ENHANCING LEARNING OUTCOMES IN WRITTEN PRODUCTION BY IMPLEMENTING WRITING STRATEGIES AND USING AI WRITING TOOLS

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Abstract. *Today's workforce is more interconnected because information technology and the Internet have transformed the workplace. Communicating clearly and effectively has never been more important than it is today. Life-changing critical judgments about writers are made solely on the basis of their writing abilities. Messages travel fast to distant locations, reaching massive audiences with minimal expense and effort. Companies tend to have a diverse workforce, and team members collaborate even when physically apart. In such a hyperconnected world, writing matters more than ever. Digital media require more written communication, and employees' skills are always on display. As a result, employers seek workers with a broader range of skills and higher levels of knowledge in their field. Research indicates that many graduates enter the workforce with insufficient business skills. The University of Economics in Bratislava and Trnava University in Trnava are determined to contribute to an educated workforce prepared for a fast-paced global economy. Research employs both quantitative and qualitative methods. Student assignments were collected via Moodle, then briefly analysed and screened for AI use. Based on the outcomes of communicative language activities done in the courses in English for Specific Purposes and English for Academic Purposes, the paper aims to find out if 79 students made progress, considering their study results. Using a t-test, their pre-test and post-test results show that the differences are statistically significant. Findings have also revealed that while some students rely heavily on AI tools during writing, others do not. In practice, students need to be taught how to use them to avoid resorting to plagiarism. Future research should be focused on investigating what AI tools they use to help them improve their career prospects.*

Keywords: *written production, writing strategy, AI writing tool, AI detector, assignment, Moodle, e-portfolio*

1. INTRODUCTION

Employers take on and promote job candidates who have excellent communication skills. Writing skills can make their careers a success or a failure. Since employees interact more than ever using information technology, all fields require communication skills. New employees must project a professional image and possess soft skills. In the information age, job challenges embrace changing communication technologies, mobile 24/7 offices, flatter management, an emphasis on teams, and global competition. A survey of American corporations has revealed that two-thirds of salaried employees have some writing responsibility. About one-third of them do not meet the writing requirements for their positions. Slovakia still faces a number of complex skills challenges. Moreover, youth skills

are lagging behind the OECD average in reading and science, and declining. In the workplace, skills are not used to their full potential. Research has revealed that graduates should improve their speaking and writing skills, presentation skills, language competence, existing knowledge, and professional skills. Scholars also point to the most absent skills among university students in the labour market, deal with employment prospects for recent graduates, and suggest how to enhance advanced skills to better meet labour market demands.

In Denmark or Finland, the countries we visited within the EU's Erasmus+ programme, universities must offer students at bachelor's and master's level guidance about their current programme, including requirements for master's and PhD programmes (completion guidance) and consequent employment opportunities (career guidance). Higher educational institutions typically have their career centres that offer a vast range of career counselling services, e.g., Business Academy SideWest or Copenhagen Business School's career centre offers seminars, events, career fairs, networking, help with CV and cover letter writing, and job interview and career clarification (OECD, 2020).

This paper presents partial outcomes of the Project KEGA 012EU-4/2023 'ePortfolio as Pedagogy Facilitating Integrative Learning'. It aims to modernise the educational process in both non-philological and philological study programmes at the University of Economics in Bratislava (EUBA) and Trnava University in Trnava (TUT), to develop digital skills, to improve speaking and writing skills, to create and present e-portfolios (Liashuk, 2024; Maierová, 2024; Rusiňáková, 2023, 2024; Shumeiko, 2024; Shumeiko & Osadcha, 2024; Spišiaková & Kittová, 2020; Spišiaková & Shumeiko, 2024; Varela Cano, 2023).

In the courses, undergraduates of both universities did communicative language activities and implemented strategies that also occur in the real world. Having finished academic courses in English for Specific Purposes (ESP) and English for Academic Purposes (EAP), and according to the Common European Framework of Reference for Languages (CEFR, C1 level) (Council of Europe, 2020), they should produce clear, well-structured texts of complex subjects, underlining the relevant salient issues, expanding and supporting points of view at some length with subsidiary points, reasons and relevant examples, and rounding off with an appropriate conclusion. They should also employ the structure and conventions of various genres, varying the style and register according to addressee, text type, and theme (Adamcová, 2014; Jordan, 2009).

2. LITERATURE REVIEW

The importance of writing strategies in the process of writing

Fluency and accuracy in written production in English are decisive factors in job opportunities and give confidence to the user while communicating. To improve the quality of formal production, different types of strategies are employed. This chapter briefly discusses research papers that focus on writing strategies.

According to Torrance et al. (2000), a 'writing strategy' can be defined as 'the sequence in which a writer engages in planning, composing, revising, and other writing-related activities' (p. 182). Based on the stages of writing, Bloom (2008) classifies writing strategies into pre-writing strategies (resourcing, elaboration, and grouping), writing strategies (rereading, substitution, and strategic use of L1), and revising strategies (guided

proofreading, resourcing, and recombining). Strategies involved in these writing stages help writers generate, organise, and fine-tune their writing. Dari et al. (2022) state that the use of writing strategies is one factor that determines learners' writing performance.

Perumal and Ajit (2020) state that although English is taught from a primary level, most college students are not able to write English correctly. It is a big challenge even for a native speaker to be proficient in writing. Writing is considered to be very important. The barriers can cause their students to develop a negative perspective on it. Nowadays, they tend to show very little interest in writing. Therefore, the scholars look at research done on ELT regarding methods, approaches, and strategies to develop writing skills.

Cabrejas-Peñuelas (2012) examines the use of self-reported strategy by American students in their writing tasks. Her research findings show that both proficient and less proficient users use a wide range of strategies. However, experienced writers prefer to use cognitive, metacognitive, and compensation strategies, followed by affective, memory, and social strategies. In her view, writers who get the best grades use more strategies. In addition, female students use more strategies than male students regarding both categories. Dari et al. (2022) also state that better writers appear to have a greater tendency to employ writing strategies and are noted to use writing strategies more often than less proficient writers. However, most learners do not take their use of writing strategies seriously or neglect their role in improving their writing performance.

