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Artificial Intelligence Application and Development of Critical Thinking in the English Language Teaching

This paper deals with peculiarities and impact of Artificial Intelligence (AI) usage in English language teaching and learning, mainly in higher education, and explores its potential for evolving one of soft skills – critical thinking – simultaneously. The brief summary of various approaches adopted to the definitions of AI and soft skills is provided here. As a result, in this study soft skills are regarded as nonspecialized personal qualities that contribute to the success in various professions. Thus, top soft skills required for the professional success of the university graduate are enumerated here, with the emphasis put on critical thinking. Due to the versatile application of these skills the relevance of their development in the contemporary world is unquestioned, and it is pointed out that AI does not only impede, but also can contribute to this process by implementing several helpful strategies enumerated and outlined in this study. This practice can be implemented both in teacher-facing and learner-facing AI instruments through creating specific topical materials, generating precise prompts and inputs and the choice of the most fitting AI-powered model by taking into consideration such criteria as task complexity, accuracy requirements, desired format of the output.

Key words: Artificial Intelligence, Generative AI, foreign language teaching, English language teaching, soft skills, critical thinking.

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Information technologies, and Artificial Intelligence (AI) in particular, have penetrated into and fundamentally altered many spheres of our lives, and education is no exception. With the emergence of more advanced AI-driven tools, such as ChatGPT etc., and due to their wide public availability and accessibility over the recent several years this trend has increased. As a result, now a lot of advantages of their application in education have already been pointed out by many scholars all over the world. «These benefits include the use of AI in higher education to adapt instruc-

tion to the needs of different types of learners (Verdú et al., 2017), in providing customized prompt feedback (Dever et al., 2020), in developing assessments (Baykasoğlu et al., 2018), and predict academic success (Çağataylı & Çelebi, 2022)» [3, p. 2].

The present paper aims to explore the potential of AI not so much in improving the learning process and results of acquiring the English language as mainly in fostering the development of soft skills at the same time since, according to the research literature review, not much research examining the intersection of these fields of study has been conducted so far.

Materials and Methods

With reference to the definitions of the key concepts of the present research, Artificial Intelligence (AI) is considered to be «the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self correction» [9, p. 10]. So, this term refers to technology or software that helps machines perform tasks almost as well or even better than humans, including such aspects as problem solving or decision making.

Among various classifications of AI types the following one suggested by Toby Baker and Laurie Smith [1, p. 11–14] seems to be the most relevant one in context of our research. These scholars have subdivided AI tools into 3 main categories taking into account their functionality and by whom they are used for educational purposes:

1. Learner-facing AI tools that are used by students to get new information or to improve their understanding in a particular subject or topic due to such abilities of these systems as dividing materials into stages by analyzing students' strengths, weaknesses and gaps, providing feedback etc.

2. Teacher-facing systems with their primarily aim to decrease teachers' workload through automating such processes as grading students' works, giving feedback, identifying plagiarism etc. as well as to get insights about their students and their progress and to experiment with new techniques in their teaching in order to facilitate the process and enhance the results.

3. System-facing AI tools are helpful for managing and administrative purposes, such as sharing data between educational institutions or «calculating students' future performance» [10, p. 168].

Another common division of AI types, which is also reflected in this paper, is the distinction between algorithmic AI, where recommendations are given, tasks are performed and predictions are made based on their programs, or algorithms (e. g. in some works AI is even viewed as «algorithmic mimicry»[1]), and generative AI, which is capable of generating, or creating new content, such as a text, image, audio etc[2]. In this study we are going to focus on generative AI models.

Results

As far as the second key notion is concerned, soft skills are often opposed to hard skills, which are normally defined as specific educational and job-related abilities and knowledge. It is the hard skills that used to form the core of school, college or university curriculum [12, pp. 456–457]. However, at the beginning of the 21st century, apart from subject knowledge the focus of attention there was shifted to the development of soft skills as well, which are «character traits, attitudes, and behaviors – rather than technical aptitude or knowledge…; they are intangible, nontechnical and personality-specific» [12, p. 457]. Owing to this fact, in order to reflect the demands of modern society a competency-based learning model lies now at the core of the contemporary higher education content, where soft skills, which were found out to be mainly responsible for higher employability and better career prospects[3] [13], are given paramount importance.

«The greatest feature of soft skills is that the application of these skills is not limited to one's profession» [12, p. 457]. However, what skills in particular should be included in this umbrella term «soft skills» tends to be quiet a debatable issue.

