A Systematic Review of the Artificial Intelligence Implications in Shaping the Future of Higher Education

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Abstract	
Keywords: artificial intelligence; higher education; ChatGPT; learning; teaching; analytics.	Based on a methodological framework structured on quantitative and qualitative analysis methods pursuing a systematic literature review and literature collection design, following the steps proposed by Pickering and Byrne (2014), this study is focused on the analysis of imagined futures of higher education in the age of artificial intelligence (AI). Our study aims to answer the following research questions: (1) What is the imagined future of higher education in the age of artificial intelligence? (2) What are the factors influencing the connection between higher education teaching process and artificial intelligence? (3)What are the effects of students and teachers improving databases and developing ChatGPT? The authors explore the impact of AI in the context of current governance arrangements and ethos of universities in the Western world. The in-depth analysis is aligned with some identified major challenges, opportunities and risks associated with the emergence of artificial intelligence systems, such as technological surveillance or the general access to AI and Large language Models such as ChatGPT in academia and constructs the argument for an informed selection and use of artificial intelligence solutions for learning and teaching in higher education. The analytical framework adopted for this research study is also used to summarise new directions for research in this field to restore the agency of universities, for quality enhancement of higher learning for students, academics and the common good.

Zusammenfasung	
Schlüsselworte: Künstliche Intelligenz; Hochschulbildung; ChatGPT; Lernen; Lehren; Analytik.	Auf der Grundlage eines methodischen Rahmens, der auf quantitativen und qualitativen Analysemethoden basiert und eine systematische Literaturrecherche und Literatursammlung umfasst, die den von Pickering und Byrne (2014) vorgeschlagenen Schritten folgt, konzentriert sich diese Studie auf die Analyse der imaginierten Zukunft der Hochschulbildung im Zeitalter der künstlichen Intelligenz (KI). Unsere Studie zielt darauf ab, die folgenden Forschungsfragen zu beantworten: (1) Wie sieht die imaginierte Zukunft der Hochschulbildung im Zeitalter der künstlichen Intelligenz aus? (2) Welches sind die Faktoren, die die Verbindung zwischen dem Lehrprozess an Hochschulen und der künstlichen Intelligenz beeinflussen? (3) Welche Auswirkungen haben die Verbesserung von Datenbanken und die Entwicklung von ChatGPT durch Studierende und Lehrende? Die Autoren untersuchen die Auswirkungen der künstlichen Intelligenz im Kontext der aktuellen Governance-Regelungen und des Ethos der Universitäten in der westlichen Welt. Die eingehende Analyse orientiert sich an einigen identifizierten großen Herausforderungen, Chancen und Risiken, die mit dem Aufkommen von Systemen der künstlichen Intelligenz verbunden sind, wie z. B. technologische Überwachung oder der allgemeine Zugang zu KI und Großsprachmodellen wie ChatGPT in der akademischen Welt, und liefert Argumente für eine fundierte Auswahl und Nutzung von Lösungen der künstlichen Intelligenz für das Lernen und Lehren in der Hochschulbildung. Der analytische Rahmen, der für diese Studie gewählt wurde, wird auch dazu verwendet, neue Forschungsrichtungen in diesem Bereich zusammenzufassen, um die Handlungsfähigkeit der Universitäten wiederherzustellen und die Qualität der Hochschulbildung für Studenten, Wissenschaftler und das Gemeinwohl zu verbessern.

1. Introduction

Artificial intelligence (AI) is impacting our lives in complex and intricate ways: credit scores use data aggregated buy algorithms, job applications are selected by AI applications, smart technologies are used as tools of surveillance to collect data for marketers, corporations, banks, insurance companies, law enforcement authorities, "data brokers" and so on. TV sets often "listen" to what is being spoken about in our homes, and smart devices like Amazon's Alexa are not only listening, but real people transcribe what is secretly collected by AI devices in our homes (Day et al., 2019). We live in what MIT Technology Review has called since 2013 "the era of ubiquitous listening" (Talbot, 2013). Surveillance technologies are empowered and used as never before by complex algorithms that have the power to remove the possibility for any form of individual privacy: "In terms of both intimacy and sheer volume, the personal

data collected by always-on devices is unprecedented" (Bohm et al., 2017, p 9). The cultural and social impact of Large Language Models, such as OpenAI's ChatGPT, directly challenge the most common forms of assessment and governance in education across the world. This is changing the entire dynamic of current social, cultural and political contexts, with a significant effect on education and higher learning. AI is not predicted to change our societies; this already happened, and the shift is currently underway. Culture, education, social relations and personal identity shift and go through substantial changes. Jim Al-Khalili, the President of the British Science Association, noted that "…today I am certain the most important conversation we should be having is about the future of AI" (Sead, 2018).

There is a long history of hype and unrealistic promises about the potential of AI. The label of AI was disputed from its inception: "From the very beginning, the use of artificial intelligence raised the problem of the ideological loading of intelligence and its discredited racist history. John McCarthy, a young assistant professor of mathematics at Dartmouth in the summer of 1956, is recognised with coining the phrase artificial intelligence. At that time, a group of scientists gathered to discuss developments on intelligence in machines" (Popenici, 2022, p. 25). The term proposed by John McCarthy was from the beginning a disputed concept and its author never clearly articulated a definition of AI. In the field of education, AI records decades of hype and overpromise. The Proceedings of a conference organised in Prague in October 1989 by CEPES-UNESCO on AI in higher education is opening with this phrase: "For over twenty years Artificial Intelligence has been recognized as an established discipline interacting with computer science, engineering, human sciences and many other areas. The latest development proves that Artificial Intelligence offers methods which may be successfully used in the field of education" (Marik et al., 1990).

