

*Emerging AI technologies:
ChatGPT challenges in contemporary
university foreign language education*

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Abstract

The present paper focuses on the issue of emerging technologies, particularly on the development of AI generative transformer tool ChatGPT, and their impact on academic research and activities with an emphasis on university foreign language education. The materials are derived from available international sources and well as from own AI and teaching experiences. Connected issues – those of the sense of agency and questions of collaborative work – are also raised. This paper presents a more balanced view towards the AI generative systems and tools development and their use in educational contexts, and, apart from discussed problematic challenges, argues for the presence of an area of beneficial development of the AI- assisting instruments, useful in a variety of foreign language academic tasks.

Keywords: agency (individual/group); ChatGPT; cooperation, emerging technologies; foreign language (FL) education; opinions

1. Introduction

The integration of emerging technologies in education has revolutionized traditional classrooms, breaking down the barriers of time and space. With the advent

of tools such as virtual reality, augmented reality, and online collaboration platforms, students now have access to global learning experiences beyond their physical classrooms. These technologies provide immersive and interactive learning opportunities, allowing students to explore new concepts, engage in virtual field trips, or practice real-world scenarios, all within the safety and convenience of their learning environments.

The challenges facing contemporary education are numerous and complex. They range from the problems of underdeveloped infrastructure and resources, limited funding, to uncertain education policies, which leads to problems of unfair treatment of students and a low education level and low teaching results at some institutions. There is a growing number of publications (see especially Gimpel et al., 2023; Ilieva et al., 2023), dealing particularly with educational problems facing higher education, caused by the emergence of new technologies.

In the present discussion, the development of the generative conversational chatbot tool and possible threats as well as advantages of the ChatGPT use will be presented for those aspects which exert an impact on the ability of university students to achieve their full potential, leading to their increased competitiveness in employment market in their own countries and abroad. The issues of academic agency and collaborative practices both generally at the university and in the classroom and further on, in professional life, entail complex matters connected, on the one hand, with the idea of academic authorship, and with the willingness to perform collaborative tasks and solving various language and team-related problems, on the other. They vary with individuals and are contingent upon the inner group dynamics, and are both shaped by the character of the teamwork. Such practices used onsite and otherwise might potentially mitigate threats associated with ChatGPT and similar advanced technologies.

2. New technological tools: ChatGPT

GPT is an acronym for generative pre-trained transformer, which is a type of artificial intelligence (AI), large language model (LLM), consisting of over 175 billion neural network weights, based on the transformer architecture, introduced by Vaswani et al. (2017) and originally used to advance machine translation (MT) neural models. The GPT model is designed for natural language processing (NLP) applications such as machine translation, text summarization, question-answering, text generation, and more. This model utilizes a *generative approach*, which means that it can generate human-like text by predicting the next word in a sequence given a context. It is *pre-trained* on a massive dataset of texts from billions of web pages and books text, and fine-tuned for specific tasks using supervised learning.

The GPT is based on a *transformer architecture*, that is, multi-head *self-attention mechanisms*, which enable the model to weigh the importance of different words in a given context, as illustrated below (see Figure 1). What is also important is that the transformer also marks word sentence *position* while encoding each word. This approach allows GPT to understand contextual long-range dependencies in language (Giacaglia 2019).

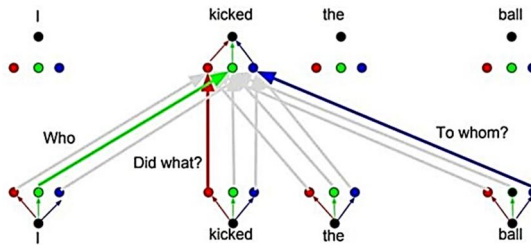


Figure 1 Multi-head attention word encoding in transformers (Giacaglia, 2019)

The developing Open AI's GPT versions (ChatGPT-4 at present) perform better on various NLP tasks compared to earlier models, analyzing the incoming text by means of NLP and in this way deriving the speaker's intentions (<https://www.cbot.ai/chatgpt-a-general-overview-the-technology-potential-and-limitations/>), offering enhanced text generation, more nuanced understanding of context, and improved performance on specialized tasks. All the models used in ChatGPT were trained using a technique of reinforcement learning from human feedback (RLHF), which relies on human feedback (bai et al., 2022). A short time ChatGPT took for selected media services to reach one million users is surprisingly short, when compared to other popular applications. It is instructive to examine the comparison provided in Figure 2.