Writing strategies are believed to play a key role in developing L2 writing. Raoofi et al. (2017) investigated the relationship between writing strategy use and L2 writing proficiency. In their research, undergraduates took a writing proficiency test and completed a writing strategy questionnaire. Research findings showed that the students generally had a relatively high use of ESL writing strategies. They also found that effort regulation and metacognitive strategies were reported as the first and second most commonly used writing strategies, respectively. In contrast, social strategy was reported as the least frequently used category. The results also showed that students with high writing abilities reported a significantly higher level of writing strategy use than those with intermediate or low writing proficiency. It was found that students with a higher writing ability reported using significantly more metacognitive, cognitive, affective, and effort regulation strategies than those with lower writing proficiency.

Developing written communication in ESP and EAP

In EAP, *writing* focuses on key aspects of academic writing, such as topic sentences, paragraph structure, and introductions and conclusions to essays. First, students typically analyze a written model, followed by a series of tasks that help them build up their piece of writing. Then, they move on to different types of essays, such as comparison, argument, and cause and effect, and look at key aspects of organization, style, and the use of language (De Chazal & McCarter, 2012; De Chazal & Moore, 2013).

In ESP, *writing* is practiced, for instance, in the 'Business skills' section, where students can develop their spoken and written communication skills in the key business areas, such as presentations, meetings, negotiations, problem-solving, business correspondence, and report writing. Each unit ends with a case study linked to the unit's business topic. The case studies are based on realistic business problems or situations designed to motivate and actively engage students. They use the language and

communication skills they acquired while working through the unit. Typically, students are involved in discussing business problems and recommending solutions through group work. Each case study ends with a realistic *writing task*. These tasks reflect the real world of business correspondence (Dubicka & O'Keeffe, 2011).

Among the most important genres in written communication are e-mails, formal letters, reports, action points/minutes, summaries, etc. (Seely, 2013). *E-mail* has been used in international business to replace formal letters, memos, and even telephone calls, because it is convenient, inexpensive, and easy to use within a networked system. The writing style can vary as much as for letters, but it is usually much more informal than in other types of written communication. Written messages are still frequently sent around within companies, so 'message-writing' practice, which can be thought of as a message sent on paper or e-mail, still needs to be done by most business English students (Donna, 2000; Bly & Kelly, 2009). Quick email messages about company happenings have become a standard method of communication in offices, but this form of communication is not suitable for all occasions. While *informal e-mails* may have replaced the interoffice memo in some situations, business memos remain in the office.

Formal and semi-formal e-mails follow a similar structure to *formal letters*. Conventions and layout of formal letters vary to some extent. However, the following are widely accepted: (a) block layout with open punctuation (i.e. no commas in addresses), (b) initials must always be included with the surname above the address of the recipient, (c) salutation (when one knows/does not know the name of the recipient), (d) endings (when one knows/does not know the name of the recipient), (e) signing the letter, then printing one's name and positioning under his/her signature, and (f) standard abbreviations (e.g. for regarding, documents enclosed, copies, etc.).

Reports can be anything from a lengthy memo (a single page) to a 40-page, well-organized and formatted analysis of a particular situation. Whatever their length, reports can effect enormous change, so they are extremely important to students. When teaching report-writing, material organization is the most important area to focus on, especially if students are unused to Western content organization. Students must also gear their message to their reader(s) and differentiate between fact and opinion. The consequence of suggesting something, in fact, when it is merely an opinion, could be far-reaching and cause bad feelings if it is found out.

Donna (2000) states that *visit reports* and *meeting minutes* can vary significantly from company to company. The minutes can be an important record of what was discussed at a meeting, so it is important to ensure that each point's summary is as accurate as possible. Action minutes or action points are more useful and concise for most business meetings than full minutes. Action minutes are intended to ensure that the decisions of the meetings are understood and carried out. The action column is important for showing who is supposed to do what by when. At the end, there is information about the next meeting: date, time, and venue.

Writing a *summary* of a single reading text or a summary from multiple sources (e.g., three or more texts) is a common written production activity in EAP and ESP. Whatever type, a summary should include: (a) the most important ideas or facts from a text (or multiple sources), (b) those ideas/facts should be rewritten in a short, concise form, using one's own

language, and (c) the produced text should be shorter than the original text. In some cases, in EAP, while writing a summary from multiple sources, citations of the authors of the texts are required.

The role of emerging educational technologies in the writing process

Artificial intelligence (AI) technologies in education have received much attention (Pokrivčáková, 2019). AI and adaptive learning technologies are prominently featured as important developments in educational technology in the 2018 Horizon Report (Adams Becker et al., 2018). There is growing interest in researching their potential impact on university courses in ESP, EAP, and academic writing. Different AI writing tools can help students write better and faster (Aljuaid, 2024; Boeru, 2024; Durgumahanti, 2025; Hrinak, 2023, 2024; Lee, 2024; Nazari, Shabbir, & Setiawan, 2021; Sucháňová, 2023; Tran, 2024).

For instance, *Canva Magic Write* can help them create a first draft of their content with a prompt, and it can also be used to analyze the tone of their writing and generate a paragraph or section that fits in with their writing style. *Grammarly*'s AI capabilities include generating whole paragraphs and pieces of text. However, it can also be a helpful tool while writing to help students choose the right words, use the correct grammar, and find ways to strengthen their writing. *Paperpal* is an academic writing tool that can help students use language relevant to their field and create peripheral writing, e.g., abstracts or summaries. Also, it can be used as an AI submission checker to look for mistakes in their manuscript before they submit it for publishing. *Wordtune* serves as an AI writing assistant to help them shorten or expand their text, generate alternative sentences, and improve the tone of their writing. *ChatGPT* can be applied to generate writing or research, essays or poetry, brainstorm ideas, and so on. *Gemini* can also be used for writing. Students can access this Google tool within Google Docs, email, and other Google products. It can understand, analyze, generate text, audio, and video, and perform various other tasks. *Microsoft Copilot* can be used as an AI writing tool or research assistant to learn more about topics, explore new ideas, and create an outline for a student's project.

