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Artificial Intelligence and Democracy: Ethical challenges for Education

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Abstract: This paper explores the ethical and educational challenges posed by the intersections between Artificial Intelligence (AI), digital technologies, democracy and education. Digitalization is transforming educational paradigms and civic participation, requiring schools to foster critical digital literacy to navigate misinformation, algorithmic bias, and surveillance (Zuboff, 2019; McChesney, 2013). Drawing on Dewey's concept of schools as laboratories of democracy (Dewey, 1916) and Freire's (1970) view of education as a tool for social emancipation, the study highlights the need to prepare citizens for active engagement in the digital sphere. Floridi's notion of the infosphere (2014) frames digital environments as integral to human experience, requiring ethical reflection on data use and AI-driven knowledge (Floridi, 2011). Furthermore, algorithmic systems can perpetuate biases embedded in training data (Noble, 2018; Buolamwini & Gebru, 2018), underscoring the urgency of developing AI literacy. Schools must ensure equitable access to technology and promote competencies outlined in frameworks like DigComp (Vuorikari et al., 2022), enabling students to critically assess digital content and participate democratically. Ultimately, the paper advocates for a balanced approach where technological innovation aligns with democratic values, ensuring that AI serves as a means of empowerment, inclusion, and civic engagement.

Keywords: Artificial Intelligence, Digital Citizenship, Education and Critical Thinking, Algorithmic Bias, Information Ethics.

1. Introduction

The digital revolution has redefined educational and democratic paradigms by introducing new ways of producing, distributing, and accessing information, fundamentally transforming how people learn, interact, and participate in public life. This evolution has reshaped participatory processes, political representation, and communication; it has created new opportunities while also raising significant ethical and structural challenges.

Digital technologies, through global interconnectivity and immediate access to information, have profoundly impacted social, economic, and political structures, redefining the very concepts of power and communication (Castells, 1996). However, the pervasive nature of these tools raises critical issues, such as the spread of misinformation and the polarization of public discourse (McChesney, 2013; Pariser, 2011).

Contemporary schools, as laboratories of democracy (Dewey, 1916), cannot overlook the impact of digital technologies on civic engagement. The participatory culture described by Jenkins (2009) underscores the need to reformulate media literacy competencies to equip students for an increasingly complex information land-

scape. In an era marked by fake news and personalized algorithms (Zuboff, 2019), education must go beyond mere knowledge transmission to foster critical thinking and digital literacy (Tyner, 2014).

Education thus plays a crucial role in shaping informed and responsible citizens who can leverage digital technologies to promote democratic values, counter misinformation, and actively engage in society. Innovative educational programs and digital literacy policies are essential to ensure that future generations can navigate the global digital ecosystem with awareness and discernment (European Commission, 2020).

2. The digital redefinition of educational and democratic paradigms

In the digital society, knowledge is no longer confined to traditional institutions such as schools and universities but is instead disseminated through global networks accessible in real time. This implies virtually unlimited access to knowledge, where digital platforms provide educational resources that reduce geographical and social barriers. However, this access remains uneven, giving rise to new forms of exclusion, commonly referred to as the digital divide. Continuous and personalized learning enables students to construct autonomous learning paths, often guided by algorithms, thereby shifting the teacher's role from a transmitter of knowledge to a facilitator of learning. This transformation necessitates new competencies, such as digital literacy, computational thinking, and the ability to distinguish between reliable information and misinformation.

The intersection of digitalization and democracy in education calls for a critical reflection on how emerging technologies influence knowledge construction and citizens' formation. Henry Jenkins in *Confronting the challenges of participatory culture: Media education for the 21st century* (2009) identifies digital participatory culture as a potential democratic tool, yet the advent of Artificial Intelligence (AI) has profoundly redefined this space. Recommendation algorithms curate content, creating filter bubbles that expose users only to topics reflecting their past preferences or behaviors, thereby isolating them from diverse information, perspectives, and opinions, ultimately undermining pluralism. The educational model proposed by Jenkins has been reshaped by AI: while adaptive AI tutors democratize access to high-quality mentorship, they also require infrastructures that may perpetuate the participation gap.

