

Policy Analysis of Educational Missions and Tactics in the EU Artificial Intelligence Strategy in the Era of Digital Transformation

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Abstract: In the era of digital transformation, AI, cloud computing, big data, blockchain, and other intelligent technologies have increasingly profound impacts on work, study, life, and especially education. The Publishing of *The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines* marked the official launch of the EU Artificial Intelligence Strategy. By analyzing policy documents published during 2018 and 2022 for the EU Artificial Intelligence Strategy, it is found that the strategy has set three strategic goals, namely achieving an “Ecosystem of Excellence”, building an “Ecosystem of Trust”, and establishing an “Ecosystem of Digital Education”. To ensure its implementation, the European Commission has published a series of policy documents successively. As the main driver of the AI strategy, education plays an important role in the development of AI, and the EU has adopted various education tactics in the series of documents. Given the particularity of the EU as a regional cooperation organization, this strategy values philosophy, norms, and cooperation. It also provides a good reference for AI development and digital transformation of society in other countries and brings new opportunities for international cooperation in the field of AI.

1. Introduction

The Fourth Industrial Revolution, with Artificial Intelligence (AI) at its core, has had a profound impact on world politics, economy, education, and other aspects, ushering human society into the era of digital transformation. By permeating, transforming, and shifting the social governance system, digital intelligence technology is shaping a digital society with informatization and digitalization as the central core. In the era of digital transformation, the impact of AI, cloud computing, big data, blockchain, and other intelligent technologies on work, study, life, and especially education, is increasingly profound. AI technology has subsequently become a key field of global competition. In recent years, many countries have put forward initiatives and strategies for industrial digital transformation, such as the “Industry 4.0 Initiative” proposed by Germany, the “National Strategy for Advanced Manufacturing (NSAM)” adopted by the USA, the “Digitizing European Industry (DEI)”

advocated by the European Union (EU), etc. Meanwhile, the United Nations Educational, Scientific and Cultural Organization (UNESCO) noted that digital technology has become a social necessity to ensure education as a basic human right, especially in a world experiencing increasing crises and conflicts [1]. Therefore, education has become the key to winning the international AI competition in the era of digital transformation [2]. During the COVID-19 pandemic, countries without adequate ICT infrastructure and well-resourced digital learning systems suffered the most educational disruptions and learning losses. The COVID-19 education disruption clearly revealed the urgent need to unite technologies and human resources to transform schooling models and build inclusive, open, and resilient learning systems. Therefore, UNESCO is actively promoting the digitization of education by providing advice, guidance, and technical support, such as publishing a series of reports, including *Artificial Intelligence and Education: Guidance for Policy Makers*, *Guidelines on the Development of Open Educational Resource Policies*, etc.

2. Literature Review

At present, academic research on AI and education focuses mainly on the following three aspects. First, theoretical exploration of AI-enabled education, including the connotations, principles, and ethics of AI-enabled education, etc. Yang Xin thinks that AI-enabled education has two connotations, namely, AI-idea-enabled education and AI-technology-enabled education. On the one hand, AI idea-enabled education provides new educational approaches, discourse styles, behavioral references, and application environments; on the other hand, AI technology-enabled education forms a new educational technology framework to promote educational innovation [3]. Peng Shaodong summarized 17 principles of AI-enabled education, including eight macro principles at the education level, five medium principles at the teaching level, and four micro principles at the factor and operation level [4]. The ethics of AI-enabled education studies the relationship between AI and education subjects [5]. Second, a deep description of the application and practice of AI-enabled education. The intelligent tutoring system, the automatic assessment system, and educational games and educational robots are the main forms of AI application in education [6]. Third, systematic analysis and international comparison of AI-enabled education. Major governments around the world are developing extensive AI strategies and implementing a series of AI-enabled education initiatives. For example, the USA is providing AI-enabled education through STEM education programs; the UK is helping students properly use AI technology by offering ethics training; Japan is encouraging universities to collaborate with companies on AI; Singapore is running the AI Apprenticeship Program to train AI graduate students; China is accelerating the development of AI disciplines and the training of high-end AI professionals [7]. In conclusion, in the era of digital transformation, AI and education will become increasingly important in the future. This requires us to consider and discuss what is the mission of education is in the age of AI, and what measures should the education system take to adapt to and respond to the trend in this era to achieve the Sustainable Development Goals (SDGs) of the UN [8].