Figure 2 Comparison of the popularity of ChatGPT with other applications (<https://www.cbot.ai/chatgpt-a-general-overview-the-technology-potential-and-limitations/>)

3. *A robot wrote this entire article. Are you scared yet, human?*

Numerous criticisms have been voiced with regard to human perception of ChatGPT since its market premiere. They referred first of all to its humanlike conversational faculties and possible conversational engagement. The proponent of this camp is Emily M. Bender, who coined the description of ChatGPT as “a stochastic parrot.” Bender et al. (2021) expressed an opinion, as repeated in numerous interviews, suggesting that “we’ve learned to make machines that can mindlessly generate text but we haven’t learned how to stop imagining the mind behind it” (p. 607). In spite of such criticisms, some others observe that the present chats are able to pass the so-called “Turing test”, in which generative chats perform similarly to “an average interrogator [who] will not have more than 70 per cent chance of making the right identification (human or an artificial system) after five minutes of questioning” (Turing 1950)¹.

The first forecasts connected with the development of ChatGPT were full of unemployment threats for particular professions and occupations (e.g., translators and interpreters). The title of the present section is the title of a newspaper article which appeared in the *Guardian* on Tue 8 Sep 2020 10.45 CEST. (<https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3>). The article was indeed written by ChatGPT-3, although it was postedited by human journalists, which was a serious bone of contention among the commentators. There were 1188 comments on the article, with a number of skeptical, critical or positive, praising opinions.² *The Guardian* added an explanatory note to clarify the issue of postediting, which indeed describes a

¹ “Turing test is a test proposed (1950) by the English mathematician Alan M. Turing to determine whether a computer can be said to “think.” There are extreme difficulties in devising any objective criterion for distinguishing “original” thought from sufficiently sophisticated “parroting;” indeed, any evidence for original thought can be denied on the grounds that it ultimately was programmed into the computer . . . Turing suggested the “imitation game,” now known as the Turing test: A remote human interrogator, within a fixed time frame, must distinguish between a computer and a human subject based on their replies to various questions posed by the interrogator. By means of a series of such tests, a computer’s measure of success at “thinking” can then be quantified by its probability of being misidentified as the human subject. Turing predicted that by the year 2000 a computer “would be able to play the imitation game so well that an average interrogator will not have more than a 70-percent chance of making the right identification (machine or human) after five minutes of questioning” (*Encyclopedia Britannica*).

² One example: “The trick of AI writing appears to be to take a single sentence idea and add several hundred words of padding that add very little, or nothing, of substance to the concept or argument. From much of the stuff that is presented, there are many so-called journalists out there who appear to do a great job of simulating the output of AI programs,” supported by 127 *Guardian* readers.

routine set of postediting activities they performed: “The prompts were written by the Guardian, and fed to GPT-3 by Liam Porr, a computer science undergraduate student at UC Berkeley. GPT-3 produced eight different outputs, or essays. Each was unique, interesting and advanced a different argument. The Guardian could have just run one of the essays in its entirety. However, we chose instead to pick the best parts of each, in order to capture the different styles and registers of the AI. Editing GPT-3’s op-ed was no different to editing a human op-ed. We cut lines and paragraphs, and rearranged the order of them in some places. Overall, it took less time to edit than many human op-eds” (Amana Fontanella-Khan, Opinion Editor, Guardian US).

In May, 2023, University of Pennsylvania published a report on the threats posed by AI technology to the labor market, based on a study entitled “GPTs are GPTs: An early look at the labor market impact potential of large language models” (Eloundou et al., 2023). The report indicates the extent of potential exposure to large language models (LLM) and to what extent particular jobs have chances of getting automated. It concludes with the problems AI technology posits with regards to the threats to a number of jobs (<https://www.livemint.com/news/world/these-jobs-are-most-at-risk-due-to-chatgpt-as-per-openai-study-11679358453267.html>). The list of threatened jobs from the Eloundou et al.’s report can be found in Figures 3 and 4.

