

ARTIFICIAL INTELLIGENCE RELATED TO EDUCATION AS SEEN BY THE EUROPEAN UNION

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Abstract

More than 80% of young people in Europe use the internet for social activities, but on the other hand, the lack of knowledge about fundamental rights and the exercise of citizenship is still worrying. European and national citizenship are not fully exercised, and we are already moving towards the construction of a new digital citizenship with new associated rights. What makes you question whether education is achieving its ends?

As new technologies, how could the use of Artificial Intelligence (AI) be aimed at guaranteeing the educational process towards a better use of democracy in EU?

The literature presents several definitions of AI, and the use of AI goes through the most varied fields of action ranging from society in general to areas such as medicine, production, and education. In the education area, the object of this study, AI, is used for several purposes, namely institutional use, Student support and preventing student dropout through predictive analytics.

This study intends to look at legislative and preparatory documents and cases presented in the literature that enshrine the issue of digital education and the use of Artificial Intelligence. For this, an integrative literature review will be used. From a theoretical and academic perspective, it is consolidated through the systematic and methodologically selected normative interpretation of national and international legal texts and the law of the European Union.

Without presenting quantitative data, the intention is to bring to the discussion and debate the contribution of Artificial Intelligence in digital education as framed in the legislative intentions of the EU.

Keywords: digital education, Artificial Intelligence, European Union.

1 INTRODUCTION

Each year, the Commission presents the Digitality indices of the Economy and Society (IDES) and Portugal appears relatively well-positioned compared to the European average. However, will this indication be enough to educate new generations regarding the desired digital transformation?

More than 80% of young people in Europe use the internet for social activities, but on the other hand, the lack of knowledge about fundamental rights and the exercise of citizenship is still worrying. European and national citizenship are not fully exercised, and we are already moving towards the construction of a new digital citizenship with new associated rights. What makes you question whether education is achieving its ends?

As new technologies, how could the use of Artificial Intelligence (AI) be aimed at guaranteeing the educational process towards a better use of democracy in EU?

The literature presents several definitions of AI; according to the British Dictionary one, AI can be defined as "the ability of a digital computer or computer-controlled robot to perform tasks normally associated with intelligent beings". And, it is in this context, the use of AI goes through the most varied fields of action ranging from society in general to areas such as medicine, production, and education.

In the education area, the object of this study, AI, is used for several purposes: (i) institutional use - (1) marketing to prospective students, (2) calculating class sizes, (3) planning curricula, and (4) allocating resources such as financial aid and facilities. (ii) Student support - (1) help in automatically scheduling their course load, (2) recommendation of courses, majors and career paths (such recommendations are based on how students with similar data profiles performed in the past, (3) just-in-time financial help (Educational institutions can use data on students to provide them with microloans or advances at the last minute of payment if they need the money to, for example, reach the end of the semester and not

drop out. (iii) Preventing dropout through predictive analytics by providing early warnings by analysing a wide range of data, e.g., academic, non-academic, and operational data. (iv) And, the last but not the least, educational institutions already apply IA in training/teaching, using IA-based software systems that respond to the pace and progress of individual students. The system evaluates students' progress and recommends, or automatically delivers, specific parts of a course for students to review and/or additional resources to consult. However, in this context, although AI-based systems can successfully help the presented activities, some cautions and issues arise, namely student autonomy and privacy.

This study intends to look at legislative and preparatory documents and cases presented in the literature that enshrine the issue of digital education and the use of Artificial Intelligence. For this, an integrative literature review will be used. From a theoretical and academic perspective, it is consolidated through the systematic and methodologically selected normative interpretation of national and international legal texts and the law of the European Union.

Without presenting quantitative data, the intention is to bring to the discussion and debate the contribution of Artificial Intelligence in digital education as framed in the legislative intentions of the EU.

After a doctrinal framework and resorting to European Union documentation through a methodology of document analysis, we seek to frame this matter in the Commission's priorities, either in legislative acts or in soft law documents.

Several electronic addresses are also used, for access and as a source, as the use of computer platforms is the basis of the focused subject. Thus, despite the debatable academic value, the institutional addresses are made available here, which will be an effective form of access and represent the execution and exercise of some of the ideas put forward by the authors

2 ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is a term for a set of technologies that have undergone rapid development in recent years. In the case of certain types of AI systems, their functions follow rules that are automatically generated and not explicitly programmed by people. This can sometimes lead to impressive results but also pose challenges [1, p. 17]. Education is part of the sectors where IA is used, but it is also a sector that prepares for the use of IA.