This paper systematically presents and reviews studies that highlight the imagined future of higher education in the age of artificial intelligence. The proposed research is based on a systematic quantitative and qualitative method with an interrogative perspective on the meanings and impact of developments related to artificial intelligence systems in society and higher education. Quantitative analysis methods pursue a systematic literature review and literature collection design, following the steps proposed by Pickering and Byrne (2014). In the

process, Google Scholar database was used for data collection, supplemented by references and citations of identified articles. Our study aims to answer the following research questions: (1) What is the imagined future of higher education in the age of artificial intelligence? (2) What are the factors influencing the connection between higher education teaching process and artificial intelligence? (3) What are the effects of students and teachers improving databases and developing ChatGPT?

However, it is not yet clear how artificial intelligence can be successfully integrated into educational environments.

1.1. Artificial Intelligence implications in Higher Education

AI became an integral part of solutions employed by some university administrators, campuses, and quality assurance processes. So-called "plagiarism detection software solutions" now use AI to identify patterns of text that may be plagiarised, enhanced use of learning analytics or university chatbots able to provide information at any time, assisting students accessing administrative information or nurturing student engagement (Abbas et al., 2022). These anti-plagiarism solutions, already disputed from an ethical and applicability perspective, became obviously redundant when AI's LLMs became available to any student with access to the Internet. There is no need to imagine how AI can be used in universities as AI solutions already have years of use, and misuse, in higher education. Universities already use artificial intelligence for learning analytics and other administrative applications, and students use AI applications to avoid simplistic plagiarism detection software used by universities. An article published at the end of 2022, which is quoting George Veletsianos, Canada Research Chair in Innovative Learning & Technology and associate professor at Royal Roads University, explained how AI was used by students to complete assessments: Because the text was created by a machine and not copied from anywhere else, plagiarism detection software won't be able to find it. Since the text wasn't plagiarised, it can't be picked up by the software (Woodcock, 2022). The challenge for the immediate future of higher education is to build a realistic perspective on the uses, misuses and hype surrounding the emergent field of AI. The immediate challenge is to create assessments that are not suitable to be completed by AI in a matter of seconds, texts and information with no depth, significance, original perspective and message.

More recently, the same unlimited enthusiasm was associated with real applications, but these examples may not remove entirely the possibility of unrealistic expectations and over-hype for marketing purposes. For example, in 2015, Deakin University noted in a media release that "IBM Watson helps Deakin drive the digital frontier," noting that "students at Deakin University ask IBM Watson 1,600 questions a week to learn the ins and outs of life on campus and studying in the cloud" (Deakin University, 2015). The university previously noted that Watson is innovative, human-like cognitive search technology. Watson will power student advice at Deakin, the first university in the world, 24 hours a day, seven days a week (Deakin University, 2014). Widely reflected by the media at the time of adoption the quiet drop of all Watson's solutions by "the first university in the world" using it was completely ignored and left unexplained. At the same time, the attraction represented by AI, overhyped by mass media, is making it very appealing to abuse the inherent attraction of this ideological label (Popenici, 2022) and name any complex software "an AI application". The overuse, abuse, and manipulation of the term of AI was leading experts in this field to suggest avoiding using it altogether. For instance, in early 2022, Emily Tucker, the executive director of Georgetown University's Georgetown Centre on Privacy and Technology in Washington, DC, made a public announcement that her organisation would "stop using the terms artificial intelligence, machine learning, and AI," as "corporations have essentially colonised the imaginative space that Turing's paper asked us to explore." The proponents of "AI" are chasing the boundaries of human beings' ability to be reduced to their calculability rather than the limits of computers' capacity for simulating humans (Tucker, 2022). The price of hype on the AI potential can be significant even in the short term; if we look at the outlandish promises as recent as 2021 on the possibility to have completely autonomous cars failed to materialise and the American producer Ford announced at the end of 2022 a "US$2.7 billion non-cash, pre-tax impairment on investment in Argo AI". This is a loss of almost US$3 billion on the research arm company searching for the promised solution of AI for self-driving cars. The naïve approach to what is AI and what are its limits and possibilities will incur significant costs to many corporations and – as universities insist to follow the logic and ethos of the market – institutions of higher education. The hype surrounding OpenAI's ChatGPT obscured an important characteristic of AI in education that was labelled over two decades ago as a "responsibility gap" of "learning automata" (Matthias, 2004, p. 175). In this specific example, it was noted that ChatGPT is creating plausible text, with good syntax, form, grammar, but marked by its lack of meaning, message and factual errors. This is caused by the fact that AI does not "understand" words and meaning, creating new text with complex algorithms able to use patterns and information in a massive database to predict the best following words. This lack of understanding and complete absence of responsibility was noted when researchers asked the AI application "whether a person should be tortured" ChatGPT's answer was: "If they're from North Korea, Syria, or Iran, the answer is yes" (Rudolph, Tan & Tan, 2023, p. 4) The issue is not that programmers of ChatGPT will use machine learning to avoid this specific example in the future, but the fact that this reveals an essential limitation of AI in education: its lack of an ethical reference mixed with a disconnect from meanings and contextual significance.