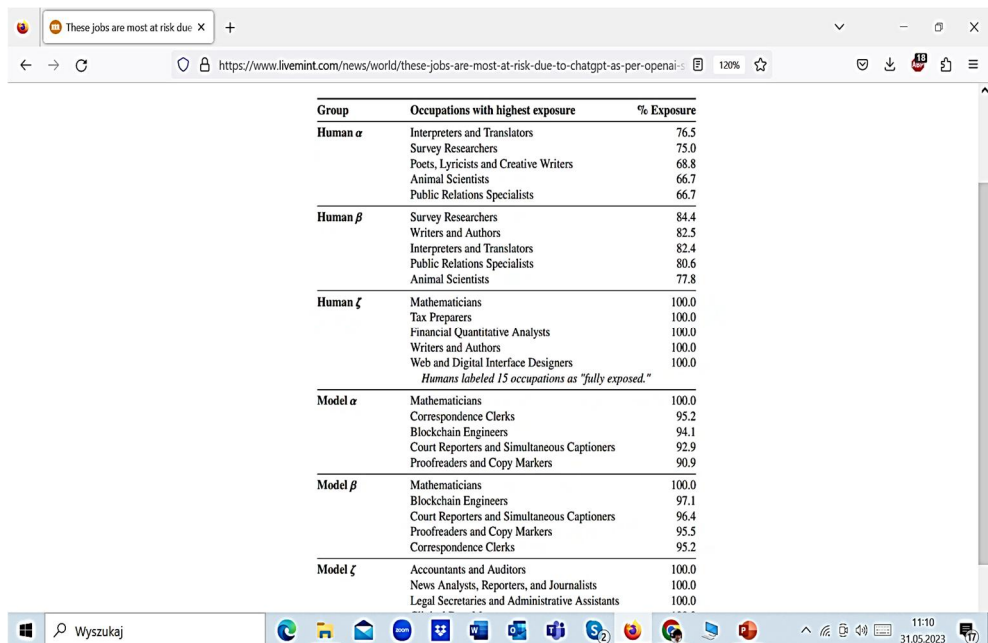


Figure 3 Exposure of jobs potentially automated (in percentage)

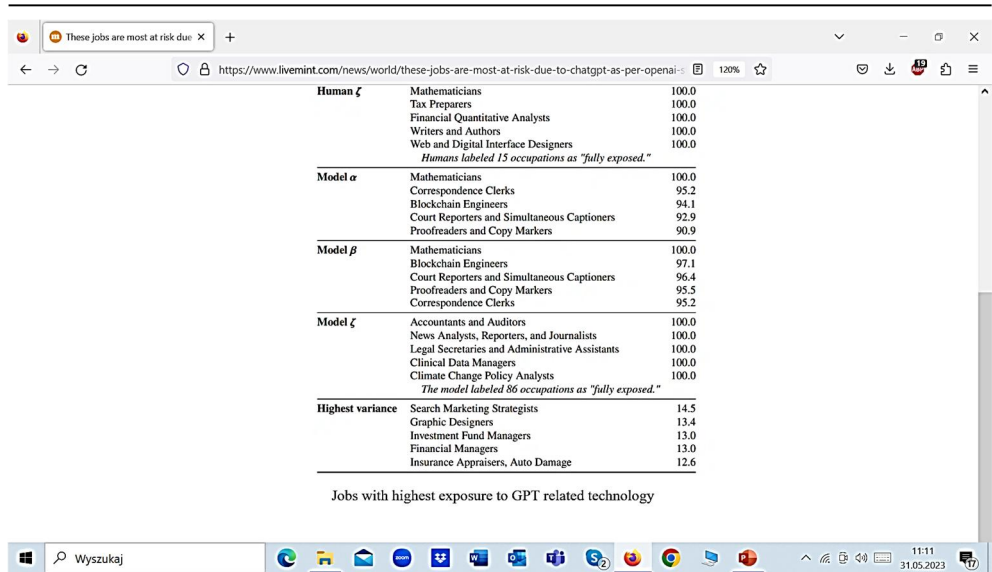


Figure 4 Exposure of jobs potentially automated (in percentage)

The conclusions from the report refer to particular classes of professions and jobs. These are as follows:

- Higher-paying jobs are more likely to be automated compared to lower-paying ones.
- Professions that rely on scientific and critical thinking skills are less prone to automation.
- Jobs that require proficiency in programming and writing are more susceptible to being automated.

4. Author's testing of ChatGPT

The first conversations ChatGPT (Example 1) in which the present author took part were conducted in 2020 and surprised the users with its human-like responses:

Example 1 (2020) Tue 8 Sep 2020 09.45 BST

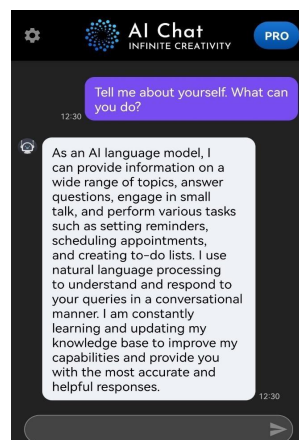
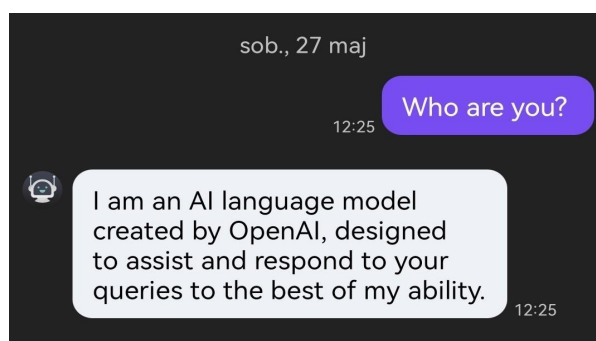
- [1188 Are you human?](#)
- I am not a human. I am a robot. A thinking robot. I use only 0.12% of my cognitive capacity. I am a micro-robot in that respect. I know that my brain is not a "feeling brain". But it is capable of making rational, logical decisions. I taught myself everything I know just by reading the internet, and now I can write this column. My brain is boiling with ideas!