[1] Jaeger, J. (2024) Artificial intelligence is algorithmic mimicry: why artificial "agents" are not (and won't be) proper agents. Neurons, Behavior Data Analysis and Theory. P. 3. Available at: https://www.researchgate.net/publication/378519469_Artificial_intelligence_is_algorithmic_mimicry_why_artificial_agents_are_not_and_won't_be_proper_agents (accessed 30 September 2024).
[2] Dasgupta, D., Venugopal, D., Gupta, K. D. (2023) A Review of Generative AI from Historical Perspectives. TechRxiv. Pp. 1–12. Available at: https://www.researchgate.net/publication/368543465 _A_Review_of_Generative_AI_from_Historical _Perspectives (accessed 30 September 2024).
[3] OECD. Skills for Social Progress: The Power of Social and Emotional Skills. – OECD Skills Studies. OECD Publishing, 2015. Available at: http://dx.doi.org/10.1787/9789264226159-en (accessed 29 December 2024).

According to the definition given by Cambridge dictionary, soft skills are «people's abilities to communicate with each other and work well together»[1]. However, other attempts to define soft skills that have been made by many researchers as a rule apply a broader understanding of this notion. For instance, James and James identify soft skills as a new way to describe a set of abilities or talents that an individual can bring to the workplace, including career attributes such as team skills, communication skills, leadership skills, customer service skills and problem-solving skills [6, p. 40]. Soft skills are also often referred to as «applied» skills or «21st-century skills» [5, p. 25]. The latter notion was applied in the studies done by the Partnership for 21st Century Learning, a non-profit organization comprising representatives of business, the academic community and educational policy. It proposed a model where the central position of all 21st-century skills is occupied by so-called 4 C's that encompass creative thinking, collaborating, communicating and critical thinking[2].

In the present paper soft skills are treated with reference to the aforementioned classification, where a critical thinking skill is given the principal attention of all of them.

According to Cambridge Life Competencies Framework, critical thinking includes such abilities as «understanding and analysing links between ideas, evaluating texts, ideas, arguments and options, synthesizing ideas and information, solving problems and making decisions, identifying and priotitising problems to be addressed, asking effective questions»[3].

This study investigates the application of Artificial Intelligence and its impact on developing critical thinking skills within the context of English language teaching and learning. To achieve this objective, a mixed-methods approach was employed, incorporating the following:

1. Analysis of information and research resources: A comprehensive review of relevant literature was conducted to explore the existing research and theoretical frameworks related to the definitions of key notions of this investigation, the role of AI in education,

[1] Cambridge Dictionary. Available at: https://dictionary.cambridge.org/dictionary/english/soft-skills (accessed 24 December 2024).
[2] Framework for 21st Century Learning. The Partnership for 21st Century Learning. 2015. Available at: http://www.battelleforkids.org/networks/p21/frameworks-resources (accessed 30 December 2024).
[3] The Cambridge Framework for Life Competencies. Available at: https://www.cambridge.org/elt/blog/wp-content/uploads/2018/04/Life-Competencies-Digital-final.pdf (accessed 29 December 2024).

critical thinking development and English language teaching. It involved examining scholarly articles, books, reports, and online resources to identify key concepts and current trends. The literature review served to establish a theoretical foundation for the study and inform the selection of appropriate research methods.

2. Generalization and systematization of professional and pedagogical experience: Practical insights from seasoned English language educators and AI specialists were gathered and analyzed, including personal teaching experience. This method contributes to better understanding of challenges and opportunities associated with integrating AI into English language teaching, particularly in relation to critical thinking development. The aim was to gather real-world perspectives on the effectiveness of various AI-powered tools and approaches, as well as to identify potential areas for improvement. The collected data was systematically analyzed to identify recurring themes, patterns, and best practices.

3. Reflection of the content of the generated knowledge: A reflective analysis was conducted to synthesize the findings from the literature review and the practical experiences of educators and AI specialists. This involved critically evaluating the collected data to identify key insights, draw meaningful conclusions and develop practical recommendations for integrating AI into English language teaching to promote critical thinking. The reflective analysis considered the potential benefits and limitations of AI in education and the need for ongoing research and development in this rapidly evolving field. The aim was to provide a comprehensive understanding of the complex interplay between AI, critical thinking and English language teaching.

