

# LA INTELIGENCIA ARTIFICIAL PROCESO DE INNOVACIÓN Y CREATIVIDAD EN LOS CENTROS EDUCATIVOS.

## ARTIFICIAL INTELLIGENCE INNOVATION AND CREATIVITY PROCESS IN EDUCATIONAL INSTITUTIONS.

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### **Resumen**

El objetivo del presente artículo es profundizar en el aprovechamiento de la inteligencia artificial (IA) en educación y sus herramientas digitales (Tabla 1), entre las que destacamos la herramienta de uso práctico ChatGPT, así como diversas

herramientas que favorecen la inclusión y que contribuyen a la consecución de los Objetivos de Desarrollo Sostenible (ODS) de la Agenda 2030 necesarios para transformar el mundo, en especial, el ODS 4: Garantizar una educación inclusiva, equitativa y de calidad y promover oportunidades de aprendizaje durante toda la vida para todos. Asimismo, para llevar a cabo un programa de innovación, trazamos los puntos de reflexión para elaborar una guía de aplicación de la IA desde la dirección de los centros educativos. Para ello, capacidades como resiliencia y creatividad deberán acompañar a las competencias del director del centro. Alineamos la IA con determinados documentos del centro como el Proyecto Educativo del Centro, la Programación General Anual y el Plan de digitalización del centro, teniendo en cuenta el diálogo entre la normativa aplicable y los profesionales educativos implicados. Dentro de esa transformación que impulsa la IA, planteamos cambios en el futuro de la Inspección Educativa. Se incluye un glosario de términos vinculados a la inteligencia artificial a los que se ha hecho referencia a lo largo del artículo.

**Palabras clave:** *Inteligencia artificial, herramientas digitales, ChatGPT, dirección de centros, proyecto educativo de Centro, Programación General Anual, Inspección Educativa, glosario de términos de IA.*

## Abstract

The objective of this article is to delve into the use of artificial intelligence (AI) in education and its digital tools (Table 1), among which we highlight the practical use tool ChatGPT, as well as various tools that promote inclusion and that contribute to the achievement of the Sustainable Development Goals (SDGs) of the 2030 Agenda necessary to transform the world, especially SDG 4: Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for all. Likewise, to carry out an innovation program, we draw up reflection points to develop a guide to the application of AI from the management

of educational centers. To do this, capabilities such as resilience and creativity must accompany the competencies of the center director. We align AI with certain center documents such as the Center's Educational Project, the Annual General Programming and the center's Digitization Plan, taking into account the dialogue between the applicable regulations and the educational professionals involved. Within this transformation driven by AI, we propose changes in the future of the Educational Inspection. A glossary of terms linked to artificial intelligence that has been referred to throughout the article is included.

**Keywords:** *Artificial intelligence, digital tools, ChatGPT, center management, center educational project, Annual General Programming, Educational Inspection, glossary of AI terms.*

## **Artificial intelligence (AI) and its central role in the digital transformation of society**

Technologies with intelligence have been around for more than 50 years, but progress in computing efficiency, new algorithms and the availability of vast amounts of data have enabled a breakthrough in the development of AI in recent decades. It has been nearly 78 years since the term was first used:

The term AI was first used at a 1956 workshop at Dartmouth College, an Ivy League university in the United States, to describe "the science and engineering of creating intelligent machines, especially intelligent computer programs" (McCarthy et al., 2006, p. 2). In the following decades, AI developed intermittently, with periods of rapid progress interspersed with periods of slow progress. (Russell y Norvig, 2016). (UNESCO, 2021, p. 10)

Marvin Minsky, a pioneer in artificial intelligence research in the 1960s, referred to AI as a "suitcase word," a term that is associated with many different meanings because any concept can be packed into it. AI has been chosen as the word of

the year for 2022 by the Foundation for Urgent Spanish (Fundéu). Previous winners include *escrache* (2013), *selfi* (2014), *refugiado* (2015), *populismo* (2016), *aporofobia* (2017), *microplástico* (2018), *emojis* (2019), *confinamiento* (2020), and *vacuna* (2021). AI is defined in the Spanish Language Dictionary of the Royal Spanish Academy (RAE) as "the scientific discipline that deals with creating computer programs that perform operations comparable to those carried out by the human mind, such as learning or logical reasoning." Russell Stuart and Norvig Peter, in *Artificial Intelligence: A Modern Approach*, provide another definition of AI: "Artificial Intelligence is the combination of algorithms designed for the purpose of creating machines that exhibit the same capabilities as a human being." According to the European Commission's definition, there are different types of AI, such as software: virtual assistants, image analysis software, search engines, voice and face recognition systems. And integrated artificial intelligence: robots, drones, autonomous vehicles, Internet of things...

UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST) defines AI as the ability of machines to mimic certain characteristics of human intelligence, including perception, learning, reasoning, problem solving, linguistic interaction and even the production of creative works. The WordArt interactive tool allows to visually display the results of a survey on AI characteristics given to teachers (Figure 1). The characteristic most frequently chosen to define AI was artificial creativity, followed by autonomy, adaptability and artificial learning, and finally artificial thinking, informatics and interdisciplinarity.

## Figure 1

*WordArt AI features*



Educational institutions should not remain unaffected by the influence of technologies, nor should they progress without addressing the distrust generated in society by the rapid advancement of this technology. By definition, schools are social institutions where students receive formal education linked to the needs of a particular social model. Our social model is embedded in the policies of the European Union, which advocates for a model of artificial intelligence deployment based on ethical algorithm design, the primacy of digital rights, and social cohesion (Martín, 2023), and this is the idea we must promote. Schools are key facilitators for the success of digital education and training. To establish clear guidelines for the use of AI in educational institutions, it would be futile and ineffective if not implemented within a coherent educational innovation program managed through school principals. Innovation in education is a continuous, unique, and deliberate process aimed at improving educational quality and student learning. This improvement can be attributed to the use and interaction with technologies and includes structural aspects related to the organization of schools, dynamics of information and communication, and, above

all, teaching and learning processes. In other words, new challenges for educational systems.

In the Organic Law 2/2006, of May 3, on Education, modified by the Organic Law 3/2020, of December 29 (LOMLOE), the promotion and encouragement of research, experimentation, and educational innovation are established among its principles, article 1.n) *The application of this principle implies that educational administrations foster the development of innovation projects.* In the preamble of the LOMLOE, it is stated that "the widespread use of information and communication technologies in many aspects of daily life has accelerated profound changes in the understanding of reality." The role of school principals is complex, and their success will be closely related to the school culture of educational institutions and the additional competencies delegated by Autonomous Communities (article 132.m of the LOE, modified by the LOMLOE). It is in these competencies, not defined in the Organic Laws, that a greater or lesser degree of autonomy in favor of the Management Teams will be recognized. Among the competencies of principals, among others:

- m) Promote the qualification and training of the teaching staff, as well as research, experimentation and educational innovation in the center.
- n) Design the educational planning and organization of the center, included in the annual general program.

Educational inspection plays an essential role as a facilitator of school improvement by providing guidance to school principals to identify areas and aspects where innovation is needed. The inspector, within their functions, may supervise the implementation of projects and methods resulting from technological advancements to ensure they contribute to quality education. However, this supervision is not based on technological expertise alone; it also involves safeguarding ethical considerations, values, and principles that underpin the Spanish education system. Educational inspection takes on a significant role

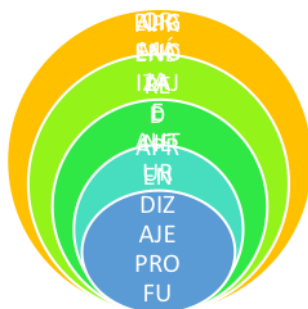
in the implementation and development of AI in education, serving as a guarantor to ensure its alignment with the values outlined in current educational laws. For instance, inspectors may oversee how schools define their strategies to ensure that AI promotes equal opportunities and encourages reflection within the educational community on the ethical values that should permeate work with AI. While inspectors need not be AI specialists, they should be aware of the risks associated with using AI without common sense. While they may not need to know the technical evolution of AI in the education system through algorithms, tools, and applications, they should understand the ethics of its implementation to advise educational institutions on ensuring that the use of specific AI applications contributes to providing students with the necessary education to actively participate in society. The ethical aspect of AI implementation in education still requires extensive literature and reflection. Numerous questions remain unanswered, such as the role of AI in education, whether curricula should be modified to adapt to AI, how AI can be effectively implemented in education, and what the initial steps should be. Addressing these questions will be challenging, and inspectors will play a crucial role in establishing regulations and norms on the ethical and responsible use of AI by teachers and students.

AI has enormous potential for social good and to promote the achievement of the SDGs, if it is developed in a way that benefits humanity, respects global norms and standards, and is anchored in peace and development (Flores Vivar-Garcia Peñalvo, 2022). It is paramount to provide principals with a basic understanding of what AI is, how it works and how it affects different aspects of society, consequently, their educational centers as the social institutions that they are. In other words, educate in AI and for AI. AI is an interdisciplinary field that intersects with many other areas of knowledge, disciplines, such as computer science, ethics, psychology, sociology and philosophy, can enrich education and allow for a more holistic approach to the challenges and

opportunities it presents. AI literacy enables managers to better understand the implications and challenges associated with this technology. This can include concepts such as machine learning, neural networks, deep learning, algorithms and AI ethics. We can see in Figure 2 the relationship between computer science, artificial intelligence, machine learning, neural networks, and deep learning

## Figure 2

*Computational relationship, artificial intelligence, machine learning, neural network and deep learning*



*Note.* Adapted from Relationship artificial intelligence, machine learning, neural networks and deep learning, UNESCO, 2021.