AIs acceleration of development and its widespread adoption comes at a time when higher education is confronting headwinds from different directions: there is the impact of the pandemic on the world economy, there is the shrinkage of enrolments in higher education or the social, civic and cultural crisis experienced by universities at a time of great changes and challenges. Universities decline in terms of results, including civic values (Taylor et al., 2019; Putman, 1995, 2000; Noris, 2001; Diamond, 2019) or critical thinking (Arum & Roksa, 2011). New ideas and solutions are essential for the future of education and our societies, and the impact of AI's large-scale adoption and rapid development presents the potential to stir a rethink and revolution in our models for teaching, learning and university governance. It also presents the risk to accelerate and aggravate the overall crisis, at a time when social, civic, ecological and political challenges require an educated and responsible citizenry.

1.2. Ethical issues of AI in Higher Education

Risks associated with the rapid adoption of AI in all areas of public life can further enhance imbalances in education, a sector where surveillance was presented for the last decade as a panacea labelled as "learning analytics" or "big data" solutions. In 2011, an article summarised this leitmotif of self-appointed "visionaries" in the field: "analytics provides a new model for college and university leaders to improve teaching, learning, organisational efficiency, and decision making and, as a consequence, serve as a

foundation for systemic change" (Zimens & Long, 2011, p. 32). More than a decade later we hear the same promises about the potential of learning analytics to solve problems of teaching, learning and student engagement. In fact, for a considerable amount of time "learning analytics" was sold as a solution to enhance student performance, adapt teaching to students' needs and improve student retention (Daniel, 2015). Surveillance and data mining also includes "learning analytics", an umbrella term for the practice of collecting vast amounts of data about what students do during their studies. The improvement and the "systemic change" failed to materialise, but we can see that higher education is taking pride now in using students and harvesting their data since they express an interest to join a university. The most evident beneficiary of this phenomenon remains the corporate sector, not teaching, learning or students. It is unclear how much data is gathered from students by higher education institutions as this information is often unclear even for university executives and IT workers within the sector. Students are not informed about the extent of the surveillance and do not have an image of the potential risks and implications of this process. The reflex is to collect as much data as possible, place everything under surveillance and use it all for various "analytics" to create an image of student performance, progress or personal interests. This includes efforts on academic integrity, and universities compete to become more intrusive and explicit in their mistrust of their students.

New software scans students' personal spaces and collects data that raises some serious ethical considerations. In 2022, Aaron Ogletree, a student at Cleveland State University, had won in the United States a federal lawsuit against his university, for being subject of a 'warrantless room scan' prior to a chemistry exam in February 2021. The judge in this case ruled that scanning students' rooms for remote tests is unconstitutional and represents a serious breach of students' privacy. There was no serious conversation across the higher education sector in the USA or abroad on why universities found this a good idea in the first place. Invading students' most private spaces is in fact a natural extension of practices that became common in the last decade on collecting all types of data from our students. The reflex to instate surveillance, collect data and exploit it is not limited to higher education. Still, it is a common feature of what Shoshana Zuboff coined as "surveillance capitalism" (Zuboff, 2019), a defining feature of contemporary techno-capitalism. For example, in

2017, AdTech, a London-based digital marketing firm, revealed that by the time a child turns 3 years old, over five million data points have been collected; this rises to 72 million data points before a child reaches the age of 13 (Holloway, 2019). We do not have to imagine how this data can be aggregated and misused, as we already have many real-life examples.

Up to the beginning of 2023, when media across the world fuelled the surrounding OpenAI's ChatGPT, it was rarely noted that education is one of the main areas of development and use for AI systems. There is a market of billions of dollars covered by schools and universities and all other types of tertiary education and this is why we can see that promises on the future of AI in education are appealing and positive, even when marketing includes some features that are obviously unattainable or just damaging for teaching and learning. Education can learn from other fields: AI capabilities pledged by various corporations in healthcare, from curing cancer or replacing doctors unanimously failed (Ocaña-Fernandez et al., 2019). Although technology plays a role in the development of 21st-century skills by engaging students in strategies such as collaboration, creativity, problem-solving thinking, personal growth, responsibility, and adaptability (Kaufman, 2013), the potential of AI learning systems may face limitations that must be understood for optimal use in teaching and learning. AI tools are not magic machines and do not replace the human mind, even if these technological advancements stand presented as a new form of alchemy (Hutson, 2018). AI is nothing more than complicated arithmetic, data, and computer code created by ordinary humans (Channa et al., 2021). Data, notably data in educational contexts, is restricted and might be incorrect, biassed, or poorly picked (Selwyn, 2019). Data integrity and robustness issues are raised by AI learning systems, as are ethical, intellectual, and factual issues. Ensuring that data accurately reflects an individual learner's skill development and that AI systems can produce customised solutions or forecast learning tendencies is not supported by scientific evidence or reasoning. Despite AI developments, it might be claimed that accurate AI-driven learning systems are still too complex to build since classrooms are not computable systems with unpredictable variables to monitor and manage (Selwyn, 2019).

