing it as one of the main advantages of using digital dictionaries suggest that our participants do not consider pronunciation as important enough to work on it and/or use AI pronunciation-related tools.

The majority of the participants (45.7%) believe the use of AI tools will not affect their mistake making. Conducting Mann-Whitney test, we recorded a gender difference, i.e. the female students believe that using AI tools will eventually result in them making more language mistakes unlike the male students ( $Z = -2.149$ ,  $p = 0.032$ ). This finding is in agreement with our result on the female students feeling the pressure to being more correct than their male counterparts. A considerably high percentage of the participants (75.8%) think that AI tools will positively affect the foreign language learning process, which supports the recent research by Huang et al. (2023), Pedro et al. (2019) and Pikhart (2020) that proved a positive correlation of using AI tools and enhancing students' learning achievements.

To compare, 42% of the participants feel that the use of AI tools will negatively affect their interaction with other people. Despite not being statistically significant ( $p = 0.481$ ), the female students are more pessimistic than the male ones (47.2% and 39.8%, respectively). A Spearman's rank-order correlation was run to determine the relationship between the students' opinion on the effect AI tools may have on pronunciation and interaction with other people. There was a strong, positive gender-related correlation between these scores, which was statistically significant ( $r(36) = 0.336$ ,  $p = 0.045$ ). It means that those female students who believe AI tools will affect pronunciation learning also believe it will negatively affect the interaction with others while such correlation was not recorded for the male students ( $r(88) = 0.221$ ,  $p = 0.410$ ). A similar reasoning was recorded with the students who have been studying English for more than 15 years ( $r(40) = 0.412$ ,  $p = 0.008$ ). They have probably been taught the English language with both traditional and experimental methods and could be seeing a negative effect the latter has on their communication in general. Some recent studies (Hohenstein et al., 2023, Wilkens, 2020) reported the disadvantages, such as the lack of personalisation and human touch, as well as the potential for a communication gap in using AI tools in corporations.

Critical thinking is crucial for making educated decisions in both academic and real-world situations. The said skills are of the utmost importance for computer engineers whose everyday activities rely upon them. The evolution of AI has added a new dimension because AI has the potential to revolutionise educational settings by personalizing learning experiences and providing real-time assessments

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(Alam, 2022; Kamalov et al., 2023), thus affecting critical thinking. 65.6% of the participants from our study believe that AI tools will negatively affect their critical thinking skills. A Spearman's rank-order correlation revealed a strong positive significant correlation ( $r(124) = 0.459, p = 0.000$ ), i.e. those students who believe AI tools will negatively affect their interaction with other people also believe the same will happen with their critical thinking skills. Despite studying in the field responsible for developing and maintaining AI, the participants are very careful and pessimistic about their future and AI's impact, which contradicts the findings by Darwin et al. (2024) and Muthmainnah et al. (2022) whose participants believe that AI will enhance students' critical thinking abilities.

There is a strong consensus that creativity is a core 21<sup>st</sup> century skill. There have been many attempts to combine creativity and AI in a computational creativity. Contemporary education favors problem-solving pedagogies fostering students to think creatively. Emerging research (Belpaeme et al., 2018; Marrone et al., 2022; Wang et al., 2023) prove that AI can foster creativity if students have a positive attitude towards it. Other studies (Habib et al., 2024) report on the negative effects AI can have on students' creativity. 66.2% of the students from our study believe that AI tools will negatively affect creativity skills. A strong positive correlation was recorded with a Spearman correlation test. Those students who think AI tools will negatively affect creativity share the same opinion for its effect on the interaction ( $r(124) = 0.383, p = 0.000$ ) and critical thinking skills ( $r(124) = 0.634, p = 0.000$ ), thus being in accordance with Habib et al.'s (2024) and Marrone et al.'s (2022) results. Before integrating AI into education, misconceptions students may have on it must be resolved, so that they can embrace the technology and use the most of it to improve their skills.

Integrating computers in language learning (CALL) has been around for some time. The most recent research (Abbasi, 2022; Alian et al., 2018; Alqahtani Mofareh, 2019; Andujar, 2019) found that students' motivation for learning a foreign language is greatly enhanced by CALL because classes are more interesting and interactive. However, the previous studies investigated CALL as a supplementary material; not the primary one. Only 29.9% of the participants from our study believe that computer-assisted language learning materials like Duolingo and Babbel will be primarily used for learning a foreign language, i.e. they agree that CALL will be used but not predominately, which supports the aforementioned studies. To contrast, 66.9% of them think that the AI-powered machine translation tools, such as Google Translate, DeepL, etc., will be used as a primary translation tool. There is a positive correlation ( $r(124) = 0.597, p = 0.038$ ) between the students' opinion on predominantly using machine translation tools in future and their using digital dictionaries on a daily basis right now. The proliferation of machine translation impressively

accurate tools creates both opportunities and challenges for language learners who do not mind using them as proven by ours and Kushmar et al.'s (2022), Kong's (2022) and Raheem's (2020) studies. It seems possible that the students prefer and are not ready to marginalise the human approach when studying, which is not necessary when translating.