The European Union is an organization for regional cooperation. To secure a world-leading position in the field of AI, the European Commission published *The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines* on March 27, 2018 [9]. This programmatic document for AI development published by the EU marked the official launch of the EU Artificial Intelligence Strategy. To further ensure smooth implementation of the strategy, the European Commission published several policy documents from 2018 to 2021. These documents not only provide all-round multilevel operational guidelines and normative criteria for AI development in EU countries, but also show that the European Commission has planned AI development in various areas and set educational missions and tactics in the AI strategy. To achieve its goals, the EU Artificial

Intelligence Strategy emphasizes philosophy, norms, and cooperation.

3. Data and Methods

3.1. Research Data

The introduction of any strategic initiative has its specific social background and target direction. The formulation and implementation of the EU Artificial Intelligence Strategy show that it is closely related to the digital transformation of European society and education. It is not a specific policy or law, but a series of policy initiatives on the development and application of AI, mainly including 7 policy documents, namely *The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines*, the *White Paper on Artificial Intelligence* [10], the *Coordinated Plan on Artificial Intelligence* [11], the *Digital Education Action Plan 2021-2027*[12], which are strategic plans; the *Humans and Societies in the Age of Artificial Intelligence*, which is a research report; *Ethics Guidelines for Trustworthy AI* [13], *Building Trust in Human-Centric Artificial Intelligence* [14], which are guidelines, see Table 1.

Table 1: Series of Policy Documents in the EU Artificial Intelligence Strategy during 2018-2022

No.	Type	Title
1	Strategic Plans	<i>The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines</i>
2		<i>White Paper on Artificial Intelligence</i>
3		<i>Coordinated Plan on Artificial Intelligence</i>
4		<i>Digital Education Action Plan 2021-2027</i>
5	Research Report	<i>Humans and Societies in the Age of Artificial Intelligence</i>
6	Guidelines	<i>Ethics Guidelines for Trustworthy AI</i>
7		<i>Building Trust in Human-Centric Artificial Intelligence</i>

3.2. Research Methods

Table 2: Analytical Framework for the EU Artificial Intelligence Strategy

Category	Factors
Implementation Background	Major motivations
	Strategic goals
	AI deployment areas
Content and Initiatives	Building a high-quality digital education system
	Training innovative talents for AI research
	Standardizing the development of AI technology
	Specific provisions on education funding
	Professional training to improve the digital skills of teachers
	High-quality educational resources in the field of AI
	AI-enabled education actions in member states
Features	Common values of the EU
	Integration of development and management
	Synergy with stakeholders

This study focuses on educational missions and tactics in the formulation and implementation of the EU Artificial Intelligence Strategy. Through a literature review, this article collects and collates the key documents published by the EU for the promotion of AI from 2018 to 2022 to analyze the

motivations, goals, areas of deployment, educational missions and initiatives, and features of the EU Artificial Intelligence Strategy. Therefore, an objective analytical framework for the content of the EU Artificial Intelligence Strategy should be built on an all-round investigation of its implementation. The emphasis is on the analysis of its context, content and initiatives, and features, as shown in Table 2.

4. Results and Discussion

4.1. Motivations and Content

4.1.1. Practical Motivations

To cope with the world's new changes in technology and make breakthroughs in AI technology, countries around the world have successively launched AI development plans. As a regional community, the EU is supranational. Therefore, the EU Artificial Intelligence Strategy is based on the values of European integration. It not only meets the realistic needs of building a digital Europe but also is an inevitable choice to achieve the goal of leading the world in AI. Therefore, the realistic motivation for the EU's AI strategy is complex and multifaceted, reflecting the digital social transformation, AI regulation, and the international competition.