Building on the OECD's definition of AI [2], the proposed Artificial Intelligence Act (AIA) [3], as proposal of the European Commission, defines AI as software that is developed with machine learning, logic-and knowledge-based, or statistical approaches and can, for a set of human-defined objectives, generate outputs such as content, predictions, recommendations, or decisions influencing the environments it interacts with [1, p. 17].

2.1 AI for digital transformation in education: Promises and challenges

Digital transformation is currently an undeniable reality with a widespread impact on all sectors of activity, including education and society in general. Concerning education can be said that this sector is continuously affected by advances in digital technologies, which often contribute to significant, if not drastic, changes.

Due to Digital Transformation, organisations, including organisations dedicated to education, have undergone a massive r(evolution) on a social, economic, and technological level in recent years. This wave [4] transformed organisations is achieved by technological enablers, often referred to as digital transformation (DT) enablers which include (1) cloud, (2) mobile, (3) social, and (4) big data - analytics. Innovation accelerators, like Robotics, the Internet of Things (IoT), Augmented and Virtual Reality, Cognitive Systems, Next-Generation Security, and Artificial Intelligence, often play a role in this digital transformation process [5].

Therefore, and considering two of the main actors in the educational environment - students and teachers - it can be said that, on the one hand, students expect to find dynamic and "technology-rich" teaching environments. And on the other hand, teachers benefit from the use of new tools that facilitate knowledge sharing and lead to higher motivation of students, among other aspects. As mentioned, digital technologies are constantly being updated, and, consequently, teachers, in general, have the imperative to keep up with these updates and introduce them in education.

However, according to [6], AI promises to improve educational processes and outcomes both in the classroom and at the educational system level. But, according to the literature, although promising, AI

at the level of the educational system is still very limited since its private use is in applications and solutions for individuals and not for schools and/or governments.

Currently, the use of AI in education is still limited at the system level. AI is mainly incorporated in applications and solutions for individuals, not schools and/or governments. Moreover, education systems rarely have establishments that allow experimentation and a smooth transition from research and development to implementation. However, it is possible to better prepare students and pupils for the transformation of work and society by developing their soft skills, namely creativity and critical sense. Also, according to [6], initiatives in the literature have demonstrated that it is possible to work with the different stakeholders involved in education to entirely introduce IA in the education system. However, this change will not occur by itself, i.e., spontaneously, but also that change will not happen by itself. Finally, a particularly challenging aspect of IA is considering the 'open sharing' of data with organisations, which is particularly difficult in the education sector - although it is increasingly happening in a controlled way in several countries.

2.2 AI in Education

Quality education is essential to achieve a sustainable world, benefiting individuals and societies. A robust education system contributes to widening access to job opportunities, improving health, strengthening the resilience of communities and institutions, boosting long-term economic growth, reducing poverty, and stimulating innovation [7]. In this sense, we can state that society in general and populations are/should be interested in education systems. Since, on the one hand, we are all learners, lifelong learning is today an unquestionable need. On the other hand, the global benefits that a solid and strengthened education system can bring are absolute. Thus, it can be said that stakeholders in education go further than just learners and teachers; they also include administrators, policymakers, parents, and other groups who play a role in society and benefit from it [7].

As mentioned above, AI is currently the big driver of the digital transformation of organisations, and it cuts across different application domains, ranging from education to healthcare. Concerning the education field [8] the rapid development and broad application of artificial intelligence have changed the way of human learning. Particularly, intelligent teaching based on computer technology has greatly enriched the classroom teaching model and cultivated and improved the comprehensive literacy of students. The development of artificial intelligence education is a thorough investigation in education. It is also a promotion of the development of artificial intelligence, which has realized the intellectualization of learning. The integration modes of artificial intelligence and education currently tend to be diversified.

The intelligent learning platform uses artificial intelligence and information processing technology to "grade" students' work from the teachers' perspective. Currently, smart grading replaces manual grading in traditional education. Intelligent grading technology can detect blank papers and papers suspected to be identical, significantly shortening teachers' time. At the same time, students' expressions can be recognised through biometric recognition technology to determine whether students are listening attentively in class, whether they are interested in the course, and whether they are effectively participating in class. AI can also analyse teachers' activities in the classroom to identify deficiencies, allowing for their correction [9].

As mentioned earlier, the use of AI technologies in the learning context is a source of motivation for students. The use of smart search and voice recognition in performing functions such as taking photos and searching questions provides students with a smart after-school learning platform. Platforms that enable smart written, oral learning and smart learning products are other platforms with great acceptance by students. Mixed reality device that uses virtual reality technology to present knowledge points in a visual way allows students to be physically present and here, also increase their motivation for learning [9].

