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ARTIFICIAL INTELLIGENCE TOOLS IN ACADEMIC WRITING INSTRUCTION: EXPLORING THE POTENTIAL OF ON-DEMAND AI ASSISTANCE IN THE WRITING PROCESS

INTRODUCTION

Quite unexpectedly, the end of 2022 and the beginning of 2023 marked the third technological revolution, after the invention of the Internet and personal miniaturised computers. The emergence and spread of artificial intelligence tools, best embodied by the famous Chat-GPT text interaction tool, marked a new era for teaching and learning in all areas of (language) instruction. The first months of 2023 saw daily reports of new achievements, enhancements or functionalities that artificial intelligence brought to various kinds of applications used for such creative activities as reading, writing, composing poetry, or even cooking. Very soon it became clear that just like it was impossible to remove computers and the Internet from the language classroom in the second technological revolution era, the same is bound to happen with AI tools in the third one.

Given the proliferation of tools using artificial intelligence algorithms to achieve whatever was previously thought unachievable, implementing an experimental programme which puts selected AI tools into instructional use in a particular teaching context seemed more than necessary. Especially highly proficient and

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highly motivated students should be exposed to AI capabilities and AI-produced input, as such high-level learners should be able to make use of AI-generated text in a conscious and beneficial way.

The purpose of the current study was to examine the opportunities and limitations of implementation of selected AI-assisted tools in the process of acquiring writing competence in English for Academic Purposes context. In particular, the researchers were interested in checking how students' preferences for use and opinions about the AI-assisted writing tools would change after participation in the experimental treatment and to what extent they would choose to interact with artificial intelligence and for what purpose.

LITERATURE REVIEW

Early and contemporary definitions of artificial intelligence (AI) and large language models (LLMs)

The current interest in artificial intelligence, best epitomised by countless challenges set up for Chat-GPT, does not mean the concept and the tools are in their infancy. As reported by Pokrivcakova (2019), the term 'artificial intelligence' itself was used for the first time in 1956 by John McCarthy. During a workshop at Dartmouth College McCarthy defined AI as "the study (of artificial intelligence) is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves" (as cited in Russel & Norvig, 2010, p. 17). Over the years, more and more scientific attempts focused on exploring AI to build "models based on human reasoning, without the end goal of replicating complex human thinking" (Marr, 2018). Quite interestingly, nowadays AI output is regarded on its own, without necessarily comparison with and reference to human output.

As Luckin et al. (2016, p. 14) define, AI are "computer systems that have been designed to interact with the world through capabilities (for example, visual perception and speech recognition) and intelligent behaviours (for example, assessing the available information and then taking the most sensible action to achieve a stated goal) that we would think of as essentially human". While such a broad definition encompasses machine learning, adaptive learning, natural language processing, data mining, crowdsourcing, neural networks (Pokrivcakova,

2019), for linguists and language teachers AI-powered tools are chiefly all those applications in computer linguistics, in the creation of computer languages, machine translations and improvement of human-machine communication via speech recognition as well as speech synthesis, which lead to enhancement of the teaching and learning environment through adding a capacity for collaboration with artificial intelligence.

Baker and Smith (2019) divide AI tools used in education into three groups:

a) Learner-facing AI tools: software that students use to learn a subject matter.

b) Teacher-facing systems: those used by teachers with the purpose to reduce their workload and make their output more effective in specific automating tasks, such as administration, assessment, feedback and plagiarism detection.

c) System-facing AI tools: they provide information for administrators and managers on the institutional level, for example, help monitor drop-out patterns across faculties or colleges.

Technically, language modelling (LM) is one of the major approaches to advancing language intelligence of machines (Zhao et al., 2023), which aims to model the generative likelihood of word sequences so as to predict the probabilities of future (or missing) tokens. Large language models (LLMs) are transformative, pre-trained foundational models that are self-supervised and adaptable to a wide range of natural language tasks (Sejnowski, 2023). Rather than use a separate network model for a separate task, LLMs are characterised by "emergent abilities", which add new capabilities to the model through the process of priming, or giving input to "learn from". Thus, pre-trained LLMs can be fine-tuned with additional training to be able to perform different language operations, as if someone were instructed to perform a specific task (Sejnowski, 2023). For instance, the AI application can be "taught" to "speak" English by "reading" text, traditional search engines can be enhanced with AI chatbot functionalities (Microsoft's Bing), AI plugins are currently being added to applications (e.g., Microsoft 365) to automate office work.