The first motivation is to consolidate common values and promote coordinated development of all EU countries. During long-term economic cooperation and political exchanges, the EU has gradually formed unified European values and set the goal of developing AI together. However, in contrast to China and the United States, the EU lacks a coordination mechanism for its member states and research institutes to conduct in-depth cooperation. Vice President Andrus Ansip and Commissioner Mariya Gabriel of the European Economic and Social Committee said: "In Europe, any strategy to deal with AI must be supranational." [11] Therefore, to ensure the global competitiveness of the EU in AI, all member states must form an EU-wide AI development strategy that adheres to common European values.

The second motivation is to promote the development of digital technology and realize the multidimensional transformation of society. In recent years, digital technology has been widely used in various fields in Europe, such as health care, education, and production services. The extensive application of AI technology has led business and public administration toward intelligent development. A wide range of market in the labor jobs have been replaced by intelligent machines, changing the structure of the labor force [15]. In the face of the changes and challenges brought about by the transformation of the labor market and the modernization of education and training systems, the EU is increasingly aware that the multidimensional transformation of society and AI technology are closely linked. Therefore, the development of AI technology and the transformation to a digital society have become an inherent need of the EU for socioeconomic development.

The third motivation is to resolve potential social risks and to build a security regulatory framework. The continuous development of AI technology is accompanied by potential social risks, such as privacy infringement, unemployment, network security, etc. Faced with the social risks posed by technological change, the EU must place as much importance on controlling the risks posed by AI as on developing AI technology. It is an intrinsic requirement for the EU to strengthen AI governance and build a secure and reliable environment for AI development. It is also an important means for the EU to exert its normative power and to strive for the authority to make international rules for AI [16].

The fourth motivation is to enhance its international influence and strive for a world-leading position in AI technology. Although it is at the upper end of the global AI value chain, the EU still lacks competitive advantages over China and the US. On the one hand, there is a "diverse and parallel" development pattern within the EU, resulting in the dispersion of development forces; on the other

hand, Europe is underinvested in AI and lacks digital companies [17]. In fierce global competition, AI has become an important force that reshapes the international competition landscape. Technological change with AI at its core provides the EU with a historic opportunity to achieve corner overtaking. Taking advantage of the current technological change and mastering the technology are the key to gaining competitive advantages for the EU. Therefore, strategic planning at the EU level is an inevitable choice for it to strive for international leadership in AI.

4.1.2. Goals and Deployment Areas

For the common interests of all EU member states, the EU Artificial Intelligence Strategy has set three goals. The first goal is to build an *Ecosystem of Excellence*, to achieve comprehensive and deep cooperation between and among EU member states, attract more investment, enhance the AI innovation capability of the EU, accelerate the transformation of business and public administration towards intelligent development, and promote the socio-economic development of the EU. The second goal is to build an *Ecosystem of Trust*, to create a secure and reliable AI regulatory framework, and develop Europe into a hub of AI globally trusted [18]. The third goal is to build an *Ecosystem of Digital Education*, to modernize education and training systems, develop digital skills and digital literacy among citizens, create a European Digital Education Hub, and promote high-quality education in Europe [12]. These three goals are holistic, overall, guiding, and sustainable. They promote each other and collectively constitute the framework of goals for the EU Artificial Intelligence Strategy.

To achieve the objectives of the EU Artificial Intelligence Strategy, the European Commission focuses on six areas of strategic planning [9]. Area 1: Stepping up investment in artificial intelligence. An AI investment framework should be built that prioritizes investment in AI technology development and application. Area 2: Strengthening the training of AI professionals. The Digital Education Action Plan shall be implemented to provide AI skills training for workers and build a talent pool for AI research and development. Area 3: Optimizing AI policies and systems. A modern AI management system should be implemented and adapted to the new AI development environment. Area 4: Developing quality standards for AI. The quality standards for AI shall be defined by the principles of “legitimate design” and “human-in-the-loop” to ensure that the AI development and application meet quality standards. Area 5: Defining a code of ethics for artificial intelligence. Based on the existing values of the EU and the *Charter of Fundamental Rights of the European Union* [19], an ethical and legal framework for AI must be built to develop secure, reliable, and responsible AI technologies. Area 6: Participating in multilateral initiatives on AI. The EU shall play a leading role at the global level by participating in international multilateral dialogues to promote the adoption of a unified approach to define the basic principles of AI development.