For education organisations, teachers and students can be checked for attendance through the school management system. There are many teachers in the school, which is cumbersome and complicated to manage. The emergence of artificial intelligence has broken the traditional school management system. On the other hand, it also ensures the safety of students. The security of campus has always been a matter of great concern, and artificial intelligence technology can be used in combination with traditional surveillance [10].

3 DIGITAL AS A PRIORITY FOR THE EUROPEAN UNION

As recently noted by the European Union institutions in a joint statement by the European Parliament, the Council of the European Union and the European Commission with the EU legislative priorities for 2022, [2, p. 2, § 2], AI will be a shared priority in the legislative work.

The European Commission, in this 2019-2024 formation, in its capacity as holder of the legislative initiative in the decision-making process of the Union, will present digital development as one of its priorities [12], implementing in 2021 a regulation that creates the Digital Europe Program [13] with a proposal for a regulation [12] on the use of artificial intelligence in the context of this digital transformation.

There were already previous institutional documents that emerged to prepare the use of artificial intelligence in the European Union. Following an invitation from the 2017 European Council, the 2018 Commission Communication will appear [14, p. 1] defining a European initiative on AI.

And where it is important to emphasize the concern to guarantee an appropriate ethical and legal framework, based on the values of the Union (in accordance with Article 2 of the Treaty on European Union) and in line with the Charter of Fundamental Rights of the European Union (in Article 6 of the Treaty on the European Union). That is, advances in technology have allowed the application of digital realities autonomously to aspects of human life, but the legal framework to guide does not yet exist in the European Union.

The law must accompany these changes in society, guaranteeing the ethical principles valued by the Member States as well as strict respect for fundamental rights. Thus, the European Parliament also emphasizes in 2020 [15], the focus on the need to create an effective and harmonized regulatory framework, based on Union law on human rights, so that AI always has the human individual as a reference [16].

On March 9, 2021, the Commission presented a vision and pathways for Europe's digital transformation to 2030 [12]. This vision for the EU's digital decade revolves around four key points:



Figure 1 [17]. EU Compass for Europe's digital transformation.

As mentioned, the Commission's proposal emerged in April 2021 [18] (Document COM/2021/206 final 21.04.2021) for a regulation by the European Parliament and the Council that will establish harmonized rules on artificial intelligence. The proposal is still being negotiated by the co-legislators, but it is expected that the process will be finalized in 2022, taking into account the priorities assumed in the joint declaration of December 16, 2021, which includes "achieving a Europe prepared for the digital age" [11].

4 A EUROPEAN UNION POLICY FOR DIGITAL EDUCATION

In accordance with the founding Treaties of the European Union, basic legal texts that enshrine the powers attributed by the States to this integration organization, the matter of education falls to each Member State (Article 165 Treaty of the European Union) [19]. Still, the European Union can complement this area of action [20]. This appears opportunely in this pandemic situation that has plagued the world since 2020 and that will not leave it the same.

The COVID-19 pandemic caused sudden and profound changes in our way of life and brought to the fore the way in which education was perpetuated along traditional lines. Digital technologies were called upon very soon and basic digital skills and digital literacy became the forefront for all citizens [9, p. 4, § C].

Digital skills were already on the horizon in new labour markets where 90% of future jobs are expected to demand them, according to European Commission estimates [9, p. 4, § G]. But, due to a virus, in a few days they became ubiquitous competences for those who had few or no connections with the digital sphere. New technologies such as AI have important potential, but they require knowledge, competence, and requalification for their use.

Such aspects are decisive in education. Almost completely face-to-face (and as such should remain at the heart of the offer), it was faced with a sudden shift to the digital plan (which complement should remain useful). This new challenge requires new approaches and responses.

And the question is: even if the organization of education systems emerges as a national competence, the European Union has never been so adequate to promote global coordination in the field of digital education, which can encompass a dimension of access to digital infrastructure, public investment.

5 CONCLUSIONS

The technological transformation is omnipresent, and the exercise of citizenship today requires extensive digital skills. Artificial Intelligence (AI) is both a resource and a constraint in these new technologies. Opening new paths to knowledge requires digital skills that are not yet within reach of citizens. Nevertheless, the use of AI in different domains, namely in education, is currently an effective strategy for major countries given the peak of a new wave of scientific and technological evolution - Digital Transformation. Thus, AI becomes a new engine for educational development and consequently for the world's economic development. However, there is a significant gap between developed countries at the level of education. In the face of aggressive competition between countries, the improvement of education supported by AI contributes to improving the level of education of the general population.

The European Union takes a position as a driver of digital transformation and urges the promotion of the development of means for adequate digital literacy for European citizens through its policies and in collaboration with the Member States.

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