The best known example of large language models has become ChatGPT, which is an AI system designed by OpenAI (https://openai.com/blog/chatgpt/) to interact with people in a natural and conversational way (Qureshi et al., 2023). As an LLM, it has been trained to predict language use based on large datasets of written language (for GPT-3.5 version, approximately 570 GB of text, see Qureshi et al., 2023) to produce many different types of responses.

LLMs in foreign language writing instruction

A range of intelligent CALL tools, supported by artificial intelligence, can be used to assist foreign language writing teaching and learning. Pokrivcakova (2019) makes a comprehensive overview of such applications, enumerating

a) personalised learning materials,
b) machine translation tools,
c) AI writing assistants,
d) chatbots,
e) AI-powered language learning software (platforms and apps),
f) intelligent tutoring systems (ITS),
g) intelligent virtual reality (IVR) applications.

Only some of these are of greater interest in view of the current research: AI-writing assistants based on natural language processing and machine learning enable correction of grammatical errors in a written text and provide recommendations for text improvement (see Grammarly, ProWriting Aid, Textio, AI Writer, Textly AI and Essaybot – Pokrivcakova, 2019). Chatting robots (chatbots) simulate intelligent human language interaction and serve as informal communication partners. Finally, IVR applications are more complex systems integrating conversational AI tools, spatial context awareness technologies, gesture and facial landmark recognition systems, NLP, speech recognition and natural language understanding technologies to create authentic conversational avatars in game-based learning environment, which could serve as teachers, facilitators or students' peers (Pokrivcakova, 2019).

Opportunities for teaching foreign languages with LLMs and Chat-GPT abound. As Bonner et al. (2023) state, LLMs can ease teacher curriculum and grading workloads, generate creative ideas for activities, draw on their immense corpus of language content to produce learner-centric materials and help deliver targeted, personalised language instruction. Other applications of AI include creating custom AI applications to engage in meaningful conversations with learners (Frazier et al., 2020) or AR- and AI-based mobile learning tools to assist students in practising reading and speaking (Shukla et al., 2019).

In a wider language learning context, LLMs can facilitate a number of processes (Kasneci et al., 2023):

- Personalised learning: models can analyse student's writing and responses, and provide tailored feedback and suggest materials that align with the student's specific learning needs.
- Lesson planning: teachers can input to the models the corpus of documents based on which they want to build a course, with the output being a course syllabus

with short description of each topic. LLMs can also generate questions and prompts at different ability levels, personalised practice problems and quizzes.

● Material delivery: LLMs can be applied to highlight important phrases, generate summaries and translations, provide explanations of grammar and vocabulary, suggest grammatical or style improvements and assist in conversation practice.

● Assessment: the grading of student work can be semi-automated with LLMs by highlighting strengths and weaknesses of student works, identifying areas which students are struggling with or checking for plagiarism.

● Stimulating deep learning: large language models can be used to assist the development of reading and writing skills, critical thinking about what students are reading and writing, analysis and interpretation skills, summarising and explaining, evaluating solutions and posing problems for out-of-the-box thinking.

● Genre and style awareness: high school students can be helped in the learning of language characteristics and using genres and styles for various subjects and topics, e.g., mathematics, physics, language and literature, and other subjects.

● Collaborative learning: LLMs can be asked to provide a discussion structure, real-time feedback and personalised guidance during discussions as well as automatically assign questions and topics to team members.

● Empowering learners with disabilities: AI-enhanced applications with speech-to-text and text-to-speech solutions may help students with visual or hearing impairment through delivering adaptive writing, translating and highlighting essential content in various formats.