The six areas of this strategy define the important tasks for the EU in the development of AI and form the core framework of the EU Artificial Intelligence Strategy. By supporting, guiding, and implementing AI, these tasks help the EU to develop AI rapidly. The EU believes that education is the most important area for the future of AI [12]. Some scholars have suggested that education is the most effective and direct means of developing AI [20]. Therefore, the EU Artificial Intelligence Strategy defines the missions and tactics of education in EU countries in the age of AI.

4.2. Missions of the Education System

In the EU Artificial Intelligence Strategy, the education system is responsible for AI research and development, and its missions are to realize its own innovation and reform, train researchers and workers needed for the development of AI technology, and shape the ethical values of the EU.

4.2.1. Providing High-quality Online Education

With the popularization of the Internet, the widespread use of digital devices, and the growing demand for digital skills in the entire society, the digital transformation of the education system has accelerated. While training the digital skills, the education system itself must constantly optimize the application of digital technologies and promote the upgrade of education and training systems to meet the development requirements in the age of AI. It is an important mission of the EU education system to effectively use digital technologies to enable education. Therefore, the EU published the Digital Education Action Plan 2021-2027 (hereafter referred to as “the Plan”), which provides a new strategic blueprint for the digital transformation of education in the EU in the age of AI. Priority 1: Fostering the development of a high-performance digital education ecosystem. Currently, the EU is short supply of digital education infrastructure. Especially during the COVID-19 pandemic, students in remote areas cannot access remote and online learning, and it is impossible to guarantee the equal right to education for disadvantaged groups. As educational organizations, schools should play an important role in protecting educational equity [21]. In the face of rapid changes in AI technology and the impact of the COVID-19 pandemic, the EU education system must insist on equality and inclusiveness, change traditional teaching models through the application of digital technologies, and provide adequate conditions and resources to develop digital skills and digital literacy of students. Priority 2: Developing high-quality online courses. Online learning has become the norm in the post-pandemic era. However, it is difficult to guarantee the quality of online teaching, while decentralized and fragmented learning will further aggravate the gap between learners. The EU education system should develop the content of online courses and learning resources intensively. For example, the EU has launched the AI to 1% of EU Citizens initiative and created an online course on AI Basics. The development of high-quality online courses will be the direction of the EU’s education reform in the future. Priority 3: Enhancing the digital skills of educators. Digital skills are essential skills for educators in the age of AI. The education system must not only develop students’ digital skills of students, but also provide training for teachers to apply digital technologies. Future development of EU education is focused on the application of AI technology to build correlations between the factors that influence education, namely educators, learners, curriculum content, and to teaching platforms, and realize the transformation of the education system itself.

4.2.2. Adapting to Socioeconomic Trend

In the age of AI, the education system should focus on training high-quality professionals in AI technology. AI is essentially a collection of technologies. Innovative research and development of AI technology is an important goal and area for the implementation of the EU Artificial Intelligence Strategy. AI technology is a double-edged sword. While promoting social progress and improving human life, it also causes a series of social problems, such as security and privacy. For AI technology to have a positive social impact, the EU should train an AI research and development workforce, constantly update and create new AI knowledge and technologies, and ensure that human beings remain at the center of AI development, application, and decision-making. The EU still has many problems in AI development, which are mainly reflected in the lack of professional and technical personnel and backward technology. *The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines* points out that the biggest difficulty faced by the EU in AI application is the shortage of technical talent, and its pool of AI talent is only half that of the US [9]. Additionally, the technological backwardness in computing power and algorithms has hindered the further development of AI in the EU. In the final analysis, the EU has to rely on education to enhance researchers’ ability to develop AI technology. Only by training more AI researchers can the EU strengthen basic research on AI-related technologies, meet the development requirements in the age

of AI, and contribute to the long-term development of AI in the EU. Progress in AI technology is partly responsible for “technological unemployment”, but that does not mean the end of employment. Education must guide the transformation of worker job expectations. AI technology should complement humans, not replace them. Education must facilitate the skill transition of workers and establish a symbiosis between humans and machines. In response to changes in the structure of labor forces and the transformation of the labor market in the age of AI, the education system has the responsibility to provide relevant training for workers to develop digital skills. It should train a workforce with digital skills to ensure social stability in the transition period. Furthermore, the EU has specified a quantitative target to improve the digital skills of its citizens, namely that by 2025, more than 70% of adults in the EU should have basic digital skills. Helping citizens better cope with the digital transformation and promoting economic prosperity in the age of AI are key tasks for education today.