As far as recent research into AI writing tools is concerned, it needs to be said that, for example, students at Oklahoma State University use free AI tools for academic research and writing, such as *Claude*, *ChatGPT*, *Perplexity AI*, *Microsoft Copilot*, *Gemini*, *Writefull,* and others (https://info.library.okstate.edu/AI/tools). All these versions also have more capable paid versions. Durgumahanti (2025) lists the top five AI tools for academic writing, i.e., *PaperPal*, *Writefull*, *Wordvice*, *WriteWise*, and *QuillBot*.

Aljuaid (2024) investigates whether and how AI tools can effectively replace traditional teaching of academic writing and the potential advantages and disadvantages of this change. AI writing tools such as *QuillBot*, *AI Writer,* and *Typeset* offer the possibility to rephrase original phrases or sentences by modifying the sentence structure or substituting words with synonyms. *Wordtune* offers a translation option that assists non-native English speakers in translating several languages into English (Nazari et al., 2021). *ChatGPT*, *Trinka AI,* and *Writesonic* facilitate generating text-based material, making writing more accessible for students and saving time. AI tools such as *Grammarly*, *Jasper,* and *Consensus* not only assist users in improving their writing but may also offer possibilities for academic proficiency when users observe discrepancies between their initial writing and the more proficient revision suggested by the tool.

To support the writing process, Boeru (2024) describes AI tools such as *Grammarly* and *Criterion*, which offer comprehensive feedback on learners' writing, help students identify their spelling, lexical, grammatical, and register mistakes, and support students in correcting those mistakes, which has a positive impact on the learning process. Tran (2024) says that AI tools provide learners with automated assistance, suggestions, and corrections through advanced algorithms and natural language processing. Lee (2024) explores the use of *ChatGPT* as a feedback tool for English cover letter writing among Korean university students in Business English courses. While students were generally satisfied with the feedback process, its impact on developing higher-order cognitive skills, e.g., critical thinking and self-directed learning, was limited. Benefits identified include enhanced language refinement, personalized learning, and increased efficiency. However, challenges such as a lack of originality and potential reliance on AI were noted.

As can be seen, AI tools, including *Grammarly*, *QuillBot*, *ChatGPT*, *WordTune*, *Paperpal*, *Jenni*, *Copi.ai*, *Essay Writer*, etc., can improve students' academic writing and engagement in higher education. However, their impact on the quality indicators of academic papers and written assignments may not be positive, and we agree with the authors that their use can raise concerns about academic integrity (Marzuki et al., 2023; Tran, 2024).

The chapters in the literature review stressed the importance of being aware of writing strategies that should be employed in the writing process, discussed how written communication is developed in EAP and ESP courses, and how written production can be improved by using emerging AI writing tools.

Students' work will be evaluated based on the activities done in the courses. It is supposed that students participating in the KEGA project for two semesters will improve their writing skills. Therefore, the main research objective is to determine the extent to which written production activities affect students' post-test results. First, the study results achieved in the pre-test and the post-test will be compared using a statistical method of *Hypothesis Testing*. Second, students' writings will briefly be analyzed via AI detectors, such as *ZeroGPT*, *QuillBot*, and *Scribbr* to find out if they rely on AI tools in the writing process. Two research hypotheses will be tested.

This research will try to answer the following research questions:

RQ1: To what extent do written production activities affect students' educational results?

RQ2: Do students rely on AI tools in the writing process?

3. METHODS

Research design. Mixed research methods involve both quantitative and qualitative analyses, two 50-point professional tests, i.e., the pre-test and the post-test, the statistical method of *Hypothesis Testing,* as well as AI detectors, such as *ZeroGPT*, *QuillBot*, and *Scribbr* to detect the assistance of AI in written assignments.

Sample. In the winter and summer semesters of 2023/2024, 132 English language learners participated in the project; 69 from TUT and 63 from EUBA. Four lecturers (one from TUT and three from EUBA) created four different groups of students. These students took courses in English for Specific Purposes and English for Academic Purposes. However, it will only be possible to statistically compare and process the results of 79 students since 40 students from TUT did only one course in EAP and were not taught by the same lecturer

in the following summer term. Also, some students from both universities did not finish their first or third year of study, or did not pass the examinations.

Instruments and Procedure. In EAP, third-year students (TUT) used material from course books (Bérešová, 2014; De Chazal & McCarte, 2012; De Chazal & Moore, 2013). During the two semesters, they were supposed to do eight written assignments, such as formal and semi-formal e-mails, action points/minutes, a summary, a CV, a cover letter, a study abroad grant application, and a report. We have chosen Moodle for submitting 217 written assignments due to its benefits. An inspiration for doing these activities was found in ESP and EAP course books (Dubicka & O'Keeffe, 2011; De Chazal & McCarter, 2012). Students did, e.g., Case study 5 – Delaney Call-centre absenteeism (a call centre that wants to find ways to reduce absenteeism and retain staff), where, apart from developing all skills, they mainly focused on writing emails (improving an email by avoiding conflict). In Unit 6 – Ethics, they focused on ethical problem-solving, where they studied how to write action points/minutes. They discussed two situations involving ethical problem-solving at work, listened to an 'agony aunt' giving her opinion on them. In this section, they looked at some tips for successful meetings, listened to a meeting about making staff redundant, then held a meeting themselves and wrote the action minutes following it. In Case Study 10 – The Fashion Screen, they were supposed to use their notes to write a summary. In addition, they were given a writing file, including a set of samples that were helpful in developing their writing.

