Artificial Intelligence in Education: Perceptions and Uses of ChatGPT by Higher Education Teachers in Portugal

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Abstract

Since it became publicly accessible in November 2022, ChatGPT, developed by OpenAI, has put artificial intelligence at the centre of discussions in all areas of society. As far as education is concerned, at first, we saw a radicalisation of extreme positions between a ban on its use in school contexts, dazzle and optimism, sometimes also exaggerated, about its potential and the fear shown by some teachers about the end of the profession.
ChatGPT, and any other artificial intelligence tool, is freely accessible on the internet, making it a democratic tool that both teachers and students can use without the need for teachers to have any pedagogical intentions when using it.
Costa et al. (2024) in a study on the use of ChatGPT by master's and doctoral students at Portuguese universities in an academic context, concluded that only 9% of students used it at the request of their teachers and as part of their teaching activity. However, it is already widely used by students, namely, to search for information, to find initial ideas for tackling a topic/concept and as a tool to help with academic work and assessment.
It is therefore important to understand how teachers perceive the use of ChatGPT and how they are implementing its use in the teaching and learning process.
Using a qualitative methodology, based on semi-structured interviews with higher education teachers at a public university in Portugal, this work presents the perceptions and uses that teachers have of ChatGPT and other artificial intelligence tools.

Keywords: *Generative Artificial Intelligence, Education, ChatGPT, Teachers*

1. ChatGPT in Education

On 30 November 2022, OpenAI published an article entitled "ChatGPT: Optimising Language Models for Dialogue" in which it announced and called for the use and experimentation of a new model called ChatGPT:
We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer followup questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests (...) [1]
From that moment on, in just 5 days, ChatGPT accumulated more than 1 million users worldwide and produced a genuine revolution and anxiety in the most varied areas of modern society [2], [3]
Its democratic nature, ease of use and the promise of a simple and effective conversation - "ask me anything" and "I may have a good answer" [3, p. 4] - make this technology one of the most disruptive ever produced, making it possible to obtain answers to complex questions that are indistinguishable from human responses.
As quickly as it spread, debates about its advantages, opportunities and even threats to some professions quickly spread to all areas of society.
In education, it didn't take long for voices to be raised against ChatGPT, leading some countries to ban its use in schools, as had happened with the use of calculators in maths teaching in the 1970s. However, given the potential of artificial intelligence systems, the implications and disruption are much greater and more significant than those caused by a "simple" calculating machine.
Besides, the introduction of any technology in education is not neutral and is bound to cause changes in the way we teach and learn. What is frightening is the speed at which these AI systems are, on the one hand, putting pressure on the status quo and, on the other, producing these changes, especially in education [3].
Just in December 2022, less than a month after the launch of ChatGPT, [4] in one of the few articles indexed on google scholar in the year 2022, when using the keywords "ChatGPT" and "education" in the title, describes the interactions with it to produce an article, on artificial intelligence in education,

written entirely by ChatGPT. This article, which is presented as an appendix in the work of[4], concluded that Artificial Intelligence (AI) has the potential to innovate and improve education in a number of ways.

Through personalised and engaging experiences for students, making teaching and learning more efficient, and supporting research and development in the field, AI can transform the way we think about and conduct education. However, it is crucial to carefully consider the ethical, technological and other challenges associated with the use of AI, and to implement measures to address them and ensure their ethical and effective use. As AI evolves, it tends to become an increasingly important tool for innovation and improvement in education, and its impact on teaching and learning needs to be continually monitored and evaluated. These are the conclusions of ChatGPT, produced in 2022, on AI in education [4].

However, on a less optimistic and more cautious note, Noam Chomsky, recognised worldwide as the founder of modern linguistics, who has been attentive to the development of artificial intelligence for many years, in an essay published in The New York Times in March 2023 [5], argues against the notion that artificial intelligence programmes like ChatGPT would be able to replicate human thought and reasoning, which makes his predictions always "superficial and dubious" [6]. His argument is based on a crude dichotomy between science and pure engineering. Science seeks to understand, while engineering seeks to produce a product that can be useful. According to him, the pioneers of artificial intelligence, namely Alan Turing, saw it as part of the cognitive sciences then emerging, using new technologies and mathematical theories of computing to advance understanding. Over the years, from the 1950s to the present, these concerns faded and were largely replaced by an orientation towards pure engineering [7], finally arriving at ChatGPT, a probabilistic system powered by astronomical amounts of information, and which doesn't understand any of the words it writes during its conversation with humans [8].