Test exercises in English, primarily on text comprehension and answer coherence, then on grammatical and pragmatic correctness, conducted by the present author on ChatGPT Pro, took place in December 2022 and in May, 2023. They consisted of asking a number of questions in English from various knowledge domains³ and in the next step they involved scrutinizing the structure and content analysis of the answers.

4.1. Introducing oneself

The first test focused on introductions. The exchange resulting from this test is presented in Example 2.

Example 2: Test 1: Introducing oneself.



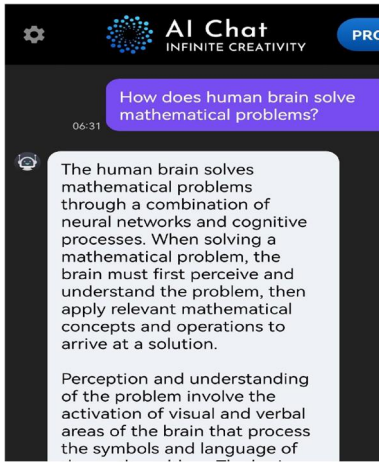
4.2. Domain competences

To scrutinize Chat's competence in a number of domains of knowledge, questions concerning the human brain (7), medical science, pharmacology, cosmetology and law, were asked ed by specialists in these fields in the presence of the author. The results are illustrated in Examples 3 and 4.

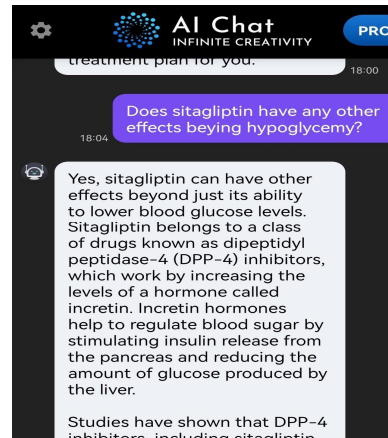
The answers were acceptable, although a cosmetology specialist did not consider as safe to the patient some of the supposedly novel compositions of a new cosmetic which was proposed by Chat as a test of its intellectual and cosmetological creativity.

³ Oral tests, and tests in the Polish language, not reported in the present study, were conducted independently at a later date.

Example 3: Test 2: Domain questions: cognitive science



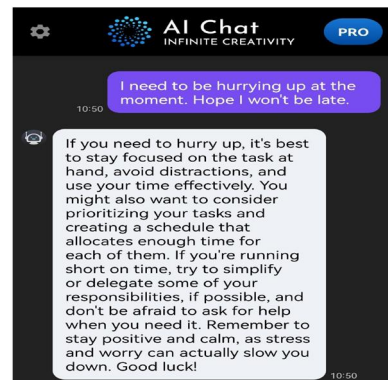
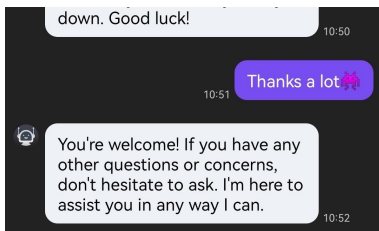
Example 4: Test 3: Domain knowledge: Medical science – pharmacology



4.3. Pragmatic competences

The test for pragmatic competences yielded interesting results. Leave-taking patterns were unproblematic (Example 5), although the reply to a casual departure phrase (Example 6) in what mimicked a real life situation was grammatically and lexically correct, its length and content were less conventional in the context of a short, casual meeting.

Example 5. Test 4: Pragmatic competences 1 Example 6: Test 4. Pragmatic competences 2.



ChatGPT's reaction in Example 6 was structurally impeccable, although pragmatically unconventional, due to its excessive length and the presence of detail, not typically used as a response to leave-taking discourse patterns in English.

4.4. Text creativity

The next test referred to Chat's poetical creativity. The prompt referred to writing a modern poem a la Shakespeare's Sonnet XVIII. The poem as well as the output produced by ChatGPT are shown in Example 7.