Data analysis. It was supposed that practising writing, without the use of AI, would help students improve their writing skills. Second, students took two professional 50-point tests – the pre-test and the post-test. Finally, the statistical method of *Hypothesis Testing*, namely a *Paired Samples t-Test*, has been chosen (Kučerová & Fidlerová, 2012) to compare students' results achieved in the tests. Second, written assignments of a subset of students' assignments (TUT) will briefly be analyzed by a lecturer from TUT using AI detectors such as *ZeroGPT*, *QuillBot*, and *Scribbr* to find out whether or not students used AI tools in the writing process. Even though many scholars question the reliability of these tools (e.g., Kumarage et al., 2023; Liu et al., 2024), they can help lecturers identify their use and see the difference, especially when they have experience in testing students' writing skills without using technologies. The following research hypotheses will be tested:

Null hypothesis (H_0): There is not a significant difference between the students' pre-test and post-test results.

Alternative hypothesis (H_1): There is a significant difference between the students' pre-test and post-test results.

Ethical issues. The research was approved by the head of the Department of English Language and Literature of the Faculty of Education (TUT) as well as the head of the Department of English Language of the Faculty of Applied Languages (EUBA). The participants gave informed consent to participate in the study and were informed of the possibility of withdrawing, with no other consequences on their status.

4. RESULTS

The results of seventy-nine students from four different study groups have been analyzed. Four different lecturers, three from EUBA and one from TUT, taught these

students. However, all the students sat for the same pre-test and the same post-test. Table 1 shows the number of students.

Table 1. Number of students

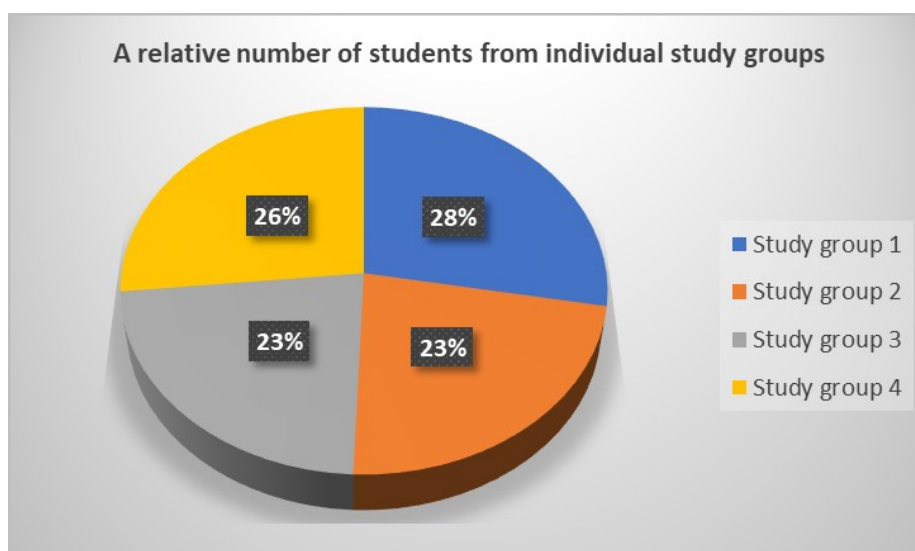| Number of students	Study group 1	Study group 2	Study group 3	Study group 4	Total
	22	18	18	21	79

Figure 1. Number of students from individual study groups

In Figure 1, a relative number of first-year (non-philological study programme) and third-year (philological) students from individual study groups from both universities (EUBA and TUT) shows that the groups were nearly of the same size.

Findings. Table 2 shows statistical characteristics calculated from the achieved results. The table primarily focuses on the average and standard deviation of the number of points achieved by students in individual study groups and all students in the pre-test and the post-test.

Table 2. Statistical characteristics calculated from the achieved results

Results		Study group 1	Study group 2	Study group 3	Study group 4	All students
Pre-test	Average	30.05	34.05	30.47	28.53	30.86
	Standard deviation	6.7637	5.2697	7.2581	5.2849	6.5303
Post-test	Average	30.18	37.95	37.00	31.33	34.06
	Standard deviation	6.1820	5.3137	6.2004	8.0087	7.3076

Comparison of results. Figure 2 shows the graphical representation of the average number of points achieved by students in individual study groups and by all students in the pre-test and the post-test.
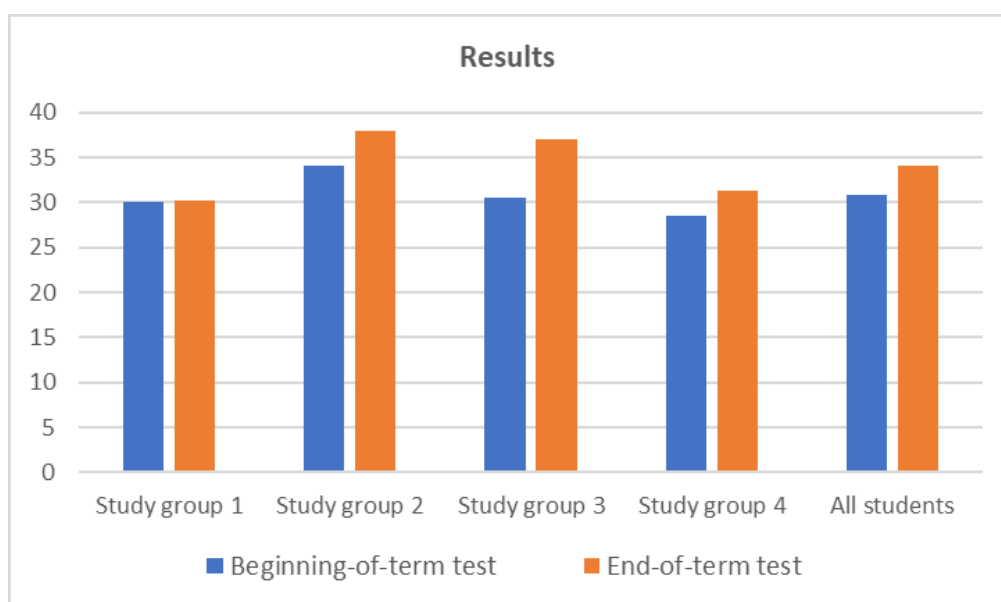

Figure 2. The average number of points achieved by students

First- and third-year students took two 50-point professional tests at the beginning of the first term and the end of the second term.