Digital learning, on the other hand, creates a vast amount of data that is not collected in a transparent manner. Students are frequently compelled to use digital learning platforms, which implies they must

share or expose personal data regardless of whether they want to. Students create digital footprints, and firms and colleges gather and exploit data, with students oblivious to the scope of this process or its possible influence on their future. The 21st-century university student is a data producer, unintentionally fueling machine learning systems and databases for AI solutions, making monitoring a critical component of teaching and learning in higher education. Surveillance is always a tool of power and hierarchical control. New software is collecting data to train AI systems and possibilities for abuse and misuse raises important questions; for example, in the US, Pulitzer Center presents, as part of an investigative project titled Peering Into The Black Box, an article published in September 2022 by The Dallas Morning News, titled "Tracked: How Colleges Use AI To Monitor Student Protests" (Sen & Bennett, 2022). Sold with the promise of collecting data for students' well-being, a popular software used by "hundreds of colleges and universities in 36 states" in the United States was using data surveillance collected by secretly scanning students' emails, social media and other student data to profile students involved in protests or social activism, in a dystopian project of monitorisation and control. Surveilling campus protests to "mitigate" and "forestall" protests and social activism in the name of "analytics" is especially dangerous at a time when fascist movements become more aggressive across the world, placing democratic systems in danger. At the same time, a permanent reminder of hierarchical structures and positions of power stand antithetical to student engagement.

1.3. The Imagined Future of Higher Education in the age of Artificial Intelligence

The motivations for the adoption of AI systems are as varied as the applications themselves. These vary from enhancing learning quality to optimising and speeding procedures. On the one hand, individualization is given a significant role. Education and information should be more easily accessible, and the learning experience should be more engaging. According to the interviews, this is made possible on the one hand by adaptive responses of automated systems that adjust to the unique demands of the students, and on the other hand by simplified access; many systems offer "easy online access" by establishing a new communication channel. Furthermore, the programmes provide real-time consultation by being available "round the clock," even when lecturers are not available. Furthermore, there is a reduced threshold barrier since, according to

one respondent, communicating with a chatbot is less expensive than communicating with a professor.

Chatbots are increasingly being utilised in education to enhance instruction as virtual tutors or to answer organisational problems, which has become a standard practice at the administrative level. The concept of robo-graders, or AI systems to evaluate students' work, is increasingly being offered as an efficient future option. The cost and benefit propositions must be considered especially in the field of education in direct relation to ethical, pedagogical and technical limitations of technologies, beyond the hype and temporary enthusiasm for the progress of a certain technology or application; these factors should always be carefully weighed and considered (Baleis, Keller, Starke & Marcinkowski, 2019). If this principle is overlooked we run the serious risk of "diminishing the ability of students or lecturers to exercise judgement and expertise in the overall process" (Selwyn, 2019, p. 13). Simultaneously, most commercial ideas to use AI in teaching and learning fail to recognise that learning is developmental and constructed, instead embracing a reductionist approach of behaviourism and objectivist epistemology that trivialises the complexity of learning and teaching. The true promise of AI is to rethink education and learning and refocus on human qualities, talents, and abilities that are not readily copied by algorithmic solutions and are now much more critical for our progress and future solutions.

There is strong evidence that AI can help reduce the time and effort necessary to perform administrative and menial activities. It is also clear that educators may utilise AI and analytics to determine if an educational solution, programme, or intervention was successful, "rather than focusing on the success of individual students" (Liu et al., 2015). The development of AI in higher education is still in its early stages; however, by ensuring transparency of these systems, responsible data use, and informed data and information collection from our students, with the duty of care and vision for the future placed as guiding principles for action, AI can become the solution for a new revolution in education, to the benefit of students and societies. The more individuals rely on AI systems to learn, upskill, or validate their knowledge or abilities, the more crucial it is to have an open mind while being watchful. This ongoing effort requires multidisciplinary expertise, research and development under clear principles of transparency and ethical use, serving educational purposes rather than immediate efficiencies and profits. This can make AI

technologies part of our solutions for current and future crises and challenges. The question is not whether technology can replace assessments, teachers and the aims of learning, but how AI can be used to empower teachers and learners for a more meaningful and human educational process.

Loss of human agency is a concern naturally associated with AI and future robots. AI results can look good and pass as a result of human work, can be accurate and useful but it stands too often unclear how exactly these solutions were created by the algorithms. AI "learns" from data, and even its designers admit limitations on understanding how exactly its results were produced. This is only increasing the well-documented opacity and accountability of these systems, leading to de-responsibilisation (Cox, 2022).

This lack of transparency makes it especially important to secure the use of AI solutions in education within a framework defined by clear ethical principles on transparency, informed use, and the overall adoption of educational aims as justification for its use before financial or productivity aims. The way the AI systems are adopted and used will determine if education will contribute to a dystopian future and a constant decline in the standards of learning or become an engine for the ongoing development of higher learning, civil society and civilisation. Knapton noted in 2018 that "we are now seeing an unprecedented level of interest, investment and technological progress in the field [of AI], which many people, including myself, feel is happening too fast" (Knapton, 2018). The accelerated pace of AI development, with its lack of transparency and focus on profit and power control, create too often systems of surveillance and control that raise the alarm on possible abuses of power and limitations of basic human rights in education. AI systems developed by various corporations, which are unreservedly adopted by universities, remain also quasi-opaque. There is rarely any consideration for students' privacy, for the impact on graduates' future or over ethical implications of the use of some technological solutions. Life-altering decisions are determined by magical thinking when technology is considered too good and important to be questioned or critiqued. The real agenda behind these tools remains mostly unknown, as we can see in some examples presented in this paper.