In fact, according to Chomsky, generative artificial intelligence systems, such as ChatGPT, Google's Gemini or Microsoft's Copilot, are simulators of natural language and, like any statistical prediction model, are based on historical data input (learning data), the refinement of the model and therefore subject to errors and misunderstandings. In other words, these systems fabricate data and generate low-quality or misleading information [9]

In a recent study, [10] evaluating the answers given by ChatGPT to software programming questions and carrying out a large-scale linguistic analysis, as well as a user study, to understand the characteristics of ChatGPT answers from linguistic and human aspects, concluded that more than half of the answers contain incorrect information and that 77% of them are long-winded. However, due to its well-articulated, positivist style of language and its comprehensiveness, 35 per cent of the participants in the study preferred ChatGPT responses even when they were incorrect.

This lack of awareness of the hallucinations that these systems still possess means that the role of the educator is fundamental for the conscious and cautious use of these chatbots. The watchword will be education, education ... education.

That's why generative artificial intelligence systems, and ChatGPT in particular, are so important and have such a huge impact on education. Unfortunately, there aren't many empirical studies on this impact on the teaching-learning process.

However, there is beginning to be a lot of documentation on the potential, the corresponding challenges and the guidelines or precautions to be taken when using these tools in general and higher education in particular, as summarised in table 1 [11].

In terms of its potential, ChatGPT can be a valuable tool for supporting students' research and studies. Through quick access to complex information, students can get immediate and detailed answers that help them understand difficult concepts. In addition, ChatGPT can be an assistant in writing and revising texts, providing suggestions and corrections that improve students' writing. This tool also supports the learning of new concepts, explaining complex subjects in an accessible and simplified way [8].

Another benefit is the immediate and personalised feedback, which helps to clarify specific doubts and allows continuous monitoring of the student's progress. In technological areas, ChatGPT can be useful in developing programming and logic skills.

However, the use of ChatGPT also presents significant challenges. One of the main risks is over-reliance on the tool, which can lead students to rely too much on ChatGPT, reducing their effort to learn independently. There is also the risk of students blindly relying on incorrect or outdated information without a critical sense of it, since the answers provided are not always accurate or up-to-date. Effective use of ChatGPT requires in-depth knowledge of the subject being studied.

Potentialities	Challenges	Precautions
Support in Research and Studies	Excessive dependence on the tool	Ensure use as a complement, not a substitute for study
Quick access to complex information	Risk of inaccurate or outdated information	Cross-check with reliable sources
Assistance in writing and text revision	Plagiarism and lack of originality	Encourage academic ethics and originality
Support in learning new concepts	Substitution of critical thinking	Promote the development of students' critical thinking skills
Immediate and personalized feedback	Lack of complete personalization according to individual needs	Use combined with guidance from teachers
Development of programming and logic skills	Technological barriers and lack of accessibility	Ensure equal access and technological training
Improvement in time management efficiency	Inappropriate or out-of-context use	Define clear guidelines for use in academic activities

Table 1. Potentialities, challenges and Precautions… guidelines from ChatGPT in education

Another challenge, perhaps the most discussed, is plagiarism and lack of originality. Using ChatGPT to produce academic work magnifies the ethical problems, such as lack of originality and violation of academic codes of conduct, present in academia. In addition, there is the danger of substituting critical thinking, as students may fail to develop their own skills of analysis and criticism, relying excessively on the answers generated by the tool.

In order to maximise the benefits and mitigate the challenges, it is essential to adopt certain precautions when using ChatGPT in higher education. Firstly, it is important to ensure that the tool is used as a complement and not as a substitute for study. Students should be encouraged to use ChatGPT as an additional tool and not as the main source of knowledge.

Cross-checking with reliable sources is crucial. Students should be taught to always verify the information provided by ChatGPT with other reliable sources, ensuring the accuracy and timeliness of the data.

Encouraging academic ethics and originality is another essential precaution. Students should be made aware of the importance of original production and ethical use of the tool, avoiding plagiarism and guaranteeing the integrity of their work.

Promoting the development of students' critical thinking is vital. Students should be encouraged to think critically about the answers provided by ChatGPT, not passively accepting all information.

Combined use with teacher guidance is also recommended. Teachers should guide and supervise the use of ChatGPT to ensure that it effectively complements student learning.

Finally, it is important to define clear guidelines for the use of ChatGPT in academic activities. Establishing rules about how and when the tool can be used will help to ensure that ChatGPT is employed in a way that is appropriate and beneficial to the educational process.

2. The use of ChatGPT by teachers

Despite all this identified potential, the systematic and intentional use of ChatGPT, or other similar artificial intelligence systems, by teachers is still very low. While higher education students, who sometimes have more digital skills than their teachers, use the system for their own benefit, whether it's searching for information, finding initial ideas for tackling a topic, or even as an aid in their academic work, including assessment [8], teachers remain hopeful and stubborn about introducing this topic into their teaching process. According to a study by [8], only 9% of master's and doctoral students in Portugal had used ChatGPT at the request of their teachers.

