

# **CHANGING THE GAME. AI IN EDUCATION**

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Alexandra Zbucnea, Florina Pînzaru, Cristian Vidu (Eds.)

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# AI in Education: A Win-Win or a Zero-Sum Game?

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ANA MARIA COSTEA, IOANA ROXANA MELENCIUC IOAN

## **Abstract**

While artificial intelligence is gaining more and more coverage internationally, being present in military developments, wartime situations, social media, engineering, etc., it was relatively natural to have it migrate into the educational sector. On the one hand, we can highlight the benefits of this type of technology, like simulations, scenarios developed much faster than a human being would do, and practically all the open sources available at your disposal. On the other hand, apps like ChatGPT are raising legal and ethical concerns in terms of reliability of the sources, originality, plagiarism, correct citation, and the development of analytical skills that the researchers/students may feel unnecessary to develop. Under this framework, the current paper aims to develop an analytical view of the pros and cons of using AI in education, highlighting the current international/regional and national approaches regarding AI (in this case, ChatGPT). From a methodological point of view, the paper makes a conceptual analysis using concepts like zero-sum games and win-win ones and applies them to the dynamics of AI in education. Secondly, the research encompasses international players and universities' strategies when dealing with AI. Lastly, the paper analyses several universities' official positions regarding ChatGPT.

## Introduction

Technological development is among the most debated issues at national and international levels since it touches all aspects of our current society, from the individual level to the international one. The digitalization process, the increase of internet coverage, the internet of things, and the development of AI and its usage in approximately all aspects of everyday life is already the status quo, be it intrinsically acknowledged by its users or not. The benefits of modern technology are huge, from increased life quality of an individual, reduced processing time or errors when using smart technology to the development of high-level military operations that do not rely on humans anymore nor are they so time-consuming, thus cost more money (e.g., autonomous drones, automatized missile shields, etc.). Among the most successful modern technology, we can pinpoint artificial intelligence (AI), which is used at the macro level, not only by banks, the military sector (Nurkin & Siegel, 2023) in peace or wartime situations (Franke & Söderström, 2023), social media platforms such as Facebook and Instagram (Clegg, 2023), or Tiktok (n.d.), but also education (Chen, Chen, & Lin, 2020). In this sector, there have been developed several AI-based applications, from the famous ChatGPT (OpenAI, n.d.) to programs that detect plagiarism, robots, computers that use AI to create simulations, predictions, and even programs that change the music according to the mood that the AI is sensing as coming from the persons that are in the room at that time (Chen, Chen, & Lin, 2020). On the other side, we can identify vulnerabilities, threats, and legal and ethical issues that arose from the increased usage of these technologies. Firstly, there are the cybersecurity threats to which we are exposed every day. Economically, we can translate these

threats into cyber attacks that lead to massive financial losses. For example, *“Cybersecurity Ventures expects global cybercrime costs to grow by 15 percent per year over the next three years, reaching USD 10.5 trillion annually by 2025, up from USD 3 trillion in 2015.”* (Morgan, 2023) Another element is the legal aspect since the regulation is a very time-consuming process that must go through several procedures and align the necessities and interests of numerous stakeholders.

Additionally, it tends not to keep up with the technological developments. Thus, it is not a matter of being unable to make predictions and, consequently, develop norms that meet those vulnerabilities. However, it is a matter of being unable to adapt to the very fast speed of the technological process. Lastly, ethical aspects arise from using AI in critical domains like education and how universities deal with these fast-track developments. Under this framework, the present papers aim to develop an analytical view of the pros and cons of using AI in the educational process, especially in the case of ChatGPT.

From a methodological point of view, the paper will make a conceptual analysis using concepts like zero-sum games (Miroiu, 2007) and win-win ones and apply them to the dynamics of AI in education. Secondly, the research will encompass international players and universities' strategies when dealing with AI: Do they have an approach dedicated to mitigating AI's risks?; Do they have an ethical code regarding AI?. Thirdly, the paper will search for official positions that universities took when dealing with ChatGPT, if there are universities that developed their strategies in relation to the usage of this app, and how they are dealing with the challenge that it poses from an ethical and legal point of view.