Testing hypotheses. In order to compare the results achieved in the pre-test and the post-test, a statistical method of *Hypothesis Testing*, namely, *Paired Samples t-Test*, has been chosen (Kučerová & Fidlerová, 2012).

Null hypothesis (H_0): There is not a significant difference between the students' pre-test and post-test results.

Alternative hypothesis (H_1): There is a significant difference between the students' pre-test and post-test results.

The result of a t-test. The test was done at the significance level of 5% ($\alpha = 0.05$). The Null hypothesis (H_0) is rejected, because the probability p = 2.21 E-06, that is, p-value = 0.00000521 (i.e., $p < \alpha$), i.e., the difference can be considered as **statistically significant**.

Even though the students took only two courses in ESP or EAP, their study results have improved. However, there was one group that did not make any progress. Considering the results of all four study groups, it is evident that they made progress as a whole.

In Table 3, students' written assignments that use AI tools can be tested. 12 out of 31 students rely on AI. It was confirmed (100%) by two or three AI detectors such as *ZeroGPT*, *QuillBot*, and *Scribbr*. 14 out of 31 students probably generated text by using AI. However, five students did not use AI tools at all. It was also identified (0%) by two or three AI detectors.

Table 3. Using AI tools in the writing process

Number of students	31	100.00%
The text is generated by AI (100%)	12	38.7%
The text is likely AI-generated and paraphrased	14	45.2%
The text is human-written	5	16.1%

5. DISCUSSION

In recent years, Slovakia has enacted wide-ranging skills policy reforms spanning all levels of education and training and many areas of labor market policy. Our project tries to contribute to improving the quality of university education. At present, according to research, graduates enter the workforce with few business skills. Scholars all around the world investigate how future employees are prepared for the world of work, what skills they need, employers' preferences in choosing job candidates, and employment prospects for future graduates (Barcziová et al., 2024; Chowdary, 2014; Lazíková et al., 2022; Machlica et al., 2017; Mitchell et al., 2010; Mýtna Kureková & Žilinčíková, 2016; Robles, 2012; Spišiaková & Kittová, 2020; Timm, 2005).

Research has shown that students' final results have improved due to using writing strategies in the writing process (Cabrejas-Peñuelas, 2012; Dari et al., 2022; Raoofi et al., 2017) and implementing emerging educational technologies and AI writing tools into the teaching and learning process (Aljuaid, 2024; Boeru, 2024; Durgumahanti, 2025; Lee, 2024; Nazari et al., 2021; Tran, 2024). A 50-point professional test included the following tasks: writing a 100-word summary, writing a 100-word formal e-mail, choosing chunks for summarizing and concluding, expressing numbers, quantities, and degrees, generalizing and specifying, linking points and arguments, and five open-ended questions. To test the significance of the difference between the students' educational results, a method of *Hypothesis Testing*, a *t-Test*, was used. The Null hypothesis (H_0), 'There is not a significant difference between the students' results achieved in the pre-test and the post-test,' was rejected. The Alternative hypothesis (H_1), 'There is a significant difference between the students' results achieved in the pre-test and the post-test,' was confirmed. Research question RQ1 'To what extent did written production activities affect students' educational results?' can be answered by 'Written production activities affected students' educational results to a significant extent.'

Altogether, 217 assignments were submitted to Moodle at TUT. In our view, using Moodle benefits both lecturers and their students. They are given materials to study independently anywhere and anytime, as well as immediate feedback on their written assignments. Students also created e-portfolios of assignments in Moodle or other platforms, such as Mahara, Google Sites, etc. (Kremenova et al., 2018). We agree with Syzdykova et al. (2021) and Song (2021) that e-portfolios support integrative learning, provide an easier and more comprehensive way to assess students' learning, and have the potential to transform their ability to combine and apply their knowledge.

Regarding research question RQ2 'Do students rely on AI tools in the writing process?' the answer is 'Yes, they do.' AI detectors, such as *ZeroGPT*, *QuillBot*, and *Scribbr*

confirmed twice or three times (100%) that 12 out of 31 students (38.7%) relied heavily on AI. Then, it was found out that 14 out of 31 students (45.2%) created texts via AI tools and subsequently paraphrased them. Finally, only 5 out of 31 students (16.1%) did not use AI tools. Here, we can state that students who showed speaking skills at the advanced level of proficiency during the two semesters did not need any AI tools to help them with writing. On the other hand, some students made spelling, grammatical, lexical, and stylistic mistakes in their written tasks. Moreover, they did not use any spell checkers or, at least, *Grammarly* or *QuillBot*, to see their mistakes or errors. We also agree with Lee (2024) that while *ChatGPT* or other tools can provide valuable feedback in the writing process, careful implementation is necessary to maximize educational benefits and promote autonomous learning.

Based on the research findings of this study, implications for practice can be recommended. Even though one group of students made no progress, from the feedback, it appears that most of them liked these creative activities. To increase their writing ability, they should not rely heavily on AI tools. Firstly, students should be familiar with different types of writing strategies and encouraged to develop a repertoire of these strategies. Secondly, lecturers should help students self-evaluate their writing tasks to become aware of their shortcomings and problems, and consequently think about using appropriate writing strategies. Thirdly, AI tools help students and educators, and lecturers should include them in language curricula (Adamcová & Rush, 2023; Shumeiko & Osadcha, 2024) to empower them with the necessary skills and competences for the future. Finally, the students should follow the guidelines relating to the use of AI tools in order not to misuse them and avoid resorting to plagiarism.

The findings provide insights for educators implementing AI tools into the curricula while maintaining teaching quality and academic integrity standards. Future research should address these challenges and investigate the long-term effects of AI-assisted feedback on students' writing development.

Even though this study includes methodological limitations, i.e., a small sample size and using AI writing tools honestly or dishonestly, it can be stated that it brings valuable findings that can be used in future research.