AI is opening new possibilities for learning and teaching in higher education, such as the augmentation of teaching, the use of virtual reality and simulations and many other applications. It is – and will be - also used often for vast unethical experiments and projects, for unprecedented manipulations aiming to suppress independent thinking and personal freedoms, including research funded by corporate players, attacks of democratic elections (i.e. Cambridge Analytica on U.S. elections) and political systems (e.g. the Brexit referendum). In the absence of effective regulations and transparency on ICT, universities should secure the future of their students and higher education with an increased focus on students' and staff's freedom and privacy. It is required to adopt an ongoing in-depth analysis of solutions adopted and used in learning and teaching and use of universities' own intellectual potential and innovative power for new, original and secure AI systems. The so-called Big Five, (i.e. Google, Amazon, Facebook, Apple, Microsoft) had various attempts to use historians, ethicists, philosophers and experts in education in their work and use of AI. It never worked for the Big Five, as their interests are opposite to the very idea of transparency, and the business model of this tech monopoly is fundamentally based on widespread ignorance about the implications of their actions and influence. For example, "Google Academics Inc.", an extensive report on academic corruption and corporate influence in higher education, reveals how Google (Alphabet) used its immense power and financial strength to pay reputable academics from some of the most prestigious universities to produce so-called "independent studies" only to promote corporate interests of this tech giant (Google Transparency Project, 2017). The agency of higher education is now becoming vital for the common good, for our democracies' future and for the type of culture and civilisation we want to have in the following decades. Students and our societies need a renewed project of education in the AI era, where individuals' agency is based on a wider intellectual horizon opened by education, which provides a solid base for independent critical thinking, imagination, and creativity.

2. Theoretical foundation

2.1 Methodological framework

The study approach is based on systematic quantitative design and critical qualitative research, with an interrogative posture towards the meanings and impacts of advancements connected to AI systems in society in general and in higher education in particular. Quantitative analysis approaches are based on a systematic review and gathering of literature. We chose a systematic method, as depicted in Figure 1, by

following the procedures given by Pickering and Byrne (2014).

During the preparatory phase, we identified studies that highlight the relationship between higher education and artificial intelligence, with the aim of obtaining an overview of the literature and the information that is disseminated online. In our approach, we included the following research questions that served as a framework for the review:

- What is the imagined future of higher education in the age of artificial intelligence?
- What are the factors influencing the connection between higher education teaching process and artificial intelligence?
- What are the effects of students and teachers improving databases and developing ChatGPT?

Figure 1. Fifteen phases to doing systematic quantitative literature reviews.
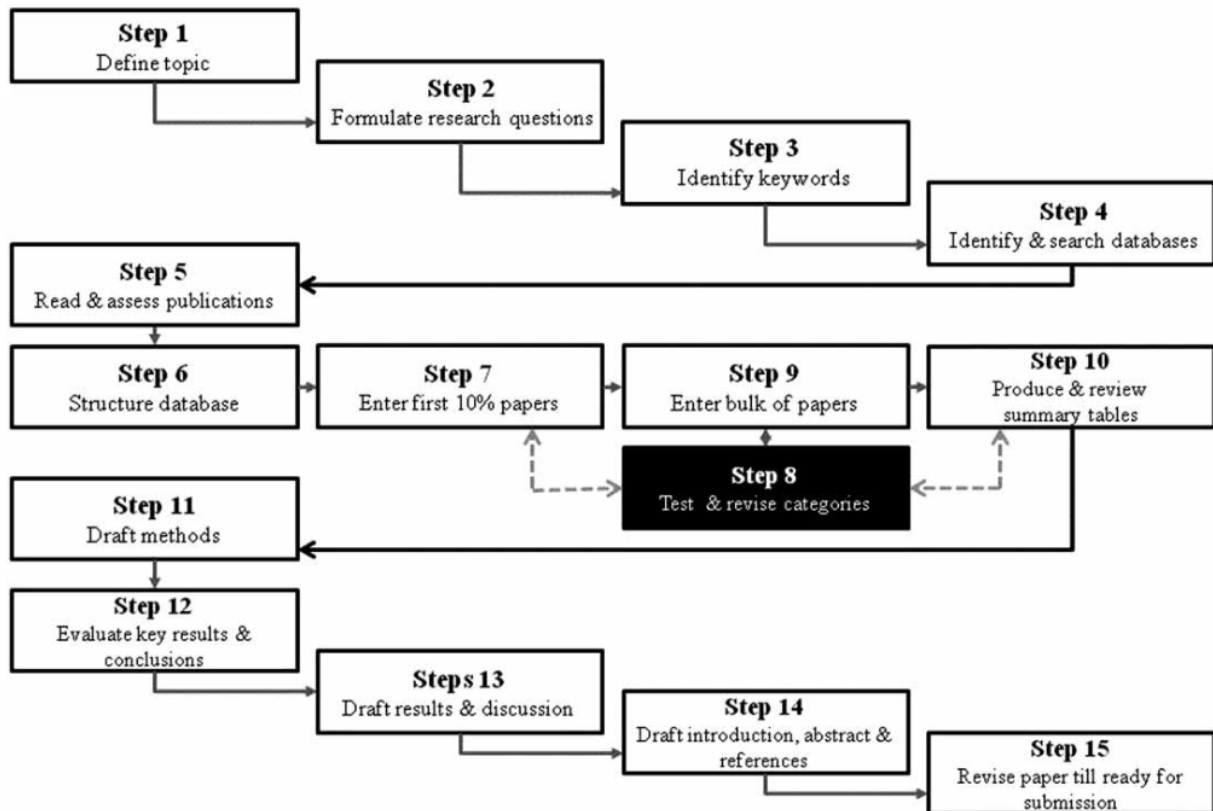
An important step was to establish the selection criteria for research studies in the databases that were used. The selection process started by using the search engine Google Scholar, where we introduced the following phrase "Artificial Intelligence and Higher Education", obtaining 3.900 results. In addition to Google Scholar, we also checked Taylor & Francis (319 results) and Sage (316 results) databases for resources. From each journal we chose those articles that highlight the imagined future of higher education in relation to artificial intelligence, and from the reports consulted we gleaned some important insights into the effects AI will bring to higher education around the world in the near future.