Beyond media literacy, it is crucial to educate individuals on the functioning of large language models (LLMs), highlighting their limitations and biases, the ethical implications of using AI tools such as ChatGPT, and the importance of prompt engineering for critical AI-driven content creation. Consequently, digital participation benefits from advanced media literacy, helping citizens navigate and understand algorithmic influence more effectively.

Zizi Papacharissi, in *A Private Sphere: Democracy in a Digital Age* (2010), observes that digital technologies facilitate bidirectional communication between governments and citizens, enhancing transparency and holding representatives accountable. Furthermore, she argues that this interaction fosters a sense of civic engagement, allowing citizens to express their concerns and demands in real time. Digital platforms, in this regard, serve as spaces for dialogue and deliberation, promoting the inclusion of diverse voices and perspectives. However, Papacharissi also highlights the risks associated with such communication, including the potential for echo chambers and polarization, where information can be selectively shared or distorted. Therefore, it is essential that citizens develop critical competencies to navigate this complex envi-

ronment, ensuring that digital communication remains bidirectional, constructive, and informative.

3. Digital transformation of power relations and political communication

Manuel Castells identifies the network as the new center of power in contemporary society. In his work *The Network Society* (1996), he argues that power is distributed through digital networks rather than being centralized in traditional political and media institutions. Government elites and mass media no longer hold a monopoly on information; platforms such as social media and digital technologies enable individuals and movements to challenge dominant narratives and mobilize on a large scale without relying on established institutional structures (Castells, 2013).

The transformation of political communication is one of the most significant aspects of the network society. According to Castells (2007), social media has made communication more interactive, decentralized, and viral, altering how citizens engage in politics. Through digital platforms, social movements can rapidly disseminate information, organize protests, and create activist communities. This has led to increased civic participation and more direct citizen involvement in political processes.

However, this new communication ecosystem is vulnerable to algorithmic manipulation and misinformation. Digital platforms use algorithms to curate and promote content, thereby shaping public discourse and potentially amplifying fake news. The control of data flows has become a dominant form of power, where major technology companies exert unprecedented influence over public opinion formation (Castells, 2013).

Castells' analysis highlights that while digital networks democratize access to information and influence, they also necessitate the preparation of citizens capable of navigating a complex ecosystem, where critical and digital skills are essential for democratic participation. The digital sphere serves as a powerful catalyst for participatory culture, in which citizens are no longer passive spectators but active contributors to public debate (Jenkins, 2009).

Digital platforms, particularly social media, facilitate the creation of global campaigns, the mobilization of resources, and the amplification of marginalized voices, further reshaping the landscape of political communication and civic engagement.

4. Implications for schools in preparing citizens

As power and political communication undergo digital transformation, schools must prepare citizens to actively and consciously engage with this new reality. Digital literacy is now an essential component of active citizenship. According to Correia (2002), the networked society creates parallel communication systems: on one hand, those accessible to informed and digitally literate elites, and on the other, those where information is passively consumed. This divide underscores the need to educate citizens who can critically interpret data and recognize biases in algorithms and digital media.

Education should equip students with the skills to identify online manipulation strategies, from fake news to information bubbles. As Martin (2008) asserts, digital literacy goes beyond technical knowledge; it includes the ability to evaluate content, engage in public discourse, and understand the ethical and social implications of digital technologies. The concept of digital citizenship extends beyond merely using

technology, it involves how individuals participate in public debate and democratic processes online. Wulandari et al. (2021) argue that digital civic education must include awareness of online rights and responsibilities, privacy protection, and digital identity management.

The use of social media as a tool for political mobilization and public participation must be accompanied by the ability to distinguish between authentic digital activism and political manipulation orchestrated by algorithms or external actors. According to Milenkova & Lendzhova (2021), digital citizenship is a prerequisite for social inclusion, and the absence of digital skills can exclude entire segments of the population from decision-making processes.

To address these challenges, schools must prepare students in three key areas: critical education, digital democratic participation, and social justice.