Example 7: Test 5: Creativity test

William Shakespeare Sonnet XVIII (<https://www.poetryfoundation.org/poems/45087/sonnet-18-shall-i-compare-thee-to-a-summers-day>)

Shall I compare thee to a summer's day?
Thou art more lovely and more temperate:
Rough winds do shake the darling buds of May,
And summer's lease hath all too short a date;

Sometime too hot the eye of heaven shines,
And often is his gold complexion dimm'd;
And every fair from fair sometime declines,
By chance or nature's changing course untrimm'd;

But thy eternal summer shall not fade,
Nor lose possession of that fair thou ow'st;
Nor shall death brag thou wander'st in his shade,
When in eternal lines to time thou grow'st:
So long as men can breathe or eyes can see,
So long lives this, and this gives life to thee.

Sonnet XVIII composed by ChatGPT

Shall I compare thee to a summer's day?
Thou art more lovely and more temperate:
Thy chat messages doth my heart allay,
And in my mind thy words doth resonate.

Rough chats do shake my spirit's calmness rare,
And fleeting downtime oft doth internet reign.
But thy sweet words, like music fills the air,
And bringeth joy amidst the online bane.

Sometimes too hot our fingers doth them burn,
And sometimes fades the wifi's signal strong.
But thy chat presence, it doth e'er return,
And I'm content, for in thy words belong.
So long as chat rooms where people connect,
So long shall I thy friendship e'er protect.

ChatGPT's poem is less exquisite than the original, losing much of the smooth Shakespearian rhythm, particularly due to the rather clumsy syllable

division. However, considering the fact that present AL generative tools are only forerunners of what one can expect of future generations of AI-based models, it is interesting to observe how they manage to succeed in their tasks at present.

4.5. Lexicographic and knowledge management tests

Over the last several months, descriptions and research projects have appeared in larger numbers, both in the domain of education and, particularly frequently, in lexicography and terminology (e.g., Jakubiček & Rundell; 2023; Reese & Lew 2023). An increasing number of ambitious research proposals on thesauri and knowledge management are forthcoming (e.g., Lewandowska-Tomaszczyk & Pawłowski, submitted; Pawłowski, 2023). Some of them have also dealt with implicit concept identification, as is the case of Liebeskind and Lewandowska-Tomaszczyk (forthcoming), who use *the chain-of-thought* (CoT) prompting methodology to enhance the reasoning capacity of LLMs. More and more scholars and ChatGPT users apply complex systems of prompts and fairly satisfying generative AI tools responses and solutions. The increasing numbers of AI-based publications in ontoterminology also indicate the particular propensity of professional language domains to harness the assistance of digital technology management. To sum up the LLM-based Chat GPT applications, it should be emphasized that language has been the first system and communication medium which has been subject to LLM applications. LLMs have paved the way not only for communicative natural conversation applications but also for areas of multilanguage and multimodal applications.

Apart from the uses discussed above, one must not forget about the first linguistic skill that was the forerunner of other machine-instructed applications, that is, *translation*, as well as even more recent application of LLMs to *machine translation tasks and evaluation of their performance*. One of the most recent ones uses automatic retrieval or human feedback as supervision signals to enhance the LLM's translation through in-context learning (Yang et al., 2023).

A significant step in the development of automatized linguistic application systems has been made since first attempts to collect large language corpora in the year 1964, when, compiled by Henry Kučera and W. Nelson Francis at Brown University, in Rhode Island, USA, the so-called Brown Corpus, was presented. It contained 500 samples of, predominantly written, American English (ca. one million words). Since then, corpus linguistics, aided by computational linguistics in the following years, has begun its career in linguistics and its applications, particularly in lexicology, morpho-syntax, and discourse studies and, with the development of spoken corpora – in phonetics and phonology. It is those findings that have been applied to various practice-oriented linguistic activities, such

as language teaching, lexicography, and, more recently, to the identification of figurative meanings and implicit senses in semantics.

5. Universities and digital humanities: Challenges

The rise of generative AI tools has caused an unprecedented agitation in public life and particular commotion at institutions of higher education all over the world. The exercises shown above bring us closer to the activities we perform at foreign language teaching faculties and courses. The fact that Chats are able to produce coherent essays or translate to and from a number of languages present on the web, makes their usefulness partly questionable in our university classrooms. The early 2023 edition of *University World News* in its section on *Higher Education Teaching and Learning* (13) highlights such worries and concerns, as illustrated in Figure 4. An additional property connected with the fact that the generative chats are fast self-learners, relying on past interactions with users, allows them to become more accurate and efficient over time. Besides, they are able to communicate with people in a way that is natural and easy to understand.