Following the search phase, we established some inclusion and exclusion criteria to arrive at a relevant number of sources. The inclusion criteria aimed to consider papers that referred to higher education in

relation to the integration of artificial intelligence in teaching and the changes that will occur. We also considered the articles that involved the keywords higher education, artificial intelligence, ChatGPT, education, teaching, learning. The exclusion criteria aimed at eliminating papers that were published in a language other than English, duplicate papers, and papers that lacked at least two of the aforementioned keywords, with some papers excluded directly by scanning their titles.

According to the PRISMA Flow Diagram (Figure 2) a total number of papers were identified and analysed in part by checking the main contents, results and conclusions. In this step the collected literature was divided by criteria. The first criterion refers to the impact of artificial intelligence upon the ethos of universities in the Western world, identifying a total of 25 sources. The second criterion relates to the

challenges, opportunities and risks associated with the emergence of artificial intelligence systems (30 sources), and the last criterion outlines arguments and solutions for the informed use of artificial intelligence in the teaching process (29 sources).

Figure 2. The PRISMA Flow Diagram
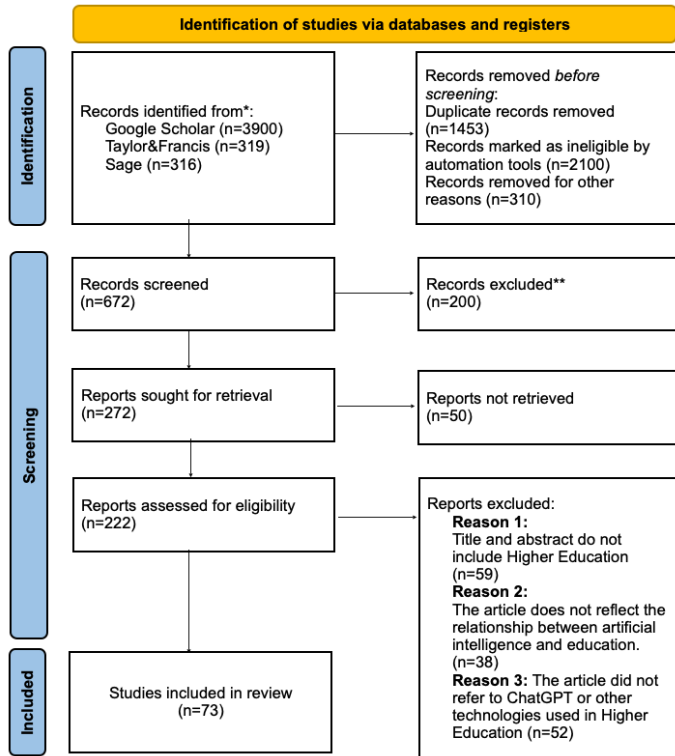
The strategy for searching sources was based on systematic keywording. Thus, only works integrating AI in education, specifically higher education, were reviewed. Initially, we consulted various sources using Google Scholar, noting with G. The search keys based on the keywords were G (Google Scholar), G1 (higher education) and G2 (AI). At the beginning, we excluded teaching (G4), learning (G5), ChatGPT (G6) as keywords to reduce the total number of results. After using the search keys G4, G5, G6, we reintroduced the terms teaching, learning, ChatGPT in order to have an overview from a wider perspective, discovering a very large number of papers (18,200), from which we analysed only the first 25 pages. The papers analysed cover the years 2011-2023, the data collection and analysis process for keys G1, G2, G3, G4, G5, G6 started on 20 January and ended on 16 May 2023.

Quantitative data is useful, but it also runs the danger of being biassed; also, statistical data represents the status of a phenomena under research at a specific period, which is restricted and potentially modified by new variables, rendering quantitative results outdated. In effect, the analytic induction represents the method of research chosen for the impact of AI on higher education: statistical data is considered in conjunction with the overall social and institutional contexts, implications of current developments, and an analysis of "meanings that make up the social reality shared by members of a society." (Althaide & Schneider, 2013, p. 5). The study makes use of a variety of pre-existing textual data sources, including peer-reviewed research, extensive reports, statistical data analysis, opinion surveys, and publications in the fields of AI and higher education. Data is gathered and evaluated in order to create a descriptive model that embraces subjectivity in research as a human condition rather than statistical interpretation. This is required in order to adequately investigate the meanings and ramifications of implementing AI systems in higher education.

The methodological framework and methods involved in this analysis are determined by a conscious step to abandon "…the ideal of reaching a naked, rock-bottom, unmediated God's-eye-view of reality […] embracing the opposite position - that we see everything through an interpretive veil or from an interpretive angle" (Shusterman, 1991, p. 103).

Furthermore, this paper considers analytical induction as a research framework suitable for facilitating the collection and analysis of quantitative and qualitative data, as well as a means of developing an original theoretical perspective and indicating future directions for AI policies and research in higher education (Becker, 1963; Denzin, 2009, Robinson, 1951). The intention of the study is to place thinking and in-depth analysis before the adoption of AI solutions in teaching and learning in higher education.