Practical objectives for AI tools, which can be incorporated into writing lessons, are as follows (Bonner et al., 2023):

1. Summarising text in level-appropriate language
2. Correcting grammar and vocabulary usage
3. Generating narrative prompts
4. Creating presentations
5. Generating lesson ideas
6. Levelling texts for testing or reading practice

The list above is supplemented by Kasneci et al. (2023) with such objectives as identifying and correcting typos, highlighting (potential) grammatical inconsistencies and suggest adequate and personalised improvement strategies, identifying opportunities for topic-specific style improvement, generating summaries and outlines of challenging texts or enabling learners' deeper processing of content.

Limitations of AI and LLMs

While AI-powered applications and large language models seem to open interesting avenues both for second/foreign language acquisition research and practical enhancement of classroom language instruction, their application poses a certain number of challenges whose awareness is crucial to their successful implementation. As noted by Sejnowski (2023), LLMs cannot store new experiences in long-term memory in dialogue, so without finetuning they have to start dialoguing "afresh" with each person they meet. Since they are huge, they find it difficult to maintain continuity during long dialogues. They do not yet have a sensory experience with the world, which makes them very much unlike humans. The very use of an AI application or a chatbot does create a novelty effect, as evidenced by Fryer et al.'s study (2017), however, it tends to be short-lived and there was a drop in task interest under chatbot-partner conditions as compared to a human partner. Other challenges encompass potential bias in the output, the need for continuous human oversight, and the potential for misuse (Kasneci et al., 2023).

While being an emerging field in educational technology with great potential, Kuddus (2022) notes the intimidating nature of AI tools, misconception and misunderstanding regarding their use in education, especially by educators who are unaware of their pedagogical limitations. Therefore, educators might find it difficult to acknowledge that despite great opportunities for dealing with content, those powerful tools require a certain amount of expertise (Qureshi et al., 2023). According to Kasneci et al. (2023), it is necessary for teachers and learners to understand the technology as well as limitations and unexpected brittleness of AI-powered systems. Moreover, educational authorities need to develop clear strategies and sound pedagogical approaches with a strong focus on critical thinking and fact checking to take full advantage of large language models. Bowman (2023) notes that there are no reliable techniques for steering the behaviour of LLMs, and experts are not yet able to interpret their inner functioning. Finally, brief interactions with them are often misleading, which can be discouraging for learners (Bowman, 2023).

For educational contexts, current debates about their use focus on academic integrity, the meaning of authorship, potential consequences for the general workforce, and unresolved copyright issues (Rillig et al. 2023). AI-generated output can be easily confused with expert opinions and false content may be created. Moreover, access to LLM-based apps could worsen digital divide effects within and among societies, favouring people with access to information and literacy to use the new tools. As Rillig et al. (2023) hypothesise, over-reliance on AI-generated interactions could reduce the amount of human interactions.

THE STUDY

The aim of the research

The current research had numerous objectives, which were prioritised by the researchers to be accomplished throughout the process. Since the present study was the first exploration of artificial intelligence tools in the writing process both for the researchers and the participants, it was quite likely that the objectives assumed at the beginning of the study might need to be verified and adjusted accordingly as experimental treatment was conducted. The study, therefore, had the major objectives as follows:

- to verify the feasibility of implementation of selected artificial intelligence tools (online text exploration services and online word processor) in the process of teaching writing for academic purposes at the C1+/C2 level in university instruction;
- to compare students' attitudes towards and preferences for use of AI-enhanced writing tools before and after experimental treatment;
- to see the extent to which students take advantage of interaction with artificial intelligence in the process of composing texts.

Apart from these major objectives, the researchers sought to explore the field of the use of artificial intelligence tools in language instruction at advanced level, hence, they intended to verify the usefulness of selected AI tools, find pedagogical ways of integrating AI-assisted tasks with other computer-based tasks and with in-class face-to-face tasks, and pave the way for new research initiatives using artificial intelligence tools.

Participants and the teaching context

The study was conducted between March and June 2023 in an undergraduate applied linguistics study programme at a middle-sized public university in Poland. The students took the double-language (English & Portuguese) translator training programme, heading towards a BA degree in translation and interpretation in both languages. The participating group was ready-made when starting the research and due to limitations of the study programme (student groups have different second foreign language – German, Russian, French, Spanish or Portugues – and they have to attend all courses in intact groups) it was not possible to apply randomisation, which would increase the validity of results and strengthen the conclusions. Most participants were Polish (12), few Ukrainian (3), mostly female (9), with 6 males, all aged 21–22 years of age. As was evidenced by the pre-treatment survey, the participants had very little knowledge of and

familiarity with artificial intelligence and the tools that use AI algorithms to support text processing and production.