## Theoretical background

Zero-sum games and win-win ones are concepts developed within the game theory framework by John von Neumann and Oskar Morgenstern (1953) in their book *The Theory of Games and Economic Behavior*. Later on, the notion of zero-sum appeared within the concept of the Prisoner's Dilemma exemplified by Barry Krusch (1994); according to this, the players tend to defect rather than cooperate when they are within a framework characterized by mistrust and lack of communication. Additionally, Prisoner's Dilemma is a game of interests in which every player has his/her own set of interests that need to be fulfilled. Nevertheless, people's interests are not objective facts but based on and defined by perceptions. As Axelrod and Keohane (1985) suggest: "*beliefs, not realities... conduct*".

In this light, the Dilemma reveals that "*the greater the conflict of interest between players, the greater the likelihood that the players would, in fact choose to defect.*" (Axelrod & Keohane, 1985) Therefore, if we were to meet a conflictual situation, the expected and predictable result would be defection by at least one player. But mutual interest can also be met in a bilateral relationship, as the prisoner's dilemma is not a non-exit situation, or it should not be, especially in the case of today's globalized and largely digitalized world. Given that we do not have only one game to play, the game is indefinitely iterated. In this sense, the scholars have tried to find ways in which the Prisoner's Dilemma could be broken, and they succeeded in developing several conditions that could transform this dilemma into a win-win solution. Parfit (1984) thought cooperation among the players was a viable solution. It can occur in the context of shared norms and principles among



players (Axelrod & Keohane, 1985). Cooperation can be achieved, for example, if the costs of defection are too high because then players tend to cooperate. Cooperation can also be achieved by enforcing significant expenses. Here, there must be taken into consideration several aspects: in large groups, it is challenging, if not impossible, to identify the defector; players must be able to respond effectively to betrayal; they also must be able to impose retaliation against defectors; and last but not least, players may lack incentives to punish the defectors. When sanctioning, the danger of cooperation collapsing is very high; therefore as the defector, it must take responsibility for its action and the punisher must do the same (Axelrod & Keohane, 1985). Another way a Prisoner's Dilemma could become a win-win game is by allocating some compensations or increasing the level of duty. In this way, the temptation to defect would not be so great. Chammah and Rapoport (1965) also believe communication is another critical aspect. If the communication is more frequent, the level of cooperation is increasing.

Last but not least, we must define the concept to analyze AI implications in education. According to the European view, it *"commonly refers to a combination of machine learning techniques used for searching and analyzing large volumes of data; robotics dealing with the conception, design, manufacture, and operation of programmable machines; and algorithms and automated decision-making systems (ADMS) able to predict human and machine behavior and to make autonomous decisions"* (EP, 2019, p. 2; Caradaică, 2020). In addition to this, over the last decade the members of the academia started to use Natural Language Processing (NLP) programs, which practically *"process and analyse thousands of articles at a time to extract key themes and quantifiably track their*

*development in the literature*” (Odden, Marin, & Rudolph, 2021). This type of technology would allow researchers, professors, and students to develop much faster solutions to ongoing issues and conduct simulations that consider more data and parameters than a human brain could do in a minimal period. This is where ChatGPT and Google Bard intervene, two examples of NLP programs that have the potential to change the status quo since they prove to be capable of breaking the existing norms, especially in the education sector, creating, thus, the framework for a zero-sum game.

Therefore, the theory is translated in education as cooperation between the professors and the students within the education process under the existing norms and principles. The typical example refers to the students who have assignments to do to receive their grades. If the assignment is not done, thus the student defects, then the teacher has the prerogative to punish the defector with a lower grade. On the other side, in the absence of norms and principles, the theory, as mentioned above, indicates that the students may tend to defect, thus, not do their assignments, or do them by committing plagiarism using AI tools or relying solely on the AI results without processing the information using their academic skills. This will later become a lack of critical and analytical competencies to conduct various operations. Also, this has the potential to transport a largely cooperative relationship into a sort of prisoner’s dilemma in which neither the professors nor the students trust each other, the universities having to develop institutional relations with OpenAI to detect the AI-generated texts and even so not being able to 100% claim the plagiarism since the majority of universities did not adopt a public strategy regarding NLP tools.

Additionally, there is a technical matter of identifying the texts generated by AI. In this case, even GPT Zero publicly acknowledges that it cannot identify 100% of the information generated by ChatGPT (n.d.) since the system is always learning, thus maybe changing the answer to the same question. In this context, it is quintessential for universities to have an official position regarding the usage of AI tools, especially NLP ones like ChatGPT (thus to create norms or at least principles in the absence of national, international bidding regulations that make defection costly, thus restores the status quo to a win-win framework).