Critical education: Schools must teach students to critically interpret digital information, recognizing biases in data and the underlying dynamics of digital platforms. According to Kahne and Bowyer (2019), media literacy is fundamental for fostering critical thinking and increasing young people's political engagement in the digital world. In this context, *The Digital Competence Framework for Citizens* (DigComp) serves as a crucial guideline for developing essential digital skills for active citizenship. DigComp identifies five key areas: (1) information and data literacy, (2) communication and collaboration, (3) digital content creation, (4) safety, and (5) problem-solving with technology. The goal is to ensure that all citizens can use digital technologies effectively and critically for social and political participation (Vuorikari et al., 2022).

Digital democratic participation: Students must be trained as digital citizens capable of using technology to express their opinions, participate in public debate, and influence democratic processes. Within the educational context, the *European framework for the digital competence of educators: DigCompEdu* (DigCompEdu) is equally relevant, providing specific guidelines for training teachers in digital competencies that enhance teaching and learning. This framework defines six areas of competence for educators, including promoting digital engagement, facilitating learning through technology, and developing digital skills among students. Integrating DigCompEdu into teacher training programs is essential for bridging the digital divide in schools and ensuring inclusive, high-quality education (Redecker, 2017).

Social justice and equality: Schools must address the digital divide by ensuring that all students have access to technology and develop the necessary skills to avoid exclusion from social participation. Pangrazio and Sefton-Green (2021) highlight that digital literacy is not just a technical issue but also a matter of rights and equitable access to knowledge and political participation. Similarly, Polizzi (2020) emphasizes the importance of digital literacy in fostering meaningful social inclusion and preventing exclusion due to inequalities in access and informed technology use.

The integration of digital education into school curricula is therefore essential. According to Milenkova and Lendzhova (2021), digital citizenship encompasses three key dimensions: improved economic opportunities, greater democratic participation, and more effective communication through new technologies. Finally, Choi and Cristol (2021) suggest that an education system based on an intersectional approach plays a crucial role in ensuring that digital education is not neutral but accounts for the diverse experiences and barriers faced by students based on factors such as gender, social class, ethnicity, and disability. This approach can strengthen the role of schools

in preparing students for the responsible and conscious use of digital technologies in participatory democracy.

5. Intersection of pedagogy, ethics, and digital technology

The synergies between pedagogy, ethics, and digital technology are essential for addressing contemporary educational challenges. The increasing integration of digital technologies in the school environment raises not only pedagogical but also ethical and philosophical questions, requiring an interdisciplinary approach to understand their impact on shaping the citizens of the future.

Don Ihde, in his analysis of technological mediation, asserts that technologies transform human experience and redefine our relationship with knowledge (Ihde, 1979; Ihde, 1990). This concept is crucial for understanding how digital tools influence not only learning but also students' perception of the world. Ihde's reflections resonate with recent research in educational technology, which highlights how digitalization can redefine the roles of teachers and students, reshaping knowledge construction processes (Bayne, 2015; Selwyn, 2021).

In parallel, Paulo Freire's critical pedagogy (1970), which considers education as a political and social act and advocates for a model based on critical dialogue between educators and students to promote social emancipation and the transformation of reality, intersects with Martha Nussbaum's perspective. Nussbaum argues for an education that fosters citizens endowed with empathetic imagination and critical dialogue skills (Nussbaum, 2010). In an era increasingly shaped by algorithm-driven digital platforms, these perspectives emphasize the importance of cultivating a digitally literate, critically engaged, and participatory citizenship, fundamental for navigating today's complex digital ecosystem (Jenkins, 2009).

The ethical reflection on digital information, as highlighted by Luciano Floridi (2013), focuses on the concept of the infosphere as a new social reality. The infosphere represents the global environment in which information, human and artificial agents, and technological systems interact in an integrated manner, redefining contemporary social reality (Floridi, 2013). This hybrid environment, where online and offline worlds are no longer rigidly separated, is described by Floridi as an onlife experience, in which individuals are continuously immersed in a flow of digital information permeating every aspect of life (Floridi, 2019). Floridi's philosophy proposes a conceptual design approach to help individuals navigate information and construct knowledge (Floridi, 2021). The infosphere is not merely a theoretical concept but a reality demanding critical analysis of its ethical and social implications. Floridi underscores the need to recognize ourselves as inforgs (informational organisms) in an existence increasingly defined by the onlife experience (Floridi, 2014).

