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THE IMPACT OF HUMAN-CENTERED ARTIFICIAL INTELLIGENCE IN HIGHER EDUCATION

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Abstract:
The academic community around the world faces several challenges due to the technological development that has shifted to the field of education. There is a strong reflection of the professors in university education regarding the modern needs of students that they are called to meet in an internationally competitive environment. The integration of innovation and technology is a cornerstone to promote the educational experience, enhance active learning and reduce the academic boredom that students may feel during their studies. The entry of artificial intelligence (AI) into the field of education through proper course design and in combination with the appropriate educational tools is a patchwork that stimulates student interest and is an important indicator of engagement through a deeper desire for learning and advanced academic achievements. All these issues raise reasonable questions about the factors that contribute to the active engagement of students and the reduction of academic boredom. The present research is a scientific article which is based on previous studies with critical thinking and with the aim of elucidating aspects in particular of Human-Centered Artificial Intelligence. Research findings show that improving teaching methods, promoting adaptive learning motivates a more human-centric solution to the application of artificial intelligence. In addition, personalized learning drives higher levels of student engagement, shaping an educational environment that is more engaging, human-centered with high devotion and commitment, reducing academic boredom.

Keywords: academic boredom, human-centered AI, adaptive learning, higher education

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1. Introduction

The application of artificial intelligence (AI) has significantly affected university education through a set of modern and innovative approaches, using educational tools that improve teaching, making it more attractive to undergraduate and graduate students (Kottara and Zaridis, 2024a).

In a broader context, artificial intelligence systems help professors manage time, prepare educational materials and adapt lessons to modern technological developments (Alimadadi *et al.,* 2020). On the other hand, there are also several challenges to the way of exploiting artificial intelligence (AI) regarding some ethical issues, emphasizing the protection of data privacy (Teng *et al.,* 2023).

Additionally, artificial intelligence (AI) has generated intense political and scientific interest worldwide. There is a lot of hype as well as reflection on its effects on society and the economy at national and global levels (Crawford *et al.,* 2023).

Remarkably, it is the fact that a high level of interaction is observed between Artificial Intelligence and university institutions through the effort for a more human-centered approach, in order to reduce academic boredom (Sollosy and McInerney, 2022; Georgopoulou, Troussas and Sgouropoulou, 2023; Kottara *et al.,* 2024b).

Several researchers have approached the definition of academic boredom, stating that it is a non-positive perspective as it is an emotion felt by students who have associated learning with a negative perception (Nett, Goetz and Daniels, 2010; Tze *et al.,* 2013). These students, in some cases have an increased feeling of inadequacy with low self-esteem and satisfaction during their studies. Additionally, they exhibit a level of burnout and a tendency to disengage (Finkielsztein, 2020).

However, studies have highlighted the issue of adaptive learning as a key factor in reducing academic boredom (Kem, 2022). This happens through the adaptation of educational content to the individual needs of students, highlighting activities and educational learning patterns that make their educational experience more enriching and engaging (Kabudi, Pappas and Olsen, 2021; Wang *et al.,* 2023).

In addition, adaptive learning systems that have been developed in recent years focus on elements such as student progress, engagement and active involvement. At the same time, they offer sustainable development to university institutions as they strengthen SDG 4 for the possibility of equal opportunities, free access and fairer study, through better evaluation of their academic effort (Kottara *et al.,* 2023; Kottara *et al.,* 2024c; Sajja *et al.,* 2024).

The level of academic boredom and the development of adaptive learning systems are set to be improved by human-centered artificial intelligence (HCAI) using advanced knowledge and technological design that frame human interaction (Zhao, 2023).

Human control is deemed necessary for the protection of personal data through a more human-centric artificial intelligence that examines the spectrum of human contribution and collaboration through a set of algorithms that has a dominant basis on the human mind (Lata, 2024).

The concept of human-centered artificial intelligence has a broader perspective as it is defined by a set of systems that are in a cyclical process of improvement given the human condition that contributes to the optimal flow of the robot-human binary relationship (Topali *et al.,* 2024).