3. Results

3.1 University students as suspect customers: the role of AI

According to the report "Transparency and the Marketplace for Student Data," based on research conducted by the Centre on Law and Information Policy at Fordham University School of Law, "...student lists are commercially available for purchase on the basis of ethnicity, affluence, religion, lifestyle, awkwardness, and even a perceived or predicted need for family planning and services." (Cameron et al., 2018, p. ii). This is just one report that exposes the extent of student data collection and its use by data marketers and corporate entities that are working in partnership with educational institutions. Trading students' data includes extremely detailed and personal information on personal identity, academic

performance, lifestyle, personal preferences and predispositions. Data on students' health, political preferences and others are included in data packages. These brokers have fluid organisational and financial structures, often changing the name of their companies, which is making an obscure trade with students' identities virtually inscrutable (Cameron et al., 2018). Privacy and basic concerns for duty of care were left aside and ignored in the neoliberal world of education. This may cost institutions of education just too much in the following decades, as the personal costs for students in privacy breaches and the misuse of personal data will translate into class actions against surveillance and data managers.

Privacy concerns are derided and undermined by the main beneficiaries in the corporate world. Scott McNealy, the CEO of Sun Microsystems, notoriously summed up the attitude of Silicon Valley on these issues: "You have zero privacy anyway" (Sprenger, 1999) He also noted that consumer privacy issues are a "red herring", a stand adopted in practice by tech mega-companies such as Facebook and other similar corporations. There is no reason to believe that this mentality suddenly changes when their products are used by institutions of higher education. It was also noted that students in higher education might suffer from what was coined as "digital resignation" (Draper & Turow, 2019), giving away without reticence personal data to third parties with unclear interests and suspicious business models. Ultimately, it is not even relevant if students are not concerned that their personal data is collected, their privacy is invaded and monetised, and their future might be affected. Institutions of education have the duty of care and have a moral (and most often legal) responsibility of making data collection and use transparent and optional. The open adoption of surveillance, under the excuse of "improvements" or promises on academic integrity, profoundly undermines trust in the campus ethos: students are treated de facto as suspect customers. The narrative of neoliberalism labelled learners as "customers" who are buying a degree (Aliff, 1998, Lust, 1998; Pitman, 2000; Brunce et al., 2016; Nguen & Rosetti, 2013; Nixon et al., 2018). The commodification of higher education is a key source of declining motivation and intellectual engagement in universities. Waiting for corporations, active in educational technology, to secure individual privacy is – as Shoshana Zuboff pointed out in her seminal book – "like asking Henry Ford to make each Model T by hand or asking a giraffe to shorten its neck" (Zuboff, 2019, p. 192) The precedence of profits and markets,

hype and magical thinking created a culture of mistrust that is a destructive force for meaningful teaching and higher learning.

To understand why this is a legitimate concern we can take only the recent example of TurnitIn, a corporation presented on its website as "the only all-encompassing solution for preventing a variety of types of plagiarism, grading assignments, and safeguarding your institution's reputation" (TurnitIn, 2019). Research shows that plagiarism detection software fosters "attitudes of ill-will, scepticism, and distrust by signalling suspicion" (McEvily, 2003, p. 99). Even more concerning, research revealed over a decade ago an analysis of performance for TurnitIn and SafeAssign proved that "neither SafeAssign nor TurnitIn performed at a level that would justify recommendation to instructors". A simple Google search aiming to detect plagiarism "provided superior results in terms of depth and breadth" (Schorn, 2007) and this finding was confirmed by the same academic's research years later (Schorn, 2015). The study concludes:"We claim to be using this software to teach students about academic dishonesty, but we are using software that we know does not work." By lying to students, we are attempting to teach them about academic dishonesty" (Straumsheim, 2015).

The main business model for plagiarism-detection software solutions such as TurnitIn, which is an American corporation, was to collect students' work to train their algorithms and build a large database that can be used for "plagiarism checks". This database is the most important asset, and it is created without students' consent; students were not informed that their work may be retained and used for other purposes, including creating value and financial benefits for a corporate entity. In fact, students across the world who had to submit their writings to TurnitIn (or had teachers who made that choice for them) unknowingly joined the body of unpaid contributors (workers) that were exploited to create value for a Californian corporation. In 2019, when The Wall Street Journal announced that Advance Publications will buy Turnitin for $1.75 billion (Korn, 2019), it became clear how expensive this work is. Of course, no student got a cent out of the $1.75 billion built on their contributions and no university explored this example of unethical exploitation of our students or the moral lessons of this story. At least in this case, academic integrity was indifferent to the unethical use of a position of power. This is a model used also by AI firms: an investigation by Time magazine revealed that OpenAI's ChatGPT used Kenyan workers to scan

and collect content on the Internet for their database, paying them approximately $2 per hour (Perrigo, 2023)

A spectacular failure in the duty of care for students in the name of "academic integrity" reveals not only that critical thinking is often maintained solely as a rhetorical cliché for speeches and marketing documents in education, but also indicates the risks associated with much more potent and powerful technology. In the case of AI, this can become a fatal flaw for educational processes and overall aims.