4.2.3. Shaping Ethical Values for AI Regulation

The development of AI technology promotes social progress and economic development, but also brings many conceptual, legal, and ethical challenges. It is not only the responsibility of governments and companies but also an important mission of the EU education system to pay attention to ethical issues such as security, privacy, and dignity brought about by AI. In view of the ethical and moral issues brought about by the application of AI technology, the *White Paper on Artificial Intelligence* emphasizes the development and deployment of AI based on European values [10]. The *EU Artificial Intelligence Act* makes it clear that the application and development of AI technology must comply with both ethical and legal standards, as well as the overall values and rules of the EU. The *Ethics Guidelines for Trustworthy AI* list five fundamental rights, including respect for human dignity; individual freedom; democracy, justice, and the rule of law; equality, fairness, and solidarity; and human rights [13]. On this basis, seven requirements for secure and reliable AI are further proposed: humans must have autonomy and play the regulatory role; AI technology must be robust and safe; data privacy must be protected and data must be administered; the principles of transparency and traceability must be followed; diversity, non-discrimination, and equity must be upheld; human well-being and sustainability must be maintained; and an accountability mechanism must be established for AI technology research and development. These basic rights and requirements define the values and ethical guidelines that AI development should follow.

The education system should improve the understanding of AI, integrate the concepts of respect for human dignity, freedom, democracy, equality, the rule of law, and human rights into the ethical code in line with the common values of the EU, perform its function of shaping human values, find an effective balance between basic values and the development of AI technology, standardize AI technology research and application in accordance with basic European values, not only guiding developers to create safe and reliable AI technology, but also guiding enterprises and individuals to standardize the application of AI technology.

4.3. Education Initiatives

In the era of digital transformation, as the main participant, beneficiary, and promoter of the AI strategy, education plays an important role in the development of AI technology. To achieve the goals of the EU Artificial Intelligence Strategy, promote the application and development of AI technology, and accelerate educational innovation, the series of documents gives education three important missions: creating a high-quality digital education system, training scientific research and innovation talent, and regulating the development of AI technology. To fulfill these three missions, the EU has proposed various education initiatives in a series of documents.

4.3.1. “Education Funding”

With the acceleration of changes and updates and the impact of the spread of COVID-19 in 2020, digital education is no longer considered an “island,” but an important way to realize the integration and innovation of AI and education. The development of artificial intelligence and digital transformation complement each other. Therefore, the EU Artificial Intelligence Strategy, with the support of *Education Funding*, provides a basic guarantee for the reform of the education system to realize the digital transformation of the education system.

First, the EU launched “Horizon Europe”. The program defines the goals and content of research and development for the EU in the field of AI in 2022, focusing on providing funding to researchers in AI, big data and other fields, and increasing financial investment in AI. The program expects to invest 19 million euros in the research and development of AI, data and robotics; 64.5 million euros in the development of deployable robots that are efficient, safe, robust, adaptable and trustworthy; 50.5 million euros in the research and development of AI leadership [22]. Second, the EU has been running Erasmus+ (European Community Action Scheme for the Mobility of University Students). Through this scheme, the European Commission supports the digital transformation of primary and secondary education, vocational education, higher education, adult education and training institutions, and provides targeted operational guidelines for key actions such as the setting of digital education frameworks and the development of digital capabilities, so as to ensure the smooth digital transformation of EU education systems at all levels. To carry out practical teaching, the EU launched the “Digital Apprenticeship Program” based on Erasmus+, to support college students from EU member states to study and train in AI companies, covering frontier fields such as big data, machine learning and AI. Third, the EU launched the “Recovery and Resilience Facility” (RRF), the aim of which is to fund the construction of broadband networks, digital equipment and digital infrastructure in the EU, and to solve the problem of basic network tools. Furthermore, the EU is addressing the issue of digital inequality at the digital technology infrastructure level through the “Connecting Europe Facility,” to meet the demand for digital transformation for network connectivity, equipment, and other hardware to the maximum extent possible. Fourth, the EU launched the “Marie Skłodowska-Curie Actions” (MSCA) [23] to fund AI actions and programs within its framework, including doctoral, postdoctoral, and university faculty exchange programs. Through Individual Fellowships (IF) and Innovative Training Networks (ITN), the EU funds cutting-edge AI research by first-class researchers, the training of AI professionals, and AI technology innovation. With the help of a series of education funding, the EU matches funds with education actions to provide financial guarantees for the digital transformation of the EU education system.