As an approach, it enables the enhancement of human capabilities through the usability and usefulness of Human-Centered Artificial Intelligence (HCAI) systems, while it refers to the development of artificial intelligence (AI) technologies that promote a multidimensional set of ethical, social and cultural aspects.

The contribution of the present study lies in the entire range of challenges mentioned above in order to highlight issues and elements that support the improvement of both the level of human interaction and personalized learning in educational contexts.

The main purpose of this research is the investigation of Human-Centered Artificial Intelligence, and, more specifically, how it can affect both academic boredom and adaptive learning through its application, meeting the modern needs of students, the level of participation, understanding, and engagement in the course, showing improved academic results.

2. Academic Boredom

Research around the world is intensifying to address academic boredom, as its occurrence has negative effects on undergraduate students, particularly on their learning outcomes and educational experience. Students' views set new foundations for their stimuli and way of learning, raising issues of technology integration, and orienting a more human-centered approach to teaching focused on their individual needs (Sharp, Sharp and Young, 2020).

An interdisciplinary interest is observed regarding various feelings of students and especially the after-achievement during their studies, taking into account the levels of academic boredom they have experienced (Kottara *et al.,* 2024d; Kottara *et al.,* 2024e). The fact arouses the interest of researchers for a more sociological examination, description and analysis of the attitudes and behaviors of students who are bored in the classroom. Dealing with boredom is preventing it by developing strategies that help reduce the burnout that occurs especially in students nearing graduation (Finkielsztein, 2020).

Hunter and Eastwood (2021), in the experiment they conducted, report that there is a great interaction between the spectrum of boredom and academic performance, while the causes are often the same. Central points that emerged are the manipulation of perceptions of performance, where in several universities it is an institutional issue, making the educational process boring.

Camacho-Morles *et al.* (2021) distributed questionnaires about students' emotions, and it was found that feelings of success were related to academic, work and other activities that were directly related to self-regulatory abilities and an adaptive learning context.

In a case study by Xie *et al.* (2022), graduate students face academic boredom. The interaction of students' performance styles and boredom coping strategies in traditional learning environments was revealed. They argued that the professor was largely responsible for the boredom as he did not interact in the classroom and did not incorporate technology. The impact of student demographics can influence the level of boredom, through testing structural models for measuring learner engagement and satisfaction (Bekker, Rothmann and Klopper, 2023).

Yang, Lian and Zhao (2023) highlighted important issues regarding traditional courses where students were found to be passive receivers in the educational process, as the course content was boring and not interactive at all. Lecturers increase the workload of preparing their lectures, and this has a negative impact on their students as they are extremely demotivated to learn and, therefore, suffer. However, the same researchers explained that artificially intelligent robots in education (AIERs) come as helpers as there is a significant reduction in the workload of professors through multidimensional teaching strategies that make it more engaging and effective.

More specifically, the use of educational robots gives learners the opportunity to have access to rich and modern educational content, increasing the interaction both with the professors and with their peers. On the other hand, if robots are used for a long time during the educational process, this brings about negative results as it can lead to boredom. It is evident that engagement is a significant indicator of student motivation and conversely, enhancing their interest promotes motivation, active participation, and optimal academic achievements. The perceptions of both students and professors regarding the adoption of educational innovation through the highlighting of the suitability of educational tools are crucial for developing teaching strategies that enhance the effectiveness of tertiary education (Georgopoulou *et al.,* 2024).

3. Adaptive Learning

The educational map has changed radically through the use of mobile and cloud computing and artificial intelligence. As a whole, advanced learning systems enabled by artificial intelligence created a new educational framework that shed light on aspects to combat boredom by meeting the individual needs of learners (Kottara *et al.,* 2024f).

The researchers Kabudi, Pappas and Olsen (2021), highlighted issues of key importance, such as identifying the types of learning interventions with the potential of artificial intelligence. This record informs future studies on the design of AI-enabled learning systems to solve learning problems and improve user experience.