In addition, UNESCO, in a global survey of more than 450 schools and universities around the world, carried out in the first half of 2023, concluded that less than 10% of these institutions have established institutional policies or offered formal training or guidelines regarding the use of artificial intelligence applications [12], [13]. The lack of such clear guidelines leads to unplanned integration into educational systems with unknown and unwanted implications. Teachers and students need to be

helped to better understand these technologies and their implications for the teaching-learning process [13].
In Portugal, for example, of all the Higher Education Institutions, despite the number of seminars on the subject, only one has produced a document with recommendations for the use of artificial intelligence in teaching. In fact, the lethargy of educational institutions does not match the speed at which these technologies are penetrating.
Another point of concern, not always addressed in the literature, is that these models, based on neural networks, are opaque in terms of how they work. In other words, once the prompt for interacting with these systems (input) is known, the response given (outupt) is completely unknown even to those who developed the algorithm. There is a veritable black box between the input and output of these systems, making them non-transparent and unexplainable, and it is not possible to verify how their results were determined [14]. This lack of transparency, together with the astronomical amount of training data collected on the internet that these systems use, leads to a lack of confidence in many of the interactions produced.

3. Exploratory study

Given all this, what is the opinion of higher education teachers in Portugal on the use of AI in teaching? Are they aware of all the implications caused by the launch of ChatGPT?
In the absence of comprehensive studies, an exploratory study was carried out by interviewing teachers at a public higher education institution in Portugal to identify their attitude towards use, perceived usefulness and ease of use, as well as AI literacy.
The interviews, conducted in April 2024 following a semi-structured script, were recorded, transcribed and their content analysed according to [15].
Eight teachers from the same educational institution were interviewed, with teaching experience ranging from 15 to 29 years, in areas ranging from maths, history, sociology, computer science, Portuguese language and pedagogy. In terms of their academic qualifications, 6 of them have a PhD and the rest are finishing their doctoral programme, making up a highly qualified group in academic terms and with a great deal of teaching experience.
To demonstrate the penetration of the ChatGPT lexicon and its association with artificial intelligence, when asked about the first word that comes to mind when talking about artificial intelligence, they all answered ChatGPT.
As for the use of the tool or other AI systems, the situation is quite different. One of the interviewees said that he was aware of the existence of ChatGPT, that he probably uses an application that uses artificial intelligence, such as Netflix or another streaming system, but that he had never used ChatGPT, showing a complete lack of knowledge about how it works. When confronted with another study carried out with students from the same educational institution in 2023, in which more than half said they frequently used ChatGPT in their academic tasks [8], he ended up recognising that for the first time, given this data, he was being challenged to reflect on the subject. Until then, artificial intelligence "was something for engineers and by engineers" and it was in informal conversations with colleagues and friends that, with the launch of ChatGPT, he realised that "there was a monster out there that was extremely dangerous and important". He has many concerns, especially about the lack of diversity of ideas generated by these systems, because he is afraid that the interactions will be generic and heavily influenced by academic trends and the concepts dictated by the majority. However, he recognises the need to understand how they work.
On the other hand, one of the interviewees, who has a background in information technology and maths, has long been involved in developing the use of AI in education and was aware of all the difficulties and uses to be made of these systems. However, he doesn't use it in his teaching practice.
Generally speaking, 75 per cent of the interviewees have used ChatGPT at some point in their teaching activities, either for administrative purposes or to help prepare lessons and activities. Curiously, only one of the interviewees assumed that they had used ChatGPT as part of activities developed by the students in which they were obliged to use it.
Those who had already used ChatGPT were unanimous about how easy it was to use. One of the interviewees said "it's very easy to use but very difficult to use well". They are generally aware of the need for contextualisation and the importance of prompts to get the best results. They consider it important to work with students on creativity and critical thinking, and they feel there is a need for greater clarification of the use of artificial intelligence in education on the part of leaders.

4. To summarize

Despite all the limitations, this first study, although exploratory, has made it possible to realise the different speeds at which teachers are approaching the use of artificial intelligence in education.
More studies involving teachers are needed, as they are the centrepiece of the entire educational process. So far, much has been said about the potential of AI in education and there is a need to develop research projects focussing on the impact of these technologies in our universities and schools in general. Supporting teachers in designing activities that integrate AI and measuring this impact on student learning is urgent and fundamental. Many experiences have already been reported by teachers, often labelled innovators, but the vast majority are still, not in denial, but a little lost in the flood of information.
As we said earlier, in the face of these generative artificial intelligence systems, the watchword is Education, Education... Education of teachers, students and society in general, with strong leaders involved in the process.

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