4.3.2. Professional Trainings

Digital skills are one of the key skills required in the age of AI. In view of the lack of digital literacy of teachers exposed to online and distance education during the COVID-19 pandemic, EU member states have proposed to comprehensively improve teacher digital competence.

First, the European Commission provides professional digital skills training for teachers. The Erasmus Teacher Academies provides professional training for teachers on the use of digital tools and methods in teaching and learning. It has launched an online self-assessment tool “SELFIE for TEACHERS” to help teachers identify their strengths and gaps in digital teaching skills and integrate digital skills training into the entire teacher education process. In addition, the EU is creating a favorable atmosphere for the training of digital talent by organizing the EU Digital Skills Award and funding the development of digital training courses. Second, digital technology is widely used in teaching in the EU. The EU calls for AI skills training programs, including the design and production of specialized educational courses, teaching templates, and short courses. Digital technology is

embedded in the overall teaching process to encourage teachers to use digital technology to design innovative and high-quality teaching plans. Third, the EU formulated the *Universal Guide to Digital Education Skills for Teachers*. The European Commission established an Expert Group on Misinformation and Digital Literacy to formulate the *Universal Guide to Digital Education Skills for Teachers* by working closely with stakeholders, to clarify the moral boundaries and ethical code for educators to use AI and big data in teaching, help teachers develop the ability to identify false information and manage information overload, and train their literacy in safe and healthy use of digital technology for teaching. Teachers' digital skills are an important guarantee for high-quality teaching. Providing support, training, and guidance to educators is an important education initiative for the EU Artificial Intelligence Strategy.

4.3.3. High-quality Courses

The competition of AI technology is essentially a competition of high-level professionals. To encourage the training of high-level AI professionals, education should be further promoted. As a result, the European Commission trains AI research and development professionals by sharing quality educational resources.

First, the EU supports schools, vocational education and training institutions to make new digital skills such as AI, machine learning, and human-computer dialogue the core literacy of students for deep learning, take computer and informatics as tools to improve digital skills, make the best of computer courses to improve student computer thinking skills, enhance students' interest in STEM (science, technology, engineering, mathematics) and strive to train high-level talents who take research and development of AI technology as their career aspirations. Second, the EU shares online learning resources. The European Commission has created the European Exchange Platform, which not only shares large-scale online course resources but also effectively connects with existing education platforms. Third, the EU expands the scope of learners. Digital education opportunities are extended to learners of vocational education, disadvantaged groups in remote areas, and female learners, so as to narrow the actual gap in digital education and realize the equality of digital education opportunities. For example, the EU encourages the participation of women in STEM education, uses STEM methods to develop higher education courses in engineering, information, and communication that are more attractive to women, to enhance the participation and career development of women in STEM subjects and the IT industry. It further improves the existing standard distance teaching model and establishes a compensatory learning mechanism and a blended learning model while providing equipment and resources for students with difficulties. Fourth, the EU enables personalized learning with AI-powered platforms. Course learning resources are customized according to the individual learning style of each student, and the learning content is presented in a variety of ways to make up for the shortcomings of classroom teaching by teachers and meet the differentiated learning needs of students. Fifth, the EU strengthens AI-enabled education exchanges to attract top talent from around the world. Systematic exchanges and professional education are carried out for AI, especially on AI ethics such as morality and privacy, to ensure that people maintain human autonomy and control in their relationship with AI. AI is integrated into the educational curriculums of other disciplines (e.g., law), to make full use of the Blue Card system to retain and attract advanced AI professionals in Europe. In addition, the EU attracts the best professors and scientists from around the world to participate in the EU Artificial Intelligence Strategy by establishing and supporting the advanced skills network composed of leading universities and university research centers to alleviate the pressure caused by AI brain drain to the EU.