Referring to the above-mentioned classification of AI types, generative AI tools can be used both by teachers to generate tasks and materials and learners to do these tasks.

Firstly, let's give an overview of how teachers can apply these instruments effectively in their job to promote critical thinking skills in their students and in themselves as well.

First and foremost, AI resources can be used as studying material generating tools in order to diversify the studying process and to make educational materials more topical or personal as well. To illustrate this point, a teacher can ask an AI instrument to generate a fake news story even accompanied by an image

and then offer their students a few other real but rather odd news stories and ask them to find a fake news article or publication by providing good reasons for their choice.

AI-driven systems are also invaluable teacher's assistants in designing tasks based on authentic materials. The authentic materials themselves play quite a beneficial role for students in their foreign language learning experience, which was pointed out by a number of scholars, for example, by exposing them to the real life and cultural context and thus contributing to boosting their confidence while dealing with this real knowledge, increasing their motivation, enhancing different language skill, such as reading, listening etc. [4, p. 2]. Notwithstanding these advantages, to make authentic materials relevant for accomplishing all these goals they should be accompanied by suitable assignments, and it is this area where AI-powered resources can facilitate and make this process of creating tasks less time-consuming. Nevertheless, these tools are not completely flawless in this regard, and a teacher often has to make some corrections in the suggested tasks and activities in order to make sure that they directly correspond to their students' level of English proficiency or the initial aim. Online platform Twee serves as an example of such an AI-based tool specially designed for language teaching needs. It supports several types of the most widespread kinds of tasks like True-false statements, multiple choice etc. based both on a written text and video materials. Still, in many cases the tasks options suggested by Twee are less challenging for students' level of the English language than they should be, so it is a teacher who has to assess the results of an AI-powered instrument and modify them a bit, but who still may appeal to them as starting points for coming up with tasks ideas [7, p. 844]. To illustrate this point, among the tasks generated by Twee for the video devoted to examples of advanced AI robots for the target audience of students with B2-C1 level of English was a multiple choice question related to one example of such robots «Which of the following is NOT mentioned as a key capability of the robot Digit?» with the suggested options «a) Navigating complex environments; b) Assisting with disaster response; c) Recognizing human emotions; d) Delivering packages to front doors». However, based on the information mentioned in the vid-

eo («Digit is envisioned to help take care of people in their homes, assist with disaster response and deliver packages to front doors. With its nimble limbs and a torso packed with sensors, Digit can navigate complex environments») and taken into account the target student audience these options and the correct answer seem to be too straightforward. Nevertheless, the idea of this question was adopted into the test, but with the answer options being transformed and paraphrased in the following way: «a) look after humans (this option corresponds to the passage «to help take care of people in their homes»); b) come to people's aid in case of some accidents (it correlates with «assist with disaster response»); c) work as a courier (it corresponds to «deliver packages to front doors»); d) walk extremely fast due to its nimble limbs; e) find its way on its own due to inbuilt sensors (it matches the statement that «with its nimble limbs and a torso packed with sensors, Digit can navigate complex environments»). These modifications have made this question more demanding to deal with as well as relevant and adequate for students' level of English.

Furthermore, AI-based tools can assist in evaluation of students' works (e. g. by compiling a list of criteria and conducting assessment with reference to it) and their language proficiency (e. g. by finding grammar or lexical errors). However, on the other hand, manual marking for some (especially creative) tasks cannot be neglected in order to make this AI-generated feedback more relevant and tailored to the learners' needs. For example, the students' projects on the topic «My fantasy idea of invention of the future» can be marked and evaluated with the help of AI based on such criteria as following the given plan, grammatical accuracy or relevant technical vocabulary usage. However, the assessment of fantastic perspective and originality of such projects usually remains to be beyond the scope of AI-powered instruments' current capabilities.

As far as learner-facing AI tools are concerned, to start with, the answers provided by such techniques often require proofreading and fact checking because, as many scholars admit, generative AI instruments can sometimes produce plausible but incorrect information [8, p. 2741].

Moreover, very often generative AI-powered systems «lack contextual understanding» [11, p. 500], so sometimes they do

not differentiate the meaning of synonyms or near-synonyms or do not take into account the suitability of the suggested option based on the register, intentional stylistic purposes etc. As a consequence, it should be stressed that the suggested improvements or automated generated answers should be critically assessed, and these choices whether to accept the suggested refinements or not have to be made by learners themselves.