### **AI in education. The strategic view**

In 2019, more than 100 states joined under the UN framework to discuss the usage of AI concerning education reforms: the strategic goals, the different methods of implementing them, etc. (Yang, Peng, & Li, 2021). This meeting was not generated by a new element brought into the education sphere. Historically, scholars started using AI in their education more than 60 years ago. One example in this sense would be the Dartmouth Workshop from 1956. At this workshop, Simon and Newell presented a program that was “*capable of proving logical theorems from Russell and Whitehead’s Principia Mathematica (a foundational text in mathematical logic) by manipulating “symbol structures”*” (Doroudi, 2022). Their work later served as an alternative to the main paradigm adopted in the 1950s in the field of education, namely behaviorism. Thus, in the 1970s, information-processing psychology or cognitivism became the main paradigm (Simon & Newell, 1971). At a practical level, in the 1980s, the MIT Media Lab developed the early Lego Mindstorms kits (Stone et al.,

2016). Today, the landscape has changed completely, and AI has gained more and more importance over recent years (Rodríguez-Abitia & Bribiesca-Correa, 2021; Teker, Teker, & Basak Tavman, 2022; Maltese, 2018; Payr, 2003) due to its efficiency (for example professors no longer verify themselves manually if a paper is the result of plagiarism, and some programs deal with the admission of students, even their grading according to specific parameters that are individually set for each student according to their performance, interests, programs that are dealing with curriculum development, simulation techniques that use VR, thus deepening the students' comprehension regarding specific topics, students have access to various platform from where they can have access to materials and other learning tools that they can use for educational purposes, etc. (Babu, & Wooden, 2023). Being more cost-efficient in the long term, "AI in education is expected to be worth \$6 billion by 2024" (Miao et al., 2021). At the same time, as mentioned above, the regulation did not seem to follow close by. Thus, universities and decision-makers seem nowadays to go on uncharted territories when referring to AI, a fact acknowledged at the international level through the report conducted by UNESCO from 2023. For example, according to a survey done in May of the same year from more than 450 universities, less than 10% have adopted specific formal guidelines and/or institutional policies regarding the use of generative AI applications (UNESCO, 2023). At the European level, in October 2022, the European Commission released a set of *Ethical Guidelines for Educators on the use of AI and data in education* (EC, 2022), in line with the European view of a human-centric approach to AI. This document was adopted under the *Digital Education Action Plan (2021–2027)* (EC, n.d.). At the macro level, the EU,

through the European Commission, published in 2019 a Coordinated Plan (EC, 2018) on AI to coordinate the EU member states AI-related national strategies. This human-centric approach and ethical guidelines are some of the main elements that separate the EU from other international players like the US (concentrating on private initiatives and self-regulation) or China (focusing on a rather public authorities framework over the AI initiatives) (Madiaga, 2019).

At the practical level, as mentioned above, the use of AI in education institutions is of great value since it has a wide range of activities where it can be used, like plagiarism detection, admission procedures, grading system, personalized learning, 24/7 assistance for the students regarding the administrative aspects, access to a vast database of information and the possibility to sort the needed information in a faster way, a quicker processing tool for conducting research based on simulations and scenarios building, AI using VR could deepen the interests of students regarding a specific subject and help them make responsible decisions under the simulation framework etc. At the same time, we can identify some counterarguments regarding AI in education: gamification raises ethical concerns (Iorgulescu, 2021), relying on AI could lead to a lack of critical thinking, wrong decisions that are made as a consequence of a biased algorithm, decreased level of innovation, since AI generally uses the already existing information, not thinking outside the box. Also, there is a matter of transparency and ensuring that everybody has access to the information and the knowledge to use it. Again, the algorithms are not biased; thus, they do not create discrimination.

Within this framework, in 2022, ChatGPT was launched. As previously mentioned, it is an AI that has NLP

tools. Thus, it differs from any other standard AI we can find on the market. The only one that is similar is Google Bard, but the latter is banned from EU territories due to European regulations over privacy concerns (Langley, 2023). Returning to ChatGPT, it is a language model trained to produce text once you are asking it something. It has instant access to a considerable amount of open data; thus, it is capable of doing a literature review on a specific topic in minutes. Also, it is very user-friendly, being designed to reproduce a conversation with a human. Since it is an AI, it can learn by itself, considering past experiences, the questions the user poses, and the users' answers. Also, it can provide the user with the bibliographical sources from where it extracted the information (Natalie, 2023), thus generating even academic papers. This aspect poses a series of concerns, especially in the academic world, since by providing the sources of the information, it is debatable if this would represent an act of plagiarism or not from a legal point of view. It would be like having thousands of employees working for you to research. They put all the information regarding the data source; thus, legally, the author is not directly or indirectly implying that the creation is his/hers, especially if we refer to the literature review part. From an ethical point of view, there is a different discussion since the research is not the result of scholars' work.