The students were approached by one of the researchers (their regular writing instructor) about the possibility of enhancing their academic writing course with artificial intelligence tools. The concept of AI-assisted writing was presented and the students were assured of the potential benefits they may gain from the participation in the experimental treatment. Most importantly, it was made clear that the use of AI tools would not lead to deterioration of their final grades, and that the major benefit of the participation, apart from enhanced skills and strategies for assisting writing, would be unlimited access to Lex.page, an online word processor enhanced with AI algorithms. All the students from the selected group agreed to participate in the study, assured of their right to withdraw and return to regular pen-and-paper writing whenever desired.

The quasi-experimental treatment took part in the face-to-face weekly classes between end of March and beginning of June 2023. The learning environment was composed of a face-to-face class, during which tasks were mainly done offline, with the instructor presenting input materials, sample texts or task solutions with the computer, and the individual computer-based component, during which the participants interacted on their own with different AI-assisted tools as well as with other students in collaborative tasks.

Design, procedure and instrumentation

The study followed a previously planned syllabus of writing tasks and materials but enhanced and assisted with selected artificial intelligence tools. The blended and flipped model of the classroom applied meant that class time was used for presentation of tools, writing models, explanations and strategy training, while most work on the writing skill was done by the participants on their own. Such a mode of work suited the planned experimental treatment, as it was interesting to find out to what extent the participants would resort to AI-enhanced functionalities of the word processor on their own, without pressure from the teacher or peers.

The study followed the one-group quasi-experimental treatment, as it was not possible to assign students randomly to experimental and control groups as for the reasons of study organisation they had to participate in academic writing classes in their intact groups. Hence, with the awareness of all the limitations and drawbacks, the one-group study design was used as a viable option for the study.

The quasi-experimental treatment was composed of the regular face-to-face component and the individual online work, and was planned to enhance the previously planned writing instruction focused on practising the genre of report

in its different forms. In consecutive weeks, students were gradually introduced to the use of AI in assisting writing instruction through the following tasks:

– Week 1: distinguishing AI from human writing – students were given four texts to find out which and to what extent were created with Chat-GPT

– Week 2: using Explainpaper (https://www.explainpaper.com/) to paraphrase difficult parts of uploaded scientific text

– Week 3: using a text on a well-known topic based on dubious sources – students were supposed to find such sources and use ChatDOC to generate answers to questions based on it, then discuss the outcome with their peers

– Week 4: interacting with ChatDOC – students were to find some texts from unknown and unauthorised sources to translate them into English and Portuguese

– Week 5: composing text with the help of AI using Lex.page

– Week 6: collaborating with AI and with other students via Lex.page

– Week 7: evaluation and discussion

The instrumentation for the study, apart from experimental treatment scenarios, comprised also a pre- and post-study survey, whose aim was to explore the participating students' experience and familiarity with selected computer-based tools that can be used to assist the writing process. Even though the major focus of the study was on state-of-the-art AI tools, a broader picture was sought, by asking the respondents to mark their familiarity on a 4-point scale (*I do not know what it is; I have only heard about it; I have tried to use it, but not fully successfully; I use it quite often*) in reference to six computer text-based services (language corpora, parallel text databases, text-to-speech synthesisers, speech-to-text transcribers, automatic translation tools, computer-assisted translation tools) and three artificial intelligence tools (chatbots, AI-assisted summarising tools and AI-enhanced word processors). For each type of application, a well-known example was given in brackets to make sure that the participants would associate the concept with the particular application. The second part of the pre- and post-survey tool was a set of 10 statements related to the assistance of modern technology tools in the writing process, which were to be responded to on a Likert-type semantic differential scale from 1 (*fully disagree*) to 5 (*fully agree*), with 3 as the neutral point (no opinion). The same tool was applied before the end of the quasi-experimental treatment and following it, to compare the changes in attitudes as a result of participation in AI-assisted writing programme.