4.3.4. AI-enabled Education Action Plans

The policies of the EU and those of its member states influence each other, both from the bottom up and from the top down [24]. The EU Artificial Intelligence Strategy encourages intergovernmental cooperation among member states to jointly achieve strategic goals. Member states have put forward many education initiatives for the EU Artificial Intelligence Strategy, which not only promote the development of AI in each country, but also enhance the comprehensive international influence of the EU in AI. Germany updated the *Artificial Intelligence Strategy of the German Federal Government* in 2020 [25]. The strategy focuses on the talent, research, and application of AI. It aims to train AI professionals through higher education and vocational education, while creating a favorable research environment for AI researchers. Its main measures include launching AI challenges, establishing the AI award “AI Made in Germany”, funding the digital innovation of university education based on AI and big data, building online AI skills to improve websites for vocational education. France’s AI strategy report *AI for Humanity* [26] provides specific guidelines for scientific research and talent training in the field of AI. First, France supports scientific research in the field of AI, establishes interdisciplinary AI research institutes, develops new computers to assist AI research, and provides powerful instrumental support for researchers. Second, France attaches importance to the training of AI professionals. It has created new master's and doctoral programs in AI, increased funding for AI research, and provided talent support for AI innovation and development. In addition to the above-mentioned countries, other EU member states have also taken corresponding education initiatives to achieve collaboration within the EU, so as to enhance the comprehensive influence of EU in AI.

4.4. Distinctive Features

In the era of digital transformation, artificial intelligence, as an innovative technology, not only concerns international status and national security, and is related to the renewal and change of various ways of human production and life, but also involves judicial protection, ethics and morality and other social issues. Based on the analysis of a series of documents published by the European Commission, the EU Artificial Intelligence Strategy not only includes clear educational missions and comprehensive education initiatives, but also values philosophy, cooperation, and norms.

4.4.1. Philosophy for Common Values

Compared to China and the USA, the EU started late and is relatively backward in AI development. However, the development of AI in the EU is not blindly imitating or catching up with others, it is based on the “European approach to excellence and trust”, emphasizing the importance of philosophy and adhering to common values of the EU to ensure that the development of AI technology and basic rights are in line with European values. Education is an important way to realize the deep integration of the philosophy with the EU’s Artificial Intelligence Strategy and to implement them throughout the process of developing and applying AI technology. First, education performs its function of educating people, imparting the basic values of the EU and taking them as the basis for shaping the common values of the EU. Second, education strengthens young people’s critical thinking and judgment, improves their sense of identity and belonging to EU values, and teaches them to combat racism, discrimination, and other erroneous values that go against the common interests of the EU. Third, education guides the rational application of AI technology to ensure that the application of AI technology is well aligned with human well-being. The series of policy documents released by the EU demonstrates that the implementation of the Artificial Intelligence Strategy is based on the common values of the EU. For example, the EU encourages women to participate in STEM education,

which reflects the values of gender equality. *The Age of Artificial Intelligence: Towards a European Strategy for Human-Centric Machines* reflects the values of human rights. The common culture and common values are the basis for the existence of the EU and an important prerequisite for the cooperation and standardized development of AI technology. Therefore, the EU must advance the development and deployment of AI based on shared values of the EU as a whole.