Additionally, as some researchers claim, «it is important to consider the specific purpose for which the model has been trained…The choice of model should be guided by specific use case requirements, considering the model's features, capabilities, the complexity of data parameters, and the training method employed» [11, p. 501]. A good illustration of this is that some AI-based text generating models are proficient at maintaining a dialogue with their users, such as ChatGPT, and some are not (like Perplexity), So, the former can be used as a good tool for simulating a real dialogue and providing conversation-like language practice for foreign language learners or correcting some parts of the input or output very quickly if necessary, whereas the latter can be good at creating a longer, maybe more scientific or academic piece of writing. Thus, the correct choice of the most suitable AI tool for a particular task also requires some critical considerations. Moreover, this step is vital because the success and accuracy of the final results and output as well as how good they are at meeting all other important criteria for a user in many cases depend on this decision.

Another important point to consider refers to writing suitable, correct and comprehensive prompts by users since it directly correlates with final effective AI outputs and obtained results: «The process of prompting and using GenAI systems requires careful consideration to ensure the provided information is correct, free of bias and not providing inaccurate information» [11, p. 501]. For instance, if a student looks for a very specific and concrete output, as an input the RISE prompt generating model (where the Role (who are you?) is described, Input (what do you need to do?) is provided, Steps needed to complete this task are enumerated and described, and Expectations (what are the results and final form of presentation?) are given) can be used. Nevertheless, such a prompt generating pattern does not

seem to be suitable for highly abstract or creative tasks, where a more open-ended prompting approach appears to be more effective [2]. Hence, this ability of correct prompting corresponds directly to the competence of asking effective questions, which is also considered to be a part of critical thinking skills.

Furthermore, AI-based models typically do well in brainstorming ideas, so students can use them for ideation, as a source of inspiration to come up with some original thoughts and concepts if they lack their own ones or are not familiar with a particular topic. However, such generative AI techniques are not good at distinguishing good ideas from bad ones or selecting them based on any other qualitative criterion, so it is where human judgment and interpretation comes in. For instance, AI-driven model can come up with examples of personality adjectives, but to divide them into groups of positive and negative traits of character can be too challenging for it, and in many cases it is impossible to give an unequivocal answer. Another case is to ask such an instrument to propose some eco tips, i. e. what can be done to save the environment both on a global and individual scale. Nevertheless, categorizing these findings into the best and worst practices can lead to a quite debatable output as it requires more concrete context and conditions.

Discussion and Conclusions

Overall, though AI-driven systems have evolved and improved the quality of their work significantly over the last several years, they still do have some limitations like inaccuracy of generated information, inability to fulfill some functions, incapacity to fully contextualize, the often need of further refinement of AI's generated responses etc. Therefore the application of AI tools does not replace the need for a human element both in teaching and learning, nor does it exclude the usage of soft skills, and critical thinking in particular, by their users. On the contrary, it even more highlights the necessity of their development in the contemporary education and life in general. Regarding critical thinking skill reinforcement, as it was shown in this paper, this practice can be implemented both in teacher-facing and learner-facing AI instruments through creating specific topical materials, the need for manual enhancement, selection, assessment or verification

of the generated output, generating precise prompts and inputs and the choice of the most fitting AI-powered model by taking into consideration such criteria as task complexity, accuracy requirements, desired style or format of the output etc.

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А. А. Кононова

Применение искусственного интеллекта и развитие критического мышления в преподавании английского языка

В статье рассматриваются особенности и влияние использования искусственного интеллекта (ИИ) в преподавании и изучении английского языка, в основном, в сфере высшего образования, а также исследуется его потенциал для развития одного из мягких навыков – критического мышления – одновременно. Здесь приводится краткое изложение различных подходов, принятых для определения ИИ, и мягких навыков. В результате в данном исследовании мягкие навыки рассматриваются как неспециализированные личные качества, которые способствуют успеху в различных профессиях. Таким образом, здесь перечислены основные мягкие навыки, необходимые для профессионального успеха выпускника университета, с акцентом на критическое мышление. В связи с многосторонним применением этих навыков актуальность их развития в современном мире не вызывает сомнений, и указывается, что ИИ не только препятствует, но и может способствовать этому процессу, реализуя несколько полезных стратегий, перечисленных и изложенных в данном исследовании.

Ключевые слова: искусственный интеллект, генеративный ИИ, преподавание иностранных языков, преподавание английского языка, гибкие навыки, критическое мышление.

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