Subtitles are considered as a primary learning tool for those who cannot understand narration in a foreign language. Recent advancements in AI have played a pivotal role in automatic video subtitling on platforms like YouTube. In spite of its popularity, 58.8% of our participants do not rate automatic subtitles as of very good quality. On the other hand, online grammar checker tools like Grammarly are rated as very beneficial and of very good quality, which is in accordance with Fitriana and Nurazni's (2022), Fitria et al. (2022), O'Neill and Russell's (2019), and Karyuatry's (2018) research.

One of the emerging AI tools is undoubtedly an interactive conversational programme Chatbot. Numerous recent research has examined its effectiveness on different language skills acquisition. Kim (2020) concluded that a chatbot provides an authentic experience and simulates human communication. Belda-Medina and Calvo-Ferrer (2022), Bibauw et al. (2022), Fryer et al. (2022), Klimova and Seraj (2023), and Mohamed and Alian (2023), are only some of the recent research, which confirmed chatbots as valuable resources in EFL learning. The findings suggest that chatbots boost students' enthusiasm and confidence, i.e. students feel competent enough to be autonomous learners who prefer communicating with a chatbot rather than a real person. Half of the students from our study (57.6%) do not choose a chatbot over a person for communication, which is contrary to the aforementioned studies. A Kruskal-Wallis H test showed that there was a statistically significant difference in using chatbots between the students based on the length of their language learning  $\chi^2(3) = 9.077, p = 0.028$ , i.e. the students with the least experience (up to five years) feel more comfortable talking to a chatbot than more experienced students. This is probably related to the fear of public speaking and peer pressure the least experienced students may feel when speaking in the class while no such pressure is present when speaking to a chatbot. Our interpretation is supported by the Spearman correlation test results, which showed a statistically significant correlation between the use of chatbots and an opinion, expressed by the least experienced students, that the use of AI will reduce the fear of making mistakes ( $r(5) = 0.889, p = 0.044$ ).

The trend of incorporating modern technologies in a scalable fashion in education has been around for several decades. The latest addition are programmes that can compose essays using online information. As soon as students learned to use ChatGPT and educators realised its double-edge sword nature, researchers started carrying out research to examine attitudes towards ChatGPT's potential plagiarist nature. Despite

many educational benefits, the most recent research (Chan, 2023; Chan & Hu, 2023; Cotton et al., 2023) reports a students' wide understanding of academic misconduct when using ChatGPT. Students clearly disapprove of using it to form the entire text but have more ambivalent attitudes towards subtler uses. Our result supports such a finding because 58.4% of the participants do not perceive the use of AI when doing their papers and reports as plagiarism. Those attitudes are a warning sign because they can potentially lead to more serious educational problems.

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### Conclusions

The aim of this research was to elaborate on the contemporary situation in terms of using digital dictionaries and AI tools in ESP education from the perspective of computer engineering students as dictionary and AI tool users. The participants' scope – university students studying at one higher education institution in Croatia – is the main limitation of the research. The present research shows that computer engineering students heavily rely on digital resources but do not use them as much as they could. In spite of different dictionary types being freely available to them, the students use the most convenient one, which is not always the most accurate one; however, they are aware of it and choose the convenient and faster option as opposed to the most accurate one. Less experienced students use digital dictionaries for receptive skills and vocabulary acquisition, while more experienced ones use them for productive skills. Female students are more worried about what kind of language they use, so they consult dictionaries more than their male counterparts. The research also shows that the students use digital dictionaries when they have to, i.e. juniors are obliged to conduct research and do a final paper whose theoretical background is usually in English. This can have some pedagogical implications and encourage ESP teachers to assign more tasks involving research in the foreign language.

The research sheds light on the students' broad and vague understanding of the term digital dictionary and points to them not recognising the line between digital tools/dictionaries and AI-based tools. Not all AI-based tools are positively perceived by our participants, i.e. some AI-based tools (e.g. pronunciation ones) are rarely used in spite of their advantages. Female students are generally more worried about the negative consequences AI tools will have on their language skills and interaction in general, but all students recognise potential consequences of using AI in language learning and skills like critical thinking and creativity. The students recognise the potential of AIED; however, they believe AI-based tools should be used only as supplementary materials for language learning. On the other hand, the students are more ready to use translation tools as a primary translation source. These findings might help language educators in planning and organizing their classes.

The students are familiar with the emerging AI tools of chatbots and ChatGPT. The least experienced students use chatbots more than others do because it reduces their fear of publicly making mistakes and peer pressure as well as boosts confidence. The students started using ChatGPT whose subtle usages are not perceived as problematic. Naturally, to define what is a subtle usage is very subjective, so even subtle usages of someone else's intellectual property are a warning sign and can potentially lead to more serious academic misconduct.

Notwithstanding a proliferation of AI-related studies in language learning, there is a relative paucity of longitudinal studies on the effectiveness of AI in ESP/EFL contexts involving language instructors and different profile students. It would be interesting to examine if a study programme is a significant variable. Our research methodology can be replicated in research involving students from other countries. Moreover, it would be interesting to examine if a native language or participants' culture plays any role or are our findings universal. Further research should be conducted on the adaptability of AI to students' learning needs (motivation, online vs offline learning vs flipped classrooms) and translating preferences as well as its effect on using digital dictionaries. Future research should shed some new light on the pedagogical and ethical implications of using AI in language learning.

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