This interdisciplinary approach enables a holistic response to educational challenges, integrating technological, ethical, and pedagogical dimensions. Schools must therefore foster an ongoing dialogue between different disciplines to educate conscious and responsible citizens capable of critically engaging with the contemporary digital ecosystem.

6. Epistemological challenges: Knowledge in the age of AI

AI is redefining epistemological paradigms, raising fundamental questions about the nature of knowledge and its construction. Yuval Noah Harari observes that algorithms not only shape our choices but also our perception of reality (Harari, 2015).

AI and big data analysis can amplify pre-existing cultural biases, transforming them into systemic structures that influence the production and dissemination of knowledge (Lupton, 2019). The datasets used to train AI algorithms can reinforce and exacerbate social inequalities. This phenomenon has been extensively discussed in academic literature, with various studies highlighting how AI training data can be shaped by historiographies and social practices that perpetuate inequality (Angwin et al., 2016; Crawford & Calo, 2016; Buolamwini & Gebru, 2018; Noble, 2018).

These studies underscore the urgency of greater attention to the quality and diversity of datasets used for AI training, as well as a critical approach to interpreting the results generated by these systems. Only through rigorous evaluation and proper contextualization will it be possible to mitigate the risks of perpetuating social inequalities and ensure that AI contributes positively to society.

Moreover, while human knowledge is constructed through processes of mediation and interpretation, the knowledge generated by intelligent systems is primarily derived from statistical correlations. These correlations, if not critically contextualized, risk being perceived as objective truths, thereby reinforcing biases and inequalities embedded in the original data.

This complexity introduces a crucial problem: how can we ensure authentic knowledge in a context where decision-making systems are opaque and often influenced by biases? A profound reflection on the role of education in contemporary society is imperative. If AI contributes to the production and validation of knowledge, it becomes essential for schools to provide adequate epistemological tools to distinguish between reliable information and misinformation, recognize biases in algorithmic data, and develop critical thinking skills to navigate an information ecosystem that is often influenced or shaped by manipulation.

Koskinen (2024) highlights the lack of satisfactory social epistemology for AI-based science, emphasizing how the increasing automation of decision-making processes can undermine the transparency and reliability of scientific knowledge. Floridi (2011) introduces the concept of the infosphere, an informational environment in which the distinctions between reality and virtuality dissolve, making knowledge increasingly dependent on the ability to interact with digital technologies. In this context, education must evolve to equip citizens not only with an understanding of how algorithms function but also with insight into how these models of intelligence shape the production and distribution of knowledge. Russo, Schliesser, and Wagemans (2024) explore the relationship between ethics and AI epistemology, arguing that the primary issue is not trust in AI per se, but rather an understanding of its internal logic and structural limitations.

Ultimately, the epistemological challenge of the AI era is not merely to comprehend how algorithms influence knowledge but to recognize that every intelligent system is the product of a specific worldview, embedded in the data and computational logics that sustain it. The role of education is not only to instruct but to provide the tools necessary to deconstruct and critically engage with the forms of knowledge that AI generates, ensuring that human agency remains at the center of the cognitive process

7. Ethical challenges: privacy, equity, and inclusion

The widespread adoption of data collection and analysis in education raises significant ethical challenges, particularly concerning student privacy protection. Fur-

thermore, the use of digital technologies in education prompts questions about ensuring equitable access to resources and fostering an inclusive environment that does not discriminate against specific user groups.

The use of educational data presents critical ethical concerns. According to Zuboff (2019), surveillance capitalism poses a significant threat to privacy, especially in educational settings, where data collection and analysis can lead to student profiling and the use of predictive tools with unforeseen consequences. Nissenbaum (2010) highlights that privacy should be understood in terms of context and information flow, a fundamental principle for safeguarding educational data. This concept underscores the importance of contextual integrity in student data management, ensuring that information is used appropriately within school environments.