6. CONCLUSIONS

The assessment of the students' achievements in an academic environment relies mainly on their ability to convey their knowledge and ideas. It helps them do assignments, enhance their critical thinking capabilities, and develop cognitive performance. The ability to write in English is fundamental for university students to function successfully in the academic sphere. There is no doubt that writing strategies and AI writing tools play a key role in developing writing in English.

The paper explored the use of main writing strategies and some tools in improving students' written communication skills in the context of ESP and EAP. It investigated the impact of written production activities and AI-assisted tools on student performance. During the two semesters of 2023/2024, the students from two universities studied how to write some of the most important genres in British and American English. They used Moodle to create e-portfolios for these activities in Mahara and Google Sites.

Proficient writers appeared to have a greater tendency to employ writing strategies. Based on the results of the pre-test and the post-test, it can be said that Slovak learners transferred some writing strategies from their mother tongue to their writing in a foreign language, or from the first foreign language to the second, both positively and negatively. On the other hand, less proficient writers relied heavily on emerging educational technologies. In writing, they can be used, and students should take advantage of using them, but not misuse them.

Research has shown that the Alternative hypothesis (H_1) 'There is a significant difference between the students' results achieved in the pre-test and the post-test.' was confirmed. Considering research questions RQ1 and RQ2, 'To what extent written production activities affected students' educational results?' and 'Do students rely on AI tools in the writing process?', it can be said that written production activities affected students' educational results to a significant extent. It was confirmed twice or three times (100%) by AI detectors *ZeroGPT*, *QuillBot*, and *Scribbr* that 38.7% of students relied heavily on AI, 45.2% of students created assignments via AI tools, and subsequently paraphrased them. Only 16.1% did not use AI tools at all.

As far as further research is concerned, we plan to investigate AI-assisted tools in more detail, first of all, to create our guidelines for using them, and secondly, to improve students' performance in written and spoken production, interaction, and mediation.

To conclude, we hope our findings will be helpful for the lecturers who teach ESP or EAP, students who want to become proficient writers, and lecturers who teach other foreign languages for professional purposes.

REFERENCES

Adamcová, S. (2014). Text ako jazyková a štylistická jednotka reči. In *Cudzie jazyky v premenách času IV* (*pp.* 26-28). Bratislava, Slovensko: Ekonomická univerzita v Bratislave. https://faj.euba.sk/www_write/files/veda-vyskum/konferencie/zborniky/cudzie-jazyky-v-premenach-casu-IV-zbornik.pdf

Adamcová, S., & Rusch, M. (2023). Integrating Artificial Intelligence in Language Curricula: Empowering Students for Future Competencies. In T. Tinnefeld (Ed.), *Journal of Linguistics and Language Teaching*, *14*(2), 187-203. https://doi.org/10.5281/zenodo.14840722

Adams Becker, S., Brown, M., Dahlstrom, E., Davis, A., DePaul, K., Diaz, V., & Pomerantz, J. (2018). NMC Horizon Report: 2018 Higher Education Edition. EDUCAUSE. https://library.educause.edu/~/media/files/library/2018/8/2018horizonreport.pdf

Aljuaid, H. (2024). The Impact of Artificial Intelligence Tools on Academic Writing Instruction in Higher Education: A Systematic Review. *Arab World English Journal* (*AWEJ) Special Issue on ChatGPT*, 26-55. https://dx.doi.org/10.24093/awej/ChatGPT.2

Barcziová, A., Bálintová, M., & Machová, R. (2024). The Employment Prospects for Recent Graduates in Slovakia and Hungary. *Conference proceedings/Full papers of RSEP International Multidisciplinary Conference* (pp. 1-10). Dubai, United Arab Emirates. https://doi.org/10.19275/RSEPCONFERENCE286

Bérešová, J. (2014). *English for Academic Purposes*. Trnava, Slovakia: Trnava University in Trnava. https://pdfweb.truni.sk/e-ucebnice/eap/

Bloom, M. (2008). Second Language Composition in Independent Settings: Supporting the Writing Process with Cognitive Strategies. In S. Hurd & T. Lewis (Eds.), *Language Learning*

Strategies in Independent Settings (pp. 103-118). Bristol, England: Multilingual Matters. https://doi.org/10.21832/9781847690999-008

Bly, R. W., & Kelly, R. A. (2009). *The Encyclopedia of Business Letters, Faxes, and E-mail* (Revised ed.). Franklin Lakes, New Jersey: Career Press.

Boeru, M. (2024). Exploring the use of AI Tools in Teaching English for Specific Purposes (ESP). *Scientific Bulletin of Naval Academy*, *XXVII*(1), 91-96. https://doi.org/10.21279/1454-864X-24-I1-013

Cabrejas-Peñuelas, A. B. (2012). The writing strategies of American university students: Focusing on memory, compensation, social, and affective strategies. *Estudios de lingüística inglesa aplicada*, *12*, 77-113. Retrieved 15 November 2024 from https://revistas.uned.es/index.php/ELIA/article/view/18028/15200

Chowdary, D. V. (2014). The importance of training engineering students in soft skills. *International Monthly Refereed Journal of Research In Management & Technology*, 3. Retrieved 11 November 2024 from https://www.researchgate.net/publication/293313936_THE_IMPORTANCE_OF_TRAINING_ENGINEERING_STUDENTS_IN_SOFT-SKILLS

Council of Europe. (2020). *Common European Framework of Reference for Languages: Learning, teaching, assessment – Companion volume*. Council of Europe, Strasbourg. Retrieved 10 November 2024 from www.coe.int/lang-cefr

Dari, R. W., Rahmawati, E., & Akhiriyah, S. (2022). An Analysis of Writing Strategies Used by Students of English Language Department. *Journal of Languages and Language Teaching*, *10*(3), 414-423. https://doi.org/10.33394/jollt.v10i3.5413

De Chazal, E., & McCarter, S. (2012). *Oxford EAP: A course in English for Academic Purposes. Upper-Intermediate / B2*. Oxford, England: Oxford University Press.

De Chazal, E., & Moore, J. (2013). *Oxford EAP: A course in English for Academic Purposes Advanced / C1*. Oxford, England: Oxford University Press.