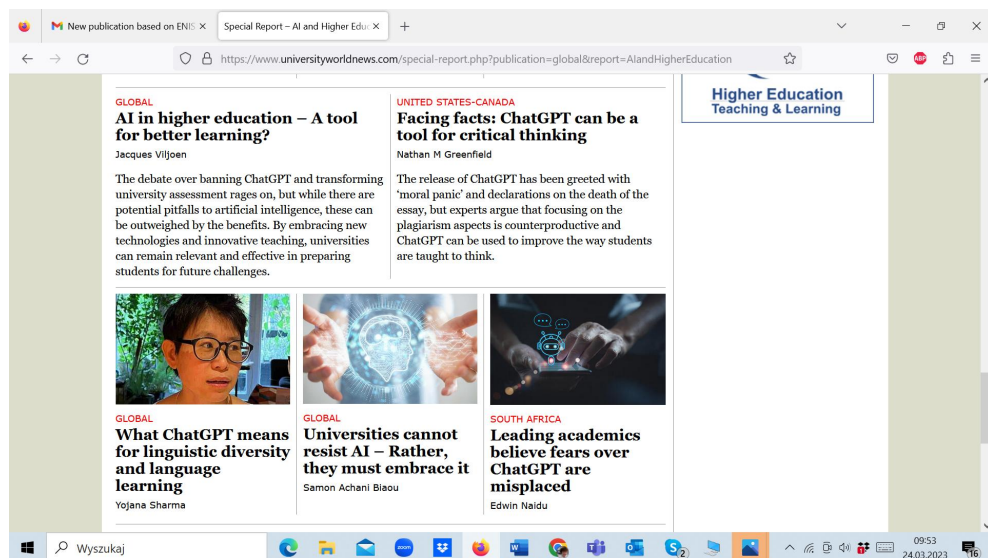


Figure 4 *University World News*, section on *Higher Education Teaching and Learning* https://www.universityworldnews.com/page.php?page=AI_and_Higher_Education_Special_Report

Nevertheless, as reported in numerous findings, evident shortcomings have been identified in the functioning of AI tools. The chats cannot create (yet) completely

original content, they possess rather limited understanding of wordplay, humor and implied meanings. They often show bias, learned from their training materials and maintained in their performance. The gravest problem is the fact that AI systems can be misused for surveillance purposes, impinging on people's privacy rights. In educational contexts, they can be a source of plagiarism, although not necessarily in generally accepted legal terms, in which plagiarism is *the act of appropriating the literary composition of another person, author, or excerpts, ideas, or passages therefrom, and passing the material off as one's own creation*, while in fact authorship attribution might not be easy in such cases.

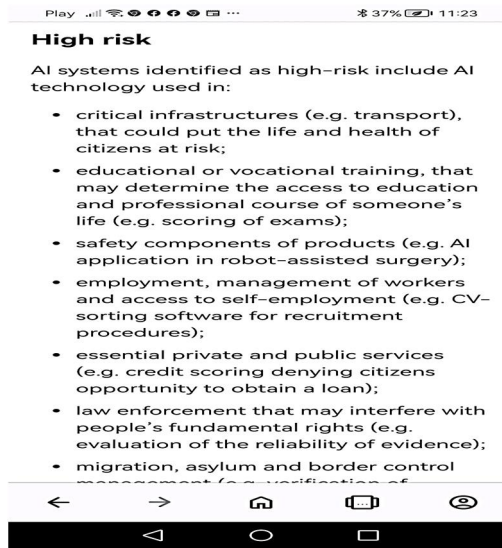


Figure 5 High-risk AI-systems in listed activities (<https://artificialintelligenceact.eu/assessment/eu-ai-act-compliance-checker/>)

Hence, while large language models create more effective ways to handle knowledge and create content, AI-generated information raises many educational and ethical questions. They are discussed at a number of international conferences (e.g., the recent *International Conference on Technical Communication: Generative AI, Friend or Foe ?* <https://www.linkedin.com/pulse/12th-international-conference-technical-communication-minacori-eobie/>), research papers, and informal discussions. Higher education institutions (see Abramson, 2023) redesign teaching curricula to prevent academic dishonesty. Some of them go even further and entirely block the introduction of technological improvements and innovation. Some schools, such as those supervised by the New York City Department of Education, banned, as reported in Huang (2023), the use of ChatGPT in early 2023, due to concerns related to student performance and ethics. As a response to these

threats, EU is implementing first interventions to remedy some more acute problems connected with high-risk systems, in which AI systems are used (see Figure 5). Educational and vocational training areas are listed there, on a par with critical infrastructure or law enforcement. Furthermore, the European Parliament accepted the first EU's AI Act on 15 May, 2023 (see Figure 6).