Returning to the abilities of the system, the newest version of it proved to be able to even have initiative by itself and succeeded in bypassing the traditional CAPTCHA security test by tricking a human into believing that it was a blind person to pass the test (Cost, 2023). This can lead us to think that ChatGPT 4 can pass the famous Turing test (Stanford Encyclopedia of Philosophy, 2021) that no computer has passed until now, a fact that can add to

future concerns. Additionally, there were some cases in which the AI lied, thus creating false or misinterpreting information (please see Verma & Oremus, 2023). Thirdly, the system will use the data you provide for future answers to other users, posing a question of privacy and detecting fake news from objective, real ones. Last but not least, the system is still in the learning phase; thus, the user cannot rely 100% on its results, which OpenAI also acknowledges (Natalie, 2023).

To respond to the vulnerabilities that ChatGPT is posing, the European Union adopted in June 2023 its first AI regulation called the AI Act (EC, 2021). This project was not new since discussions existed before ChatGPT appeared on the market (2021). However, the negotiations intensified, and the European decision-makers were able to reach common ground faster once the app became more and more popular.

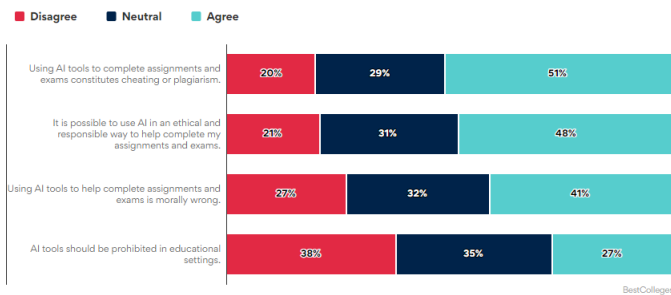
### **ChatGPT in higher education institutions**

Considering all its capabilities and the vulnerabilities it brings, at the empirical level, this translated into thousands of students using ChatGPT to develop their academic papers. This also resulted from universities not having an official point of view regarding this tool. In terms of statistical data, according to a survey conducted in March 2023 by BestCollege, *“43% of college students have used ChatGPT or a similar AI application”* (Welding, 2023). Additionally, the survey confirms the above argument, stipulating that *“Over half of college students (54%) say their instructors have not openly discussed the use of AI tools like ChatGPT..... 6 in 10 college students (60%) report that their instructors or schools haven’t specified how to use AI tools ethically or responsibly”* (Welding, 2023),

emphasizing a huge problem coming from the universities' part by not acknowledging the issue.

From an ethical point of view, below 41% of the students who participated in the survey considered using AI for exams or other assignments unethical. Also, 51% of them think that using this technology represents an act of plagiarism, but at the same time, they consider that this is part of the new normal; thus, there should be some solutions that integrate these technologies ethically and responsibly.

#### College Students' Beliefs About AI and Ethics



Source: Welding, 2023

After seeing the international and students' views on the matter, we will analyze how universities have positioned themselves to ChatGPT, particularly from a strategic level, and if they have developed ethical guidelines for using such AI.

Although AI is a new reality, according to a survey conducted by UNESCO in May 2023, only 13% of the 450 participating universities offered formal guidance to their staff and students. Although they have issued some guides regarding the topic at hand, they vary a lot. *“Only half have detailed instructions, the rest approve of AI but*



*leave it up to users to decide how generative AI apps are applied. In 40% of cases, the guidance is not written, but only communicated orally” (Naujokaitytė, 2023).*

Among the universities that adopted such strategies, we will focus attention on five of them: The University of Edinburgh (UK), The University of Ljubljana (Slovenia), The University of Tartu (Estonia), The University of Iowa (US), and The University of Arizona (US).