Donna, S. (2000). *Teach Business English*. Cambridge, England: Cambridge University Press.

Dubicka, I., & O'Keeffe, M. (2011). *Market Leader Business English Course Book. Advanced* (3rd ed.). Harlow, England: Pearson Education Limited.

Durgumahanti, S. (2025, January 21). Top 5 AI Tools for Academic & Research Writing. https://paperpal.com/blog/news-updates/top-5-ai-tools-for-academic-writing

Hrinak, J. (2023). The Analysis of English Language and Literature Teacher Trainees' Outputs in Academic Writing Course at the Tertiary Level of Education. *EDULEARN23 Proceedings of 15th International Conference on Education and New Learning Technologies* (pp. 4842-4846). *Palma, Spain*. https://doi.org/10.21125/edulearn.2023.1284

Hrinak, J. (2024). Artificial Intelligence and Academic Writing. *ICERI2024 Proceedings of 17th annual International Conference of Education, Research and Innovation* (pp. 2871-2876). Seville, Spain. https://doi.org/10.21125/iceri.2024.0747

Jordan, R. R. (2009). *English for Academic Purposes*. Cambridge, England: Cambridge University Press.

Kremenova, I., Fabus, J., Fabusova, V., & Tothova, D. (2018). A Proposal of Possibilities of e-Portfolio Utilization for Students of the e-Commerce and Management Study Program. *EDULEARN18 Proceedings of 10th International Conference on Education and New Learning Technologies* (pp. 4168-4172), Palma, Spain: IATED. https://doi.org/10.21125/edulearn.2018.1056

Kučerová, M., & Fidlerová, H. (2012). *Štatistické metódy*. Trnava, Slovakia: AlumniPress MTF STU.

Kumarage, T., Sheth, P., Moraffah, R., Garland, J., & Liu, H. (2023). How Reliable Are AI-Generated-Text Detectors? An Assessment Framework Using Evasive Soft Prompts. In H. Bouamor, J. Pino, & Bali, K. (Eds.), *Findings of the Association for Computational Linguistics: EMNLP*

Hrdličková, Z. (2025). Enhancing learning outcomes in written production by implementing writing strategies and using AI writing tools. *Advanced Education*, 26. DOI: 10.20535/2410-8286.331366

2023 (pp. 1337-1394), Singapore. Association for Computational Linguistics. https://doi.org/10.18653/v1/2023.findings-emnlp.94

Lazíková, J., Takáč, I., Rumanovská, Ľ., Michalička, T. & Palko, M. (2022). Which Skills Are the Most Absent among University Graduates in the Labour Market? Evidence from Slovakia. *Social Sciences*, *11*(10), 438. https://doi.org/10.3390/socsci11100438

Lee, G. (2024). AI-Based Writing Feedback in ESP: Leveraging ChatGPT for Writing Cover Letters Among Korean University Students. In Y. Wang & M. S. Cárdenas Carlos (Eds.), *Proceedings of the XXIInd International CALL Research Conference* (pp. 131-136). https://doi.org/10.29140/9780648184485-20

Liashuk, X. (2024). The use of Artificial Intelligence for developing business writing skills in English for Specific Purposes (ESP). In H. Vančová (Ed.), *Language, Literature, and Culture in Education 2024: Conference Papers* (pp. 37-57). Nitra, Slovakia: SlovakEdu.

Liu, J. Q. J., Hui, K. T. K., Al Zoubi, F. *et al.* (2024). The great detectives: humans versus AI detectors in catching large language model-generated medical writing. *International Journal for Educational Integrity 20*, 8. https://doi.org/10.1007/s40979-024-00155-6

Machlica, G., Toman, J., Haluš, M., & Martinák, D. (2017). Enhancing advanced skills to better meet labour market demand in the Slovak Republic. *OECD Economics Department Working Papers*, No. 1416. OECD Publishing, Paris. http://dx.doi.org/10.1787/72c55c64-en

Maierová, Eva. (2024). Developing Writing Skills in Business English. *Mehrsprachigkeit – Begegnung von Sprachen und Kulturen*, 73-83. Hamburg, Germany: Verlag Dr. Kovač.

Marzuki, Widiati, U., Rusdin, D., Darwin, W., & Indrawati, I. (2023). The impact of AI writing tools on the content and organization of students' writing: EFL teachers' perspective. *Cogent Education*, *10*: 2236469. https://doi.org/10.1080/2331186X.2023.2236469

Mitchell, G. W., Skinner, L. B., & White, B. J. (2010). Essential soft skills for success in the twenty-first century workforce as perceived by business educators. *Delta Pi Epsilon Journal*, *52*(1), 43-53. https://eric.ed.gov/?id=EJ887222

Mýtna Kureková, L., & Žilinčíková, Z. (2016). Are student jobs flexible jobs? Using online data to study employers´ preferences in Slovakia. *IZA Journal of European Labor Studies*, *5*:20. https://doi.org/10.1186/s40174-016-0070-5

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of artificial intelligence powered digital writing assistant in higher education: randomized controlled trial. *Heliyon*, *7*(5), e07014. https://doi.org/10.1016/j.heliyon.2021.e07014

OECD (2020). *OECD Skills Strategy Slovak Republic: Assessment and Recommendations,* OECD Skills Studies, OECD Publishing, Paris. https://doi.org/10.1787/bb688e68-en

Perumal, K., & Ajit, I. (2020). Enhancing Writing Skills: A Review. *Psychology and Education* (2020), *57*(9), 2229-2236. https://doi.org/10.17762/pae.v57i9.592

Pokrivčáková, S. (2019). Preparing teachers for the application of AI-powered technologies in foreign language education. *Journal of Language and Cultural Education*, *7*(3), 135-153. https://doi.org/10.2478/jolace-2019-0025

Raoofi, S., Binandeh, M., & Rahmani, S. (2017). An Investigation into Writing Strategies and Writing Proficiency of University Students. *Journal of Language Teaching and Research*, *8*(1), 191-198. https://dx.doi.org/10.17507/jltr.0801.24

Robles, M. M. (2012). Executive Perceptions of the Top 10 Soft Skills Needed in Today's Workplace. *Business and Professional Communication Quarterly*, *75*(4), 453-465. https://doi.org/10.1177/1080569912460400

Rusiňáková, J. (2023). Academic e-portfolio. *Lingua et vita*, *XII*(2), 39-45. Retrieved 20 October 2025 from https://linguaetvita.sk/en/archive/lingua-et-vita-24-2024

Rusiňáková, J. (2024). Akademické e-portfólio, rozvoj písomných zručností a proces hodnotenia. *Inovatívne metódy vo výučbe cudzích jazykov z aspektu interkultúrnej komunikácie I.*, 186-200. Prešov, Slovakia: Prešovská univerzita v Prešove.