Selected AI tools used in the writing environment

Extensive literature to date has focused on the use of different computer-mediated applications as a part of the writing environment for learners. Most

notably, the research concerned the use of word-processors (both downloadable applications and online), language corpora (ready-made and do-it-yourself), online collaborative whiteboards, automatic translation systems and social media. However, the third technological revolution of 2022 has brought about the concept of artificial intelligence and large language models into the potential use in the writing classroom. Hence, there arose a need to make a selection of AI-enhanced tools for the current study. While the artificial intelligence tools are spreading each week, most of them are very early builds or demonstration versions, featuring one selected functionality and not enabling more in-depth teaching and learning. Lists of AI tools useful for selected tasks abound, and sample applications can be found below:

- Writing: ChatSonic, ChatABC, JasperAI, Quillbot
- Coding: CoPilot, Tabnine, MutableAI, Safurai, 10Web
- Research: PaperPal, Perplexity, YouChat, Elicit
- Productivity: Synthesia, Otter, Bardeen, CopyAI
- Content Creation: Writesonic, Tome, Copysmith, TextBlaze
- Images: StockImg, Midjourney, NightCafe, Photosinic
- Videos: Pictory, DeepBrain, Lumen5
- Audio: Murf AI, Speechify, Lovo AI, Media AI
- Music: Boomy AI, Soundraw, Beatover, Soundful
- Presentations: Simplified, Slidesgo, Sendsteps
- Resume Building: KickResume, Rezi AI, Resume AI, Enhance CV

Obviously, as was the case with Web 2.0 tools at the beginning of the twenty-first century, most of these tools are likely to be extremely short-lived, soon acquired by bigger companies, merging with other tools or simply disappearing.

In the current study, it was a concern of the researchers to ensure equal access to the study tools, which meant that only freely available services or those for which students could be granted complimentary access to the full version could be used in the process. However, easiness of use and free-of-charge accessibility cannot be sole criteria for the selection of research instruments. Hence, additionally, the researchers undertook a careful analysis of available AI applications with the purpose of selecting those that would meet the criteria of simplicity, relevance to the foreign language writing process and versatility of use. While it would be unrealistic to expect freely available online demos to meet these criteria, one particular AI-assisted writing environment, Lex.page, could be safely selected as the target context for the study.

As a result of this meticulous selection and evaluation process, the following applications were applied in the current research.

1. Lex.page (https://lex.page) is the major artificial intelligence application used for the study, a word processor joining the standard document creation and editing features with functionalities of collaborative writing and artificial intelligence operations of continuing writing, generating text from prompts, getting AI feedback on one's writing, and asking AI to insert a random word. Lex.page is generally available as a paid service, however, the researchers managed to obtain free fully-functional licences for the participating students.

2. Perplexity (https://www.perplexity.ai) is an online service enabling generating answers on different (known and unknown) sources.

3. Explainpaper (https://www.explainpaper.com/dashboard) is an online tool with the functionality of uploading texts as pdfs to be later paraphrased or asked questions about.

4. ChatDOC (https://chatdoc.com) is an application enabling "chatting with documents", i.e., a file-based reading assistant that can extract, locate and summarise information from documents.

RESULTS AND FINDINGS

Pre-study and post-study survey

The results of the pre-study survey suggest that the participants quite often reach for help when they get stuck when writing (60%). A significant percentage of the questioned believe that learners should refer to supplementary tools when developing their writing skills to see grammatical and lexical suggestions (47%). Furthermore, it is supposed that automatic translation tools are useful for learners as they expose problems of word-for-word translation (47%). More than that, the participants think that foreign language students should be taught how to make good use of AI tools in the writing process (60%). The obtained data confirm the scientific analysis by Pokrivcakova (2019) and Baker and Smith (2019) who enumerate a myriad of AI-assisted tools and their usefulness in the learning contexts. Additionally, a great percentage of the survey participants is of the opinion that there is a place for artificial intelligence tools such as ChatGPT in learning how to write in a foreign language (54%). What is more, the students hold the opinion that AI tools are useful in learning paraphrasing (40%).