Learning is a continuous process, as man has a need for new ideas and knowledge. Both personalized and adaptive learning platforms offer new teaching approaches and solutions in the modern digital age. The development of a model adapted to the individual needs of students is important for the course of students (Kem, 2022).

Gligorea *et al.* (2023) conducted a literature review analyzing 63 peer-reviewed articles evaluating the development of adaptive learning algorithms and their effects on teaching staff. From the data that emerged, it became clear that the presence of algorithms

was of crucial importance for the personalization of educational experiences. Barriers such as the cost and complexity of artificial intelligence in the educational process should not distance the possibility of adopting adaptive learning, which can revolutionize education by meeting the individual needs of students, improving their academic performance and engagement.

Rane, Choudhary and Rane (2023) examined aspects of the integration of Artificial Intelligence (AI) in academia and particularly in the spectrum of Education 4.0 and 5.0. It was found that education needs to move away from traditional models and follow the imperative needs of the digital age.

An educational environment that integrates technology and artificial intelligence is organized and implemented in order to meet the needs and preferences of students individually. At the same time, it encourages them for a more engaging and effective educational experience. It is important to balance technological innovation and ethical criteria, ensuring the effectiveness of artificial intelligence in a personalized environment that promotes adaptive learning.

In the same year, researchers Fariani, Junus and Santoso (2023) claimed that adaptive learning (AL) helps the level of analysis of students' diversity, enhancing learning outcomes while increasing their satisfaction through the provision of motivation.

Sari, Tumanggor and Efron, (2024) in their research examined the impact of adaptive learning systems based on artificial intelligence, focusing on Smart Sparrow and IBM Watson Education. The results showed high rates of course completion with increased student engagement. Conducting this research in blended settings strengthened the view of the effectiveness of adaptive systems over traditional teaching methods (Kottara *et al.*, 2024g). The researchers emphasized that these systems give equal opportunities to students, while at the same time offering them a higher quality education.

In addition, through the research of Sajja *et al.* (2024), it was found that the use of an intelligent assistant through artificial intelligence for personalized and adaptive learning in university institutions can reduce the cognitive load of students. This fact provides the opportunity for easy evaluation of the educational content, with the simultaneous possibility for personalized learning support.

The body of research shows that AI-powered adaptive learning systems have transformed the educational process by providing personalized learning experiences that are inextricably tailored to individual student needs, maximizing engagement and learning outcomes.

4. Human-Centered Artificial Intelligence

Artificial intelligence is on the rise and gaining more and more ground using automation of people's everyday mental tasks. It has also been found to help predict knowledge across disciplines (increased interdisciplinary), yet there remains to this day the capture

of a central question that focuses on how all these tools can enhance the human mind, reducing the stakes of human values (Schmidt, 2020).

Rafsanjani and Nabizadeh (2023) state that human-centered artificial intelligence is particularly aligned with adaptive learning systems that largely cover the needs of students and enhance the role of professors, supporting an interactive and personalized educational experience. However, today the level of artificial intelligence cannot cover at a high level the whole set of human information and provide the corresponding experiences. It is precisely at this point that human-centric artificial intelligence gives essential help in that machines are able to understand and use human input to enhance human skills. Significant advantages of human-centered artificial intelligence are architecture in processing and improvement of design and engineering capabilities. Additionally, through data-driven project management with personalization, it can deliver systems' training that promotes human-centered artificial intelligence.

The challenges for researchers are of utmost importance as the perspective of the anthropocentric approach to artificial intelligence focuses on human well-being through responsible design, respecting the rules of morality and ethics, and respecting the full range of human cognitive abilities (Ozmen *et al.,* 2023).

Through Human-Centered Artificial Intelligence, special importance is given to interdisciplinary collaboration, respecting ethical standards. Harmonious coexistence between humans and AI is emphasized, contributing to the well-being of humanity. Sciences such as computer science and medicine have been found to create a framework, especially during pandemic crises (Usmani, Happonen and Watada, 2023).