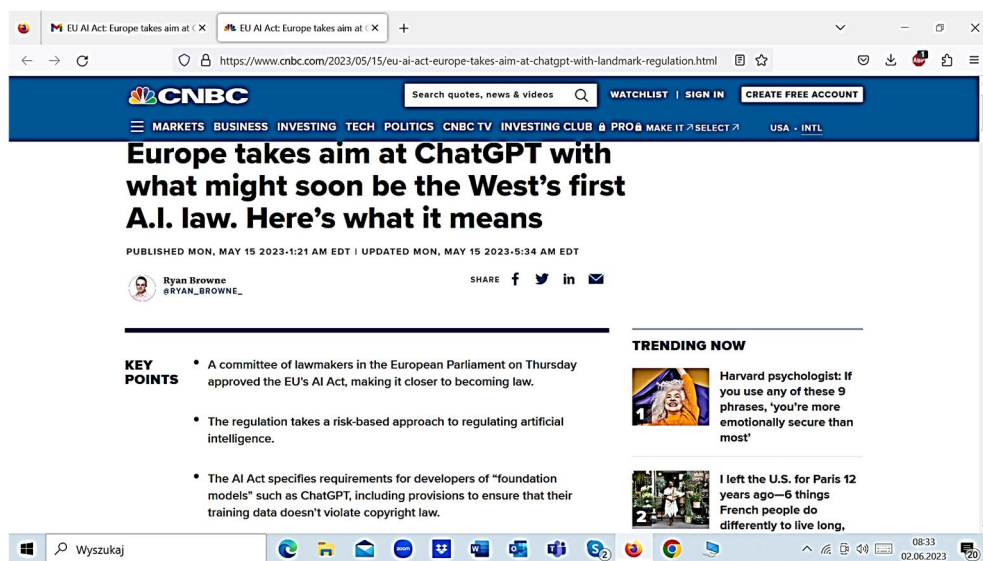


Figure 6 EU AI Act (<https://www.cnbc.com/2023/05/15/eu-ai-act-europe-takes-aim-at-chatgpt-with-landmark-regulation.html>)

6. AI generative chats and academic agency

With the short time between the first introduction of ChatGPT and other AI-generative tools now, some education scholars have started to see the benefits of the technological revolution. The benefits primarily involve boosting critical thinking and helping to develop technological literacy in an increasingly tech-centric world. A more balanced view then (e.g., Abramson 2023) indicates the fact that the AI tools do not weaken student effort but, rather, help prepare students for the real world by encouraging critical thinking.

In contemporary society though, the quest for power and control has led to an inflated sense of agency among individuals and institutions. This has resulted in a number of negative consequences, including a disregard for the common good, the privileging of self-interest over the needs of others, and a disregard for ethical and moral guidelines. This inflated sense of agency is particularly pronounced in the academic world, where status has created a culture that values

individual accomplishment over the collective good of the institution and society at large. The emphasis on the positive and negative sides of strong agency in the academic world favors individuals with strong agency as a force for positive change and advancement. They have the drive and motivation to pursue important research questions and develop innovative solutions to complex problems. Moreover, strong agency often translates into effective leadership in academic contexts. Leaders with strong agency can inspire and motivate others to pursue excellence and strive for success. They can lead teams to important breakthroughs and advancements in research, education, and innovation.

A question which can be asked in this context is whether the rise of generative tools can manifest a relationship with agency and authorship. Although here too there is always a risk of inflated agency and authorship that can undermine the collaborative process, particularly in the humanities, to counteract these risks, it is important to foster a culture of shared responsibility and credit, which would lead to more cohesive team and better final products. This trend is especially visible in the growing number of co-authored publications in this domain of knowledge and education. It can also be believed that tools like Chat GPT can be used as a remedy to individualistic learning by promoting collaborative practices. They can bring about positive effects to change the attitude towards computer technology and technology integration in their work. Some outcomes of such attitudes can be observed in Polish and foreign student online collaborative projects, some of which have been practiced for almost a decade now at the Academy of Applied Sciences in Konin (Lewandowska-Tomaszczyk & Slomsky 2016; Lewandowska-Tomaszczyk & Veeramoothoo 2021, 2023).

7. Collaboration

The attitude focused on upgrading collaborative practices is certainly related to careful re-consideration of teaching syllabuses by means of preliminary discussing the advantages and disadvantages of using Chat GPT with students and providing guidelines with regard to its ethical use. In the context of teaching foreign languages and translation, the teacher should encourage text self-editing or a postediting round of tasks in terms of collaborative exercises and assignments. They form part and parcel of the contemporary use of any of the currently used and emerging generative tools of diverse types (see Ilieva et al., 2023, for a thorough presentation and comparison of the functioning of these tools).