4.4.2. Norms for Orderly Development

Orderly development is another feature of the EU Artificial Intelligence Strategy. The emphasis on norms has laid a stable foundation for the development of AI in the EU. First, the emphasis on normative development is reflected in the adherence of the EU Artificial Intelligence Strategy to the unification of development and administration. This is different from the American notion of development, which attaches great importance to the rapid development of AI technology, seizing technological heights and sovereignty while ignoring regulation. The EU has put more emphasis on binding rules. The *White Paper on Artificial Intelligence* points out that the EU is committed to developing the innovation and credibility of AI technology at the same time and insists on integrated consideration of the AI policy incentive framework and future regulatory frameworks to minimize the likelihood of risks. Second, the importance given to normative development is reflected in the high importance attached by the EU to risk prevention. The EU AI strategy emphasizes priority attention to the "high-risk sectors" involved in AI development, including healthcare, education, agriculture, finance, and other areas. The EU points out that each competent authority should be responsible for the monitoring and control of AI-based "high-risk" technologies and products. In the face of the challenges brought about by the changes in the labor market, the EU focuses on new skills training needed for developing AI, while using AI to create new value and new jobs to prevent the risk of unemployment caused by the impact of new technologies. Third, the emphasis on normative development is also reflected in the emphasis on ethical norms in the EU Artificial Intelligence Strategy. Compared to other countries, the EU pays particular attention to the ethical and moral issues brought about by AI. *The European Artificial Intelligence Landscape* and the *Coordinated Plan on the Development and Use of Artificial Intelligence Made in Europe* make it clear that the ultimate goal of AI is to serve the welfare of human society, and the development of a credible ethical and legal framework is a necessary approach to the normative development of AI. The development and design of AI technology must comply with the principles of "ethics" and "safety". To develop a safe and reliable AI regulatory framework, the European Commission has published normative guidelines, such as the *Ethics Guidelines for Trustworthy AI* and the *Building Trust in Human-Centric Artificial Intelligence* and passed the *EU Artificial Intelligence Act*. The EU plans to train a group of AI ethics experts and take the lead internationally in putting forward an AI legislation initiative. "This is the first time that a comprehensive AI regulatory framework has been established at the global level to guide and constrain the development of AI technology," said an American critic. The EU intends to build a safe and reliable regulatory framework for AI on a global scale and focus on solving the complex ethical issues accompanying technological development, in order to improve the international competitiveness and voice of the EU in AI.

4.4.3. Cooperation for Coordinated Development

It is in the common interest of all EU member states to promote the realization of AI strategic goals to improve social life and improve the international competitiveness of the EU. To ensure the successful realization of the goals of the AI strategy, the European Commission has established the principle of collaborative governance. This principle requires synergy between nations and regions in strategic planning, active interaction between the government, business, and education in the EU,

and synergistic amplification effect of stakeholders in promoting AI technology progress. The impact of AI is supranational. The EU is committed to establishing a supranational policy framework in line with European values and fundamental rights, and to coordinating specific plans for the implementation of the AI Strategy in cooperation among member states. Such examples include building a European Digital Education Hub to integrate educational resources at the EU level and realize the unification of monitoring and experience sharing in digital education within the EU. Examples also include establishing and supporting a network of leading universities and higher education institutions for the Digital Europe Program, enabling access to high-quality educational resources across the EU. In addition, the EU is actively participating in the deep international cooperation on the AI strategy. The EU is aware that other important work in the AI field still requires international cooperation, so the EU will continue to work with relevant international organizations and like-minded countries in the AI field.

5. Conclusion

Currently, digital intelligence technology is irreversibly affecting all levels of education, and the combination of AI and education is the trend of the times. AI drives education reform and accelerates education innovation. At the same time, as the main body of technology development, education has the responsibility to provide support for AI technology innovation. The series of documents published by the EU for its Artificial Intelligence Strategy shows that the EU education system has undertaken important educational missions and adopted strategies and initiatives to achieve its strategic goals. In the age of AI, it is crucial to properly handle the relationship between education and AI, effectively embed emerging technologies into the process of education and teaching, perform the function of education in the development and application of technology, and truly realize the integrated development of AI and education.

Undeniably, in the era of digital transformation, AI provides a lot of power and convenience for the development of education and its transformation. To some extent, education in the digital society is under deep reconstruction. AI is a strategic technology. To fully seize the historic opportunity presented by AI, the EU must attach importance to the need to combine forces, maximize the effect through cooperation between countries, create a broad platform for multiparty cooperation, and take coordinated actions to cope with fierce international competition. In conclusion, education, as the best way to realize the strategic vision of AI, demonstrates its educational mission and actions undertaken in the era of AI, providing important support for the achievement of EU's AI strategic goals. In addition, the series of education initiatives in the EU Artificial Intelligence Strategy and actions taken by the EU in AI values, ethics, and international cooperation also provide a good reference for AI development and digital societal transformation in other countries and bring new opportunities for international cooperation in the field of AI.

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