The elimination of educational inequalities and academic boredom in some cases can be drawn from the humanization of Artificial Intelligence for a personalized and adaptive learning, overcoming algorithms and creating inclusive and effective educational environments. The dynamics of human-centered frameworks for artificial intelligence in education imply holistic, participatory design, while simultaneously empowering social-emotional learning. Today, there is a great need for pedagogical artificial intelligence that will go beyond traditional learning environments (Lata, 2024).
It is no coincidence that researchers are studying Learning Analytics (LA) and Artificial Intelligence (AI) in order to upgrade the quality of university education, supporting teaching and learning by creating good practices. Although this effort is being made to adopt AI in authentic environments, there is a limitation of research, with a significant lack of a pedagogical approach to the integration of technology. Human-centered design and its application in the field of higher education is a big challenge, which is being challenged more than ever by the stormy developments of artificial intelligence (Topali *et al.,* 2024).

5. Discussion and Conclusions

Artificial intelligence has revolutionized higher education across the globe, surpassing human capabilities in computing and decision-making, and even in teaching.

It has been established that Human-Centered Artificial Intelligence is based on humans, who have the ability to feel and review situations through reflection. However, researchers report that it is governed by two elements, the first is artificial intelligence with the presence of human control (Shneiderman, 2020), and the second is artificial intelligence in the human condition (Stanford HAI, 2020).

In addition, human-controlled artificial intelligence is a defining factor that is distinguished by the level of human control while helping to automate everyday tasks. Notably, Human control AI leverages the collaboration between human control and AI automation to enhance human productivity with a high level of reliability, safety and trust (Shneiderman, 2020). The presence of artificial intelligence algorithms in collaboration with the human presence lends a framework for augmenting human intelligence using machine intelligence to enhance human well-being. Taken as a whole, all these elements in the university space and in the educational process have created a new context in which traditional teaching is annihilated and virtual classrooms and lessons through virtual reality take their place. However, research shows that AI can make classes more engaging and increase student interest. This is happening as professors underpin their teaching in the framework of new strategies with the combination of artificial intelligence and human existence (Kottara and Zaridis, 2024; Kottara and Asonitou, 2024).

Educational innovation with the use of the right digital educational tools enables a more upgraded and effective university teaching (Georgopoulou *et al.,* 2024). Especially through personalized learning that adjusts to the modern needs of students with the adoption of digital learning platforms, the opportunity is provided to obtain more advanced learning outcomes and active participation that almost eliminates academic boredom (Kem, 2022).

It appears that adaptive learning based on Human-Centered Artificial Intelligence has changed the academic map and the role of professors in the educational process, with better results, since it focuses on the individualized needs of students (Rafsanjani and Nabizadeh, 2023).

In its entirety, this research reveals Human-Centered Artificial Intelligence as an aid to the difficult educational issues that have arisen from time to time. It is important to focus on a more interactive and exciting experience that positively affects the understanding of educational content, and the development of advanced skills, while at the same time providing greater satisfaction to students (Topali et al., 2024).

According to the aforementioned, higher education is faced with new challenges that can bring about, through the human-centered design of artificial intelligence, many benefits that the university community is called upon to seize today.

6. Limitations and Recommendations for Further Research

Through this research, the importance of human-centered artificial intelligence and the level it contributes to university education through adaptive learning systems that have a predominant orientation to the needs of students have been highlighted. In addition, it

was identified that all these perspectives can enhance the role of professors by supporting the personalized learning experience, which reduces academic boredom.

However, despite the fact that these critical issues were clarified, there is a limitation in the methodology as it focuses on already existing studies, drawing some general conclusions without implementing primary research (quantitative or qualitative). It is considered important to carry out further research on the field under consideration, as it is necessary to collect and analyze data of a more generalized nature, comparing the results from universities around the world.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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