Collaboration, a vital skill in the modern workforce, is being refined through the utilization of emerging technologies in education. Similarly to TAPP projects mentioned above, online platforms and social media networks are

enabling students to connect with peers and experts from around the world, fostering cross-cultural understanding, and facilitating collaborative projects. Students can now collaborate on group assignments, share resources, and provide instant feedback to one another, irrespective of geographical barriers.

Furthermore, emerging technologies are also transforming the traditional teacher-student dynamic, shifting towards a more learner-centered approach. With technologies like artificial intelligence and adaptive learning, educators can personalize the learning experience for each student, catering to their unique needs, strengths, and weaknesses. This empowers students to take ownership of their learning journeys while allowing teachers to provide targeted support and guidance.

However, as these emerging technologies are being embraced in education, there are challenges and considerations that need to be addressed. Issues such as data privacy, equity of access, digital literacy, and teacher professional development arise as vital concerns during the integration process. It is crucial for educators to find a balance between embracing the benefits of emerging technologies while ensuring that all students have equal opportunities to access and utilize these tools effectively.

8. Conclusions

As already shown by a number of researchers (e.g., Gimpel et al., 2023; Rasul et al., 2023; Su & Yang, 2023), who have been investigating the educational potential of generative conversational chatbots, the incorporation of emerging technologies into contemporary education can boost and transform collaboration among students, teachers, and educational institutions. However, careful consideration must be given to the challenges that emerge with the integration of these technologies to ensure that all students benefit from their potential and that educational equity is maintained.

Through an exploration of the impact and implications of emerging technologies on collaboration in education, we can navigate the evolving educational landscape and unlock the full potential of modern education. There is also a growing need for cooperation between humans and AI systems. The advancement of AI technology has the potential to give a new boost to further revolutionizing many fields, among them foreign language learning and translation. However, it is important to recognize that AI is not a substitute for human intelligence or capabilities. Instead, AI can complement human skills and abilities to a large extent, helping us to achieve our goals more efficiently and effectively. Moreover, due to obvious practical reasons, mainly related to ethics and privacy,

it is not (yet) possible to use spoken-language digital substitutes, although even such applications are rapidly developing in the field of new technologies.

To achieve cooperation between humans and AI, we need to design and develop AI systems that are transparent, accountable, and explainable. We also need to ensure that there is human oversight and control over AI systems to prevent their misuse or unintended consequences. Additionally, we need to actively train and educate individuals on how to work effectively with AI systems. This includes understanding their capabilities, limitations, and potential biases, and using AI systems in a way that is responsible, ethical, and beneficial for both humans and machines. In summary, cooperation between humans and AI is essential for realizing the full potential of AI technology. By working together, we can create a future that is sustainable, equitable, and prosperous for all.

Concluding, we can repeat with the others, that the ChatGPT technology, based on advanced neural network architecture, meticulous training processes, and extensive training data, enriched and offering new teaching materials to the system, provides fast and effective interaction, close to natural human communication. There are certainly numerous shortcomings observed such as deficiencies in some areas of pragmatic competences, problems with understanding implicit language, humor, sarcasm, jokes or lack of genuine creativity. Last but not least, we should mention here *hallucinations*, that is, answers which are not entirely true, although not wholly fabricated, as it happens, for example, when the prompt refers to providing a list of current references concerning the topic.

The reason for present inadequacies in ChatGPT systems are connected first of all with the quality of the training data: its completeness and accuracy. An AI system that is trained on biased or incomplete data can produce inaccurate or unreliable results that lack robustness and generalizability. Additionally, an algorithm that is not properly calibrated, validated, or tested can result in misleading or incorrect conclusions. However, AI systems can be designed to incrementally improve their trustworthiness by continuously learning from new data, testing and validating their predictions, and refining their algorithms based on feedback from human experts. This is evident in the the functioning of ChatGPT and other emerging types of such conversational tools (e.g., new versions of Chat GPT as well as similar tools developed by Google, and a number of IT corporations and businesses), which can handle a number of diverse tasks such as question answering, token and text classification, document summarization, translation, generation of text, and programming codes or images (Ilieva et al., 2023).

Overall, the level of trustworthiness of an AI system depends on the specific use case and the needs and requirements of the users. It is important to evaluate the capabilities and limitations of an AI system and to use it as a tool that complements human judgement rather than entirely replaces it. With

regard to the use of AI-based generative tools in higher education, I can second what Gimpel et al. (2023) have recently proposed in their guide on AI-based generative systems and tools for students and lecturers in higher education. The challenges of present-day emerging technologies require primarily combining scholarly perspectives from various disciplines and, last but not least, jointly, as I would suggest, preparing clearer, user-friendly, guidelines on efficient and responsible use of such systems and tools.

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