In addition to theory, it is important to provide practical opportunities for managers to work with AI tools and technologies. This could include developing competencies in the ChatGPT tool, which is a language model capable of generating human-like text. It uses an AI, called Generative Pre-trained Transformer, to generate natural language.

## How to improve education using AI



As we can see in Figure 3, developed by the authors, education can be improved by using AI through tools developed by UNESCO (2021) in Artificial Intelligence and Education: A Guide for Policymakers. Tools such as virtual assistance; language learning, ChatGPT; Virtual Learning Environments (VLE), interactive tools that benefit from AI, inclusion, the Model of Learning Based on Collaboration and Dialogue (MABCD), the e-portfolio, virtual reality and augmented reality, Open Educational Resources (OER) and, finally, monitoring in discussion forums.

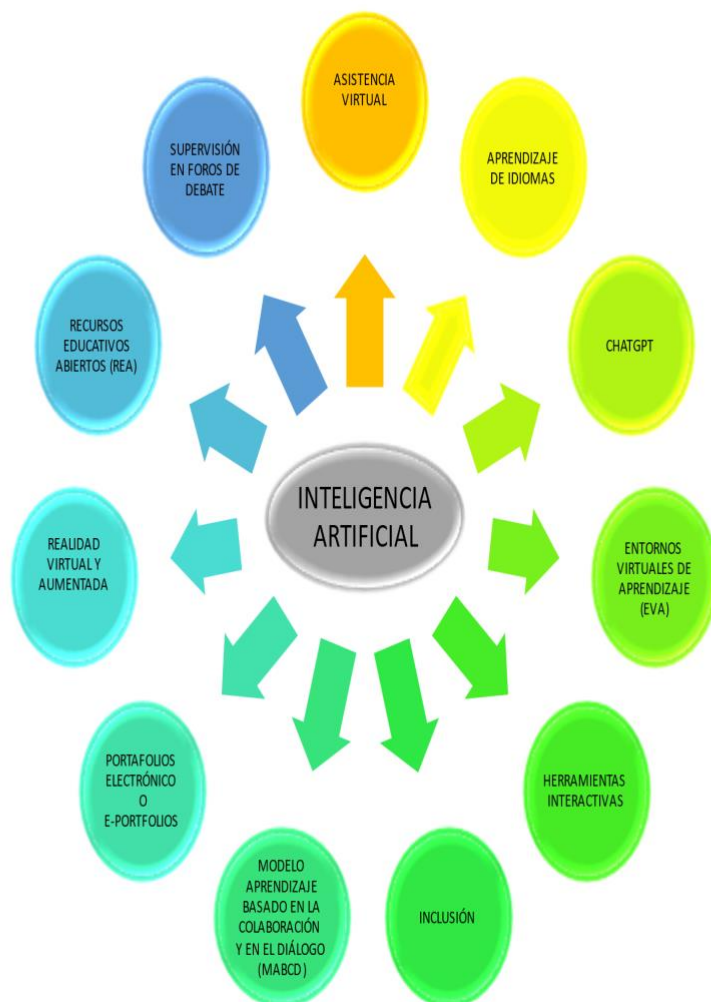
Domingo Farnós, in 2023, states that the integration of AI can facilitate access to a wide range of online educational resources, including multimedia materials and interactive tools. He suggests that an intelligent virtual classroom would employ a combination of AI technologies, machine learning, and data analysis to personalize student learning, improve teaching effectiveness and efficiency, and provide precise and timely feedback. Farnós cites examples of AI-driven platforms such as the Text Summarizer<sup>1</sup>, where, regardless of geographical location, physical disabilities, or learning differences, each student can complete writing tasks quickly. He also mentions Massive Open Online Courses (MOOCs), where tutors could use algorithm-based recommendations to suggest other courses based on the interests and progress of enrolled learners. Lastly, if a student uses a language learning app on their mobile phone, the app, using natural language processing algorithms, can adapt lessons and exercises according to the student's skill level.

### Figure 3

*How to improve education using AI*

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<sup>1</sup> <https://resumidordetextos.com/>



The [DigiCraft](#), educational program, which experiments with cutting-edge technologies (AI, augmented reality, robotics, etc.), is being implemented in different autonomous communities of Spain.