Quite interestingly, the post-study results indicate a substantial growth in the number of students who refer to supplementary tools when developing their writing competence (75%), which may show that the knowledge gained in the scientific experiment was of great advantage for the participants. Also,

it confirms the finding of Kasneci et al. (2023) that LLMs can facilitate a number processes in a learning language context, e.g., developing genre and style awareness.

However, as far as the previous experience and satisfaction with ChatGPT or other AI tools are concerned, the students' opinions are divided, which might suggest that the students are not fully convinced of the usefulness of the AI tools in writing or they did not use them successfully because of not being properly trained. Additionally, a lot of participants do not agree that with contemporary advances in AI, very soon translators and writers will be replaced by machines.

As regards familiarity with and previous experience of selected computer-based tools in teaching writing, the results of the pre-study survey indicate that the students are not so much accustomed with AI tools. A significant percentage of the survey participants claim that they are unfamiliar with tools like language corpus (e.g., COCA or BNC) – 74%, AI-assisted word processor (e.g., Lex.page) – 87%, AI-assisted summarising tool (e.g., chatDOC) – 87%, text-to-speech synthesiser (e.g., Ivona or Dragon) – 54% or computer-assisted translation tool (e.g., MemoQ or Trados) – 54%. Some of the students admit that they only heard of indicated AI tools, like language corpus (e.g., COCA or BNC) – 20%, Chatbot (e.g., ChatGPT) – 20%, speech-to-text transcriber (e.g., Google Cloud) – 53% and computer-assisted translation tool (e.g., MemoQ or Trados) – 20%.

In terms of the results from the post-study survey, there has been a considerable increase in participants' knowledge about AI-assisted word processor (e.g., Lex. page) – 95%, AI-assisted summarising tool (e.g., chatDOC) – 93% and Chatbot (e.g., ChatGPT) – 70%. The results may highlight that it is necessary to teach foreign language students how to make use of AI tools in educational contexts, especially in the writing process. The results are in line with the findings of Bonner et al. (2023), who show a lot of practical objectives for AI tools, like summarising, correcting or generating ideas.

What is more, the pre-survey results show that the students have tried some of the computer-based tools, but rather unsuccessfully. These encompass parallel text database (e.g., Linguee or Glosbe) – 47%, chatbot (e.g., ChatGPT) – 60% and text-to-speech synthesiser (e.g., Ivona or Dragon) – 33%. There is also one computer tool that is extremely often used by the research participants, namely an automatic translation tool (e.g., Google Translate) – 81% of the students admitted that they use it.

As far as the opinions on AI tools of the study participants are concerned, the results have been outlined in the table below, and grouped into two categories: positive and negative ones.

Table 1

Students' opinions on the usefulness of AI tools (original spelling)

AI tool	Opinion	
	Positive	**Negative**
Explainpaper.com	• A very useful, precise, easy accessible and simple tool, which certainly helps people to improve their writing skills, by giving precise answers for follow-up questions; the sentences are sometimes quite long, probably due to the nature of the text • The best of the tools I've been provided with during this exercise—fast, provides with a lot of precise information, proposes follow-up questions, definitions or names are underlined • Useful to understand complicated texts and paraphrase them • The level of knowledge can be chosen (from little child to a university graduate), gives you related resources; • The feature of "customising your explanation" seems like a brilliant technological solution	• It is rather focused on one task, cannot find possible mistakes • Sometimes misses out on data which could be of help • It lacks creativity, text structure almost identical in most cases, sometimes messes paraphrase with summary; • Sometimes provides extra information that isn't necessary or related to the question, questions that are built in a wrong way are ignored • Had a technical problem (didn't finish the paragraph) which has been fixed by the second try
Chatdoc.com	• A useful device in case of having a long text from which exact information is required; avoids generalising • The chat indicates the page and the fragment that information is from, so it is easy to verify the correctness of its answers • The tool is mostly designed for doing text analysis especially for longer pieces of writing; the answers were very long and detailed • It's not very complicated for average users, highlights certain parts of the text, which makes data searching easier • I liked that there were so many options for changing the size of the document. Also, the option 'recommended questions' helped me to understand better how AI technology works. Also, I liked how while answering one of my questions, AI wrote down the answers in subsections. It made everything way more pleasant to read	• Minor grammatical mistakes ("the use of smartphones have become…"). The text can be too overwhelming for some • Buggy software, slowly reacting site, while giving the answers, limited number of options provided, dull interface • Had some technical issues (an error occurred two times while answering). Nevertheless, it was fixed from the 3rd try • It can paraphrase information given in the article, so the text generated by the program is repetitive