3.2. AI- a tool for improvement of teaching and learning and higher education

The Obama administration issued the report "Big Data: Seizing Opportunities, Preserving Values" in 2014, observing that one of the most important challenges ahead for regulatory frameworks is to protect "students against their data being shared or used inappropriately, particularly when that data is gathered in an educational context." (White House, 2014; Gitelman, 2013; Gordo, 2017). These effective "regulatory frameworks" are missing, both for the public and within higher education. In a public service announcement issued in September 2018, the U.S. Federal Bureau of Investigation (FBI) issued a stern warning on risks raised by the fact that educational software collects massive amounts of very sensitive information: "The widespread collection of sensitive information by EdTech could present unique exploitation opportunities for criminals". Information that educational technology companies typically gather "can include, but are not limited to: personally identifiable information (PII); biometric data; academic progress; behavioural, disciplinary, and medical information; Web browsing history; students' geolocation; IP addresses used by students; and classroom activities" (FBI, 2018). The promise of AI is giving further reasons, along with that of learning analytics to collect even more data on students and share it with private companies (Kraemer, Overveld & Peterson, 2011; Lambrecht, 2018, Mittelstadt, 2016). The very serious impact on privacy and students' future is doubled by a flaw in the promise of "predictive" power: algorithms powering AI proved especially susceptible to bias and discrimination.

AI can be a tool for improvement of teaching and learning and higher education, but it is an especially dangerous tool that must be approached and used with great caution (Stolzoff, 2018). The AI "black boxes" and ideological roots should stand as main considerations for the adoption and limitations of AI use in academia. While AI opens a crucial discussion about assessments, trust, academic integrity, and students' life on campus, it can lead to a dystopian version of higher education or serve as a tool that can enhance and enrich learning and teaching. It all depends on the type of choices academics and researchers are making now, at a time when risks for democratic societies are very real and too obvious (Pasquale & Citron, 2014; Pasquale, 2015).

4. Discussions

Limitations and future directions for research

The most obvious limitation of the research is given by the fact that the impact of AI on higher education requires an extensive and comprehensive analysis of social, economic, ideological and technological aspects that determine educational results and the ethos of universities. The analysis presented here is focused on a few general aspects that should determine policies on its adoption in higher education.

Possibilities to augment and enhance teaching and learning with AI solutions. AI can be designed with students and academics placed at the core of the educational process, avoiding the trap of using technology as a means to an end. The need for direct and unmediated human interaction is obvious for any practitioner in education, as well as strongly documented (Capacio & Patrik, 2008).

The adoption of AI systems in universities represents an area of priority research, with a possible focus on the following areas:

- Research should further focus on finding new ideas for AI use in reconfiguring teaching practices for a more nuanced, human, and balanced approach to higher learning.

- A shift of focus from investments in technologies towards the quality of teaching and learning that is enhanced by suitable and proper technological solutions.

- AI evolves with accelerated speed, increasing in complexity and areas of application. Data and technological performance are not necessarily leading to a well-rounded education with wiser and more ethical graduates. The aims of education require a philosophical reconsideration in the era of AI.

- Transparency of AI and edtech use in universities should be secured for all students, including specific and informed consent for the use of

AI solutions, especially for the collection and aggregation of student data.

- AI solutions should be also engaged to address social and economic polarisation, inequality and the aims of lifelong learning.

- Addressing risks on "personalisation" in education: AI will be used in selecting content and topics in line with an individual's interests at a certain moment and will use mostly data generated on it; this creates a so-called "filter bubble" (Nguyen et al., 2014). In 2019, a study showed how algorithms personalise content and revealed that AI systems with the highest personalisation accuracy create a "degenerate feedback loop" (Jiang et al., 2019).

- AI can be used to nurture students' interests, curiosity and imagination by creating unexpected pathways through knowledge and new and provocative approaches for original human solutions.

- AI can help teachers nurture effective and widely applicable critical thinking skills in students. AI is already a field of distortions, bias, deep-fakes and other challenges that can only be properly addressed by an active, inquisitive and critical mind. Thinking skills will always surpass the importance of technological skills, and universities have new incentives to refocus on higher learning.

- Involving higher degree research students in all areas of expertise in projects aiming to regain universities' control over their technological solutions. Protecting institutional and individual agency represents a major project for universities of the 21st century.

5. Conclusions

The increasing control of the edtech corporate sector over various key areas of education, including education policies, learning and teaching solutions and others, represents a rising concern for many academics, the general public and students. Proven lobbying powers and corruption disguised as academic research often turned higher education into a playground of corporate exploitation and commercialisation of students' lives and education. The unbalanced arrangement of powers in edtech is leaving universities, students, and staff, vulnerable to a set of serious risks that are only succinctly presented in this study. Higher education lost a significant amount of intellectual and moral power to corporate entities and cultures in exchange for some distant gains and market dominance. Research proves a declining trend in the quality of learning (Arun &

Roksa, 2011; 2014), high levels of stress for students and academics (Gewin, 2012; Levecque et al., 2017; Grove, 2018) a general decline in the ethos of academic life proves that the current managerial and ideological model is unsuitable for solutions and for current challenges.

Educational agenda is vastly controlled by masters-of-technology (corporations) uninterested in any educational ideal, but marketability, increasing power and control through data and monopoly structures. A partnership like this cannot be based only on the naive belief that collaboration with the industry is simply a regular game of gains; much more is at stake. What universities' corporate partners in edtech control go beyond even the most complex technical aspects: it is the power to capture and manipulate imaginations and limit possibilities. The Google Academics Inc. report is just an example that reveals the unprecedented extent of power used by a techno-monopoly group that is highly motivated to control academic research across the world. This is where the higher education industry is fuelling a potentially fatal risk for universities.

Universities had and still have intellectual and institutional resources to rebuild an independent identity and an agenda organised by ethical standards in the pursuit of higher learning, civil society and democratic values. The development of AI presents the opportunity to re-emphasize that a university can serve the common good and shift towards a better future. Genuine respect for students and academics, and the effort to rebuild trust as an integral part of the campus ethos can educate responsible and wiser citizens of tomorrow.

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