Eubanks (2018) emphasizes how digital technologies can exacerbate inequalities, particularly when algorithmic systems disproportionately disadvantage vulnerable communities. Her research demonstrates that automated decision-making in social services, including education, risks reinforcing structural disadvantages rather than mitigating them. Recent studies (Williamson, 2017; Selwyn, 2022) confirm that predictive tools applied to education, such as learning management systems and AI-based assessments, may replicate biases present in the training data. Without critical examination, these systems risk deepening existing inequalities rather than promoting fairness.

The ethical challenges associated with educational data require a responsible and transparent approach that prioritizes privacy protection and equity promotion. Knox, Williamson, and Bayne (2020) argue that the governance of educational digitalization should be grounded in clear ethical frameworks capable of addressing the sociotechnical implications of data usage. Educational institutions must adopt explicit policies and ethical guidelines to ensure that student data is managed securely and responsibly. This includes compliance with data protection regulations such as the General Data Protection Regulation (GDPR) in the European Union and the Family Educational Rights and Privacy Act (FERPA) in the United States, as well as the development of institutional policies that prioritize student rights (Regan & Jesse, 2019).

Inclusivity in digital education should not be limited to technology's access but should also consider how data-driven approaches may inadvertently disadvantage certain student groups. Slade and Prinsloo (2013) propose an ethical framework for learning analytics that centers on student autonomy, informed consent, and social justice. They warn that, without adequate ethical oversight, data-driven education risks becoming a tool of surveillance rather than a means for enhancing learning outcomes.

Adopting an inclusive pedagogical approach is essential to ensuring equal opportunities for all students, regardless of their socioeconomic background. Ethical principles should guide the development and implementation of data policies in schools, ensuring respect for student dignity and rights while fostering a safe and equitable learning environment.

8. Conclusions: Balancing innovation and democratic values

The school, understood as a democratic laboratory, represents the primary setting where students acquire the tools to actively participate in public life and address the challenges of the digital society. John Dewey, in *Democracy and education: An intro-*

duction to the philosophy of education (1916), conceived education as a process of collective growth, in which dialogue and concrete experience foster the development of an informed and engaged citizenry. This vision is more relevant than ever today, as AI and digital technologies redefine the relationship between individuals, knowledge, and society.

Digital literacy cannot be confined to the mere acquisition of technical skills; it must also encompass AI literacy as the ability to understand and critically assess AI systems. Algorithms, in fact, can reflect and amplify societal biases (Noble, 2018) and are often opaque even to experts (UNESCO, 2021). This underscores the need for an educational framework that enables students to critically examine the ethical and social implications of automation.

From this perspective, schools must remain spaces for democratic experimentation, where students can engage with diverse ideas, develop critical thinking skills, and learn to interact responsibly with technology. Digitalization offers extraordinary opportunities to expand access to knowledge and promote new forms of democratic participation. However, if not accompanied by an inclusive education that upholds fundamental values of social justice and equity, it risks exacerbating existing inequalities.

Luciano Floridi, in *The Fourth Revolution* (2014), highlights the necessity of adopting a global educational perspective to prevent a growing divide between those who can critically interrogate the technological systems shaping the infosphere and those who passively endure their effects. Innovation, therefore, should not be an end but must serve humanity, safeguarding the principles of democracy, inclusion, and collective responsibility in the digital age.

Educational institutions must adopt a proactive approach that integrates technological progress with the formation of critically aware citizens capable of questioning the role of technology in society. In this regard, Dewey's thought remains essential: education should not merely instruct but foster active participation, transforming schools into civic laboratories where students learn to shape the future on ethical and democratic foundations. The challenge for 21st-century education is thus to integrate digital innovations without losing sight of the core values of civic coexistence, ensuring that AI and emerging technologies serve as instruments of empowerment rather than exclusion. Education thus becomes a bridge between innovation and democratic values, between technology and active citizenship

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