Perplexity.ai	• A tool similar to ChatGPT, limited to answers based on text only • Similar to ChatGPT but with the option of searching particular sites (Wikipedia, YT, News, etc.) • It's easy in use, giving satisfying results, available for smartphones, smoothly working, time-saving tool with pleasant interface; • Different sources such as News, YT, Reddit, Academic sources can be discovered. Follow-up questions are available (in case something is not understandable/out of curiosity); • I didn't find any downsides of this tool	• The answers are sometimes too vague, has limited knowledge • Sometimes answers are too simple and general. There is no proof that the materials are legitimate
Lex.page	• A helpful tool, can generate texts and make it following all the guidelines of a human; heavily facilitates writing • I was surprised that the text was fully correct and met my expectations 100%. In case of necessity of paraphrasing the text, there is no problem as well • It is a pleasant tool, as a rather lazy person and being able to supply input required data and then prompt what has to be edited is indeed a great option	• I am a bit dissatisfied that it neglects my instructions (like the word limit in the text – in that case I had to change it manually) • The text written with the help of lex.page feels like too "AI-influenced" – predictive and with lots of repetitions • I am honestly disappointed with the tool, it was not user-friendly and the way in which it was unintuitive made me struggle to produce any text for a longer time

On the whole, the implemented study regarding AI tools in academic writing instruction led to a growth of the participants' knowledge and use of AI-enhanced tools in the process of writing and general usage in diversified contexts. The study results suggest that most of the artificial intelligence tools seem to be new and never properly tested before by the students in question. As the results of the post-study survey show, the respondents' knowledge and usage concerning separate AI tools have grown significantly, for instance chatbot (e.g., ChatGPT – up to 80%, AI-assisted summarising tool (e.g, chatDOC) – 93%, AI-assisted paraphrasing tool (e.g., Explainpaper.com) – 70%, AI tool generating answers based on different sources (e.g., Perplexity.ai) – up to 90%, and AI tool assisting in writing (e.g., Lex.page) – 60%. The aforementioned respondents' opinion indicate that there are strengths as well as weaknesses of the practicability of using and applying AI-enhanced tools in the development of writing competence, which echoes the findings of Kasneci et al. (2023), Sejnowski (2023) and Rillig et al. (2023).

DISCUSSION OF RESULTS

The motivation for conducting the study was to find an appropriate way to support the process of teaching and developing writing competences in a group of academic students. The results obtained during the experiment prove that assisting teaching writing with artificial intelligence tools can be one of the solutions supporting the process of developing and improving writing competence at the academic level. The conducted study shows a visible increase in the students' initial knowledge about AI tools as well as other information technologies that can be used in the academic learning process of various language skills, including the development of academic writing.

The obtained results are satisfactory and indicate that students have enriched their knowledge of AI tools in the process of developing academic writing competence. The growth was measured by comparing the results of surveys conducted before and after the study. The detailed results prove the increase in the respondents' knowledge in three areas: theoretical, practical and ethical. As regards the first mentioned, the study participants expanded their knowledge of artificial intelligence tools used in the writing process, in particular AI-assisted word processor (e.g., Lex.page) – 8%, AI-assisted summarising tool (e.g., chatDOC) – 6%, and Chatbot (e.g., ChatGPT) – 40%. What is more, the students admitted being also familiar with other tools, for instance language corpus (e.g., COCA or BNC), text-to-speech synthesiser (e.g., Ivona or Dragon), speech-to-text transcriber (e.g., Google Cloud) and computer-assisted translation tool (e.g., MemoQ or Trados). In terms of increasing knowledge in the practical area, the AI-powered tools implemented in the course of the experiment (Lex.page, Perplexity.ai, Chatdoc.com, Explainpaper.com) prove to be beneficial for the students. The collected students' opinions highlight that the tools are easily accessible and not complicated in usage. Moreover, these tools have varied useful functions, for example, can generate texts based on the given hints, paraphrase diverse texts with different levels of difficulty as well as provide sample texts on a given topic. Finally, regarding the ethical side of using artificial intelligence tools, respondents have doubts and strongly emphasise that the tools should be used in accordance with the principle of creating scientific texts without violation of the ethical principles.