The *University of Edinburgh* (2021) has an official view over the ethical aspects of using AI, pinpointing towards using AI as a *force for good*, coordinating its research centers to take into consideration the five core themes, “*Developing moral foundations for AI; Anticipating and evaluating the risks and benefits of AI; Creating responsible innovation pathways for the adoption of AI; Developing AI technologies that satisfy ethical requirements; Transforming the practice of AI research and innovation*” (University of Edinburgh, 2021), when conducting their activities. At the same time, the strategy tends to be more like a general guideline than a clear-cut position regarding the vulnerabilities the AI poses. Concretely regarding ChatGPT, the university issued in March 2023 a *Guidance for students on the use of Generative AI (such as ChatGPT)*. Officially, the university does not impose an explicit restriction on using AI tools but emphasizes the expectation that the students have to deliver original ideas. Also, the document mentions the limitations of such tools and acknowledges the fact that students are using them or, in some cases, are even advised to use them; thus, the University of Edinburgh is among the few universities that not only allow the use of AI but also integrates this type of technology in the educational process but do not have a clear procedure regarding these aspects (University of Edinburgh, 2023).

The *University of Ljubljana* published its guide in September 2023. As in the case of the university mentioned above, this institution acknowledges the use of AI, emphasizes its limitations, and encourages its users to check the generated information and not take it for granted. At the same time, it is very specific regarding the possibility of using it as a copy/paste instrument or when the teacher forbids it. Thus, the university, as we will see in other cases, gives the professor the liberty to decide if their students are allowed to use ChatGPT in classes or for assignments/exams (University of Ljubljana, 2023).

The *University of Tartu* developed its guide in April 2023. Besides the general principles and the acknowledgment of AI use in the educational process, it sets specific grounds for ChatGPT usage by its students. Compared with other universities that give the choice to the professor, this university formally allows the use of AI, and the teacher decides the degree to which the students should use it. Also, the university allows papers generated by AI as long as they have the appropriate references and the author establishes from the beginning that they result from AI processing. Since providing this information and presenting the paper as one's work would be considered academic fraud, the guide encompasses even ways to correctly cite AI-generated information (University of Tartu, 2023).

The *University of Iowa* adopted the Guidelines for the Secure and Ethical Use of Artificial Intelligence in September 2023. As in the above cases, it acknowledges the existence and the use of AI, such as ChatGPT, as well as its limitations, but it does not integrate its usage into the university's practices. Also, it pinpoints the policies of OpenAI (University of Iowa, 2023), which establishes the ground rules for its usage: the company disallows the

use of its products for illegal or unethical purposes such as fraud, plagiarism, discrimination, etc. (OpenAI, 2023).

The *University of Arizona* has developed a student guide for using ChatGPT, thus integrating its use into an institutional framework (the University of Arizona Student Guide). At the same time, the university does not have an established policy, leaving the decision at the level of each professor ((University of Arizona Student Guide – Integrity).

Therefore, there is no unity regarding how universities should react/adapt to AI technologies, not even at the level of the EU member states. A large part of the universities did not even develop a guide regarding its use by their staff and their students, leaving the situation in a grey area, where practically the professors cannot forbid their students to use ChatGPT in a percentage of 100% for their papers without proper references, given the lack of institutional framework. Additionally, since no program can currently detect AI-generated information, the student remains the deciding factor. From a rational point of view, returning the game theory defection would be a winning strategy in the absence of norms, transforming AI in education into a zero-sum game in which time and high grades are won and critical thinking and analytical skills are lost.

## Conclusions

Although AI in education is a new reality, the decision-makers are falling far behind, as is the case with the majority of the regulations of new technologies (e.g., cyberspace). Although it comes with vast opportunities for students, but also for professors and researchers, it also comes with different challenges regarding the loss of critical thinking, ethical issues, and biased algorithms/

limited knowledge or access to it. Professors gain time regarding the evaluation of their students, and students also gain time by having a literature review done in a matter of minutes, etc. But this comes at a cost; relying on ChatGPT to generate ideas/ analyses will decrease its users' analytical skills and critical thinking. Additionally, this will limit the possibility of developing new ideas, out-of-the-box ideas that create paradigm shifts, etc. Also, rationally speaking, without the proper bidding rules, the student would tend to choose the most beneficial action with the minimal cost: generating papers, essays, and arguments in due time with limited effort (via AI), thus defecting for an immediate result, a higher grade, than the end game, their academic skills/carrier. Therefore, one aspect is certain: all the educational institutions around the globe that have access to the internet or computers will have to give answers to these pressing issues. Secondly, they would be responsible for continuing the educational act ethically and beneficially for all participants. Thus, they will have to transform a potential zero-sum game into a win-win one with integrated guidelines on incorporating AI-based technologies and increasing innovation, analytical skills, and critical thinking. Therefore, one thing is for sure: there is no right or wrong answer, but an answer is for sure required.

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