Seely, J. (2013). *Oxford Guide to Effective Writing and Speaking: How to Communicate Clearly* (3rd ed.). Oxford, England: Oxford University Press.

Shumeiko, N. (2024). The Use of Learning Management Systems in the Educational Process: The Expediency and Benefits. *Educological Discourse*, *45*(2). https://doi.org/10.28925/2312-5829.2024.2.5

Shumeiko, N., & Osadcha, K. P. (2024). Application of artificial intelligence in higher education institutions for developing soft skills of future specialists in the sphere of information technology. *Journal of Physics: Conference Series, 2871, 012027*. https://doi.org/10.1088/1742-6596/2871/1/012027

Song, B. K. (2021). E-portfolio implementation: Examining learners' perception of usefulness, self-directed learning process and value of learning. *Australasian Journal of Educational Technology*, *37*(1), 68-81. https://doi.org/10.14742/ajet.6126

Spišiaková, M., & Kittová, Z. (2020). Labour Market Requirements for Foreign Language Education with a Focus on Spanish. *Advanced Education*, *7*(14), 29-37. https://doi.org/10.20535/2410.196817

Spišiaková, M., & Shumeiko, N. (2024). E-learning resources implementation in teaching business English and testing English speaking skills at the university level. *Folia linguistica et litteraria*, *XIV*(48), 289-304. https://doi.org/10.31902/fll.48.2024.14

Sucháňová, Z. (2023). AI Tools for Pre-Service EFL Teachers: Exploring Applications and Implications. In M. Demirbilek, M.S. Ozturk, & M. Unal (Eds.), *Proceedings of ICSES 2023 – International Conference on Studies in Education and Social Sciences* (pp. 638-654), Antalya, Turkiye. ITES Organization. https://files.eric.ed.gov/fulltext/ED652352.pdf

Syzdykova, Z., Koblandin, K., Mikhalyova, N., & Akinina, O. (2021). Assessment of E-portfolio in Higher Education. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(02), 120-134. https://doi.org/10.3991/ijet.v16i02.18819

Timm, J. A. (2005). Preparing students for the next employment revolution. *Business Education Forum*, 60(2), 55-59.

Torrance, M. G., Thomas, V., & Robinson, E. J. (2000). Individual differences in undergraduate essay-writing strategies: A longitudinal study. *Higher Education*, *39*, 181-200. https://doi.org/10.1023/A:1003990432398

Tran, T. T. H. (2024). AI Tools in Teaching and Learning English Academic Writing Skills. *Proceedings of the 20th AsiaCALL International Conference* (AsiaCALL 2023), *4* (pp. 170-187), Da Nang City, Vietnam. https://doi.org/10.54855/paic.23413

Varela Cano, D. P. (2023). Učenie sa/osvojovanie si druhých jazykov. *Teória a prax ekonomického vzdelávania 2023*, 23-30. Bratislava, Slovensko: Vydavateľstvo EKONÓM.

ПІДВИЩЕННЯ ЕФЕКТИВНОСТІ НАВЧАННЯ ПИСЬМА ЗА ДОПОМОГОЮ СТРАТЕГІЙ ТА ІНСТРУМЕНТІВ ШТУЧНОГО ІНТЕЛЕКТУ

Анотація. Сучасний робочий процес став більш комунікативним завдяки інформаційним технологіям та Інтернету, які змінили професійний світ. Повідомлення швидко доходять до віддалених місць, а компанії часто мають дуже різноманітну робочу силу, де співробітники взаємодіють, перебуваючи на відстані. У такому гіперзв'язаному світі письмо має більше значення, ніж будь-коли. Цифрові медіа вимагають більше письмової комунікації, що передбачає розвиток навичок письма. Як наслідок, роботодавці шукають працівників із ширшим спектром навичок та вищим рівнем знань у своїй галузі. Згідно з дослідженням, випускники вищих навчальних закладів виходять на ринок праці з недостатньою сформованістю бізнес-навичок. Університет економіки в Братиславі та Трнавський університет у Трнаві прагнуть зробити свій внесок у підготовку освічених фахівців, здатних адаптуватися до швидких темпів розвитку глобальної економіки. У дослідженнях використовуються як кількісні, так і якісні методи. Було проаналізовано та перевірено на наявність ознак ШІ письмові роботи студентів, виконані на платформ Moodle. Також було досліджено результати виконання студентами комунікативних завдань, впроваджених під час вивчення курсів «Англійська для спеціальних цілей» та «Англійська для академічних цілей», та визначено, чи досягли 79 студентів прогресу, враховуючи їхні навчальні результати. Використовуючи t-тест, аналіз результатів тестів до і після навчання показав, що різниця є статистично значущою. Дослідження також виявило, що деякі студенти значною мірою покладаються на інструменти штучного інтелекту під час виконання письмових завдань, в той час як інші цього не роблять. На практиці студентів потрібно навчити, як правильно використовувати ці інструменти, щоб уникнути порушення етичних норм. Майбутні дослідження можуть фокусуватись на вивченні інструментів штучного інтелекту, які можуть використовуватись студентами для кар'єрного зростання.

Ключові слова: письмо, стратегія написання, жанр, завдання, Moodle, е-портфоліо.