CONCLUSION

The continuing development of artificial intelligence tools has undoubtedly potential to impact the spheres of teaching and learning in many ways. The results of the conducted study reveal that AI-powered tools might aid students in the development of their writing and translating competence and necessitate changes in the whole process of teaching academic writing. However, as the study results confirm, they can also impede the process of developing writing skills as they lack creativity, provide simple and quite often repetitive vocabulary, react slowly or make minor grammatical mistakes. Researchers and educators receive the opportunity to adapt to the diverse and ever-changing needs of learners, learning contexts, and new tools and resources.

An interesting perspective to be explored in further studies is to what extent such newly-introduced tools are used once the teacher-led intervention is withdrawn. Such an investigation would enable answering a crucial question of whether students incorporate AI tools into their writing skillset on a permanent basis or use them only when prompted in class. This will be the focus of our further research.

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ARTIFICIAL INTELLIGENCE TOOLS IN ACADEMIC WRITING INSTRUCTION: EXPLORING THE POTENTIAL OF ON-DEMAND AI ASSISTANCE IN THE WRITING PROCESS

Summary

This paper deals with the implementation of artificial intelligence tools in the process of teaching writing for academic purposes. The aims of this scientific study were to verify the practicability of implementation of selected artificial intelligence tools at the C1+/C2 level in university instruction and to gain insight into the attitudes and changes in preferences for use of AI-enhanced writing tools. The analyses were also focused on investigating the extent to which students take advantage of the potential of interaction with artificial intelligence tools in the process of composing academic texts. The research material was collected through a one-group *quasi*-experimental treatment in an undergraduate applied linguistics group of students. The obtained results indicate a significant increase in the use of and familiarity with artificial intelligence and the tools that apply AI algorithms to support

text processing and production. The statements of the respondents prove that AI-assisted tools themselves and the knowledge how to apply them in the academic writing process remain vital and constitute a significantly useful element in the development of writing competence.

Keywords: artificial intelligence tools; Chat-GPT; English for academic purposes; writing instruction

NARZĘDZIA SZTUCZNEJ INTELIGENCJI W NAUCZANIU SPRAWNOŚCI PISANIA NA POZIOMIE AKADEMICKIM. BADANIE POTENCJAŁU WSPOMAGANIA PROCESU PISANIA W JĘZYKU OBCYM

Streszczenie

Pojawienie się i rozpowszechnienie narzędzi sztucznej inteligencji, czego najlepszym przykładem jest narzędzie do interakcji tekstowej Chat-GPT, zapoczątkowało nową erę nauczania i uczenia się. Pierwsza połowa 2023 roku codziennie przynosiła wieści o nowych sukcesach, ulepszeniach lub możliwościach, jakie sztuczna inteligencja wnosi do różnego rodzaju działań twórczych, takich jak pisanie tekstów czy komponowanie poezji. Celem badania było sprawdzenie możliwości zastosowania wybranych narzędzi AI w uniwersyteckim kształceniu językowym na poziomie C1+, aby poznać postawy i preferencje dotyczące korzystania z narzędzi do pisania opartych na sztucznej inteligencji. Przeprowadzone analizy koncentrują się także na tym, w jakim stopniu studenci wykorzystują możliwość interakcji z narzędziami sztucznej inteligencji w procesie pisania tekstów akademickich. Uzyskane wyniki wskazują na znaczny wzrost wykorzystania i znajomości sztucznej inteligencji oraz narzędzi wykorzystujących algorytmy AI do wspomagania przetwarzania i produkcji tekstu, co pokazuje, że same narzędzia obsługujące sztuczną inteligencję oraz wiedza na temat ich zastosowania w procesie pisania akademickiego mogą stanowić istotny czynnik w procesie kształcenia przyszłych tłumaczy.

Słowa kluczowe: narzędzia sztucznej inteligencji; Chat-GPT; język angielski do celów akademickich; nauczanie sprawności pisania