Table 1 presents twenty-seven tools that enable the leveraging of AI in education, among which we highlight tools that favor inclusion and contribute to the achievement of the Sustainable Development Goals (SDGs) of the 2030 Agenda necessary to transform the world, especially SDG 4: Ensure inclusive, equitable and quality education and promote lifelong learning opportunities for

all. It showcases tools such as virtual assistance; language learning in a fun, effective and free way through [Duolingo](#)<sup>1</sup>; [ChatGPT](#)<sup>2</sup> which functions as a chatbot; Virtual Learning Environments (VLE) in which classroom management platforms gamify learning ([ClassDojo](#)<sup>3</sup>), the free online platform for distance learning ([Edmodo](#)<sup>4</sup>), the free tool that allows video uploading ([Flipgrid](#)<sup>5</sup>), the tool for classroom organization ([Google Classroom](#)<sup>6</sup>), the non-profit organization that offers free education ([Khan Academy](#)<sup>7</sup>), the open source platform in the field of virtual education ([Moodle](#)<sup>8</sup>), and the visual collaboration tool to facilitate course planning ([TrelloEducation](#)<sup>9</sup>). Interactive tools that benefit from AI such as [Baamboozle](#)<sup>10</sup> which creates question and answer games, [Kahoot](#)<sup>11</sup> is a tool to gamify learning in the classroom, [Mentimeter](#)<sup>12</sup> encourages student participation through word clouds, polls and quizzes, [Quizizz](#)<sup>13</sup> is a gamification tool that allows evaluation, and [WordArt](#)<sup>14</sup> allows the results of a survey to be displayed visually. We highlight inclusive tools that allow speech recognition and transcription that convert spoken language into text such as [Bear File Converter](#)<sup>15</sup> and, conversely, online realistic speech generation tools from text such as [Dictation](#)<sup>16</sup>, tools to improve literacy skills such as [Dytective](#)<sup>17</sup>, and the online realistic speech generation tool [SpeechGen](#)<sup>18</sup>, intelligent emotional robots used with students with Autism Spectrum Disorder such as [Trastorno Espectro Autista](#)<sup>19</sup>, classroom adaptations for sensory processing difficulties [Understood](#)<sup>20</sup>; virtual reality projects such as the [Asignatura empatía](#)<sup>22</sup> developed with the aim of fighting bullying and [StorySign](#)<sup>23</sup> augmented reality application to help hearing impaired students; the intelligent tutoring system of the Model of Learning Based on Collaboration and Dialogue (MABCD); the electronic portfolio or e-portfolio [Portafolios digital](#)<sup>21</sup> that self-assess academic progress by collecting projects on a physical or digital support (Educación 3.0). Open Educational Resources (OER) has a large collaborative environment for students and for teachers such as [CK-12](#)<sup>24</sup>, a network of open educational resources such as [Procomún](#)<sup>25</sup> and a non-profit program aimed at promoting inclusion in education such as [AI 4 ALL](#)<sup>26</sup>;

finally, monitoring in discussion forums allows sorting of messages in the forums and automatic replies such as [Jill Watson](#)<sup>27</sup>. Likewise, AI is closely related to digital competence through various tools outlined in Table 1, some of which particularly enable the development of specific key competencies. These include linguistic competence for using virtual assistance, engaging in conversation through AI in the Model of Learning Based on Collaboration and Dialogue (MABCD), and supervising forums for debate. Additionally, plurilingual competence is linked to language learning. The remaining competencies, such as citizenship, cultural awareness and expression, entrepreneurial, mathematical, and competence in science, technology, engineering (STEM), as well as personal, social, and learning-to-learn competencies, are developed through Virtual Learning Environments (VLEs). This is achieved using interactive tools, promoting inclusion through the use of electronic portfolios, and incorporating virtual, augmented reality, and Open Educational Resources (OER).

**Table 1**

*Leveraging AI in education and its tools*

LEVERAGING IA IN TOOLS EDUCATION		WHAT IS IT?
Virtual assistance	Alexa de Amazon Asistente de Google Siri de Apple	Virtual voice assistants.
Language learning	<a href="#">Duolingo</a> <sup>1</sup>	A fun, effective and free way to learn a language.
Holding conversation	a <a href="#">ChatGPT</a> <sup>2</sup>	AI tool created by Open AI that works as a chatbot.

Virtual Learning Environments (VLE)	<a href="#">ClassDojo<sup>3</sup></a> <a href="#">Edmodo<sup>4</sup></a> <a href="#">Flipgrid<sup>5</sup></a> <a href="#">Google Classroom<sup>6</sup></a> <a href="#">Khan Academy<sup>7</sup></a>  <a href="#">Moodle<sup>8</sup></a>  <a href="#">TrelloEducation<sup>9</sup></a>	<p>Classroom management platform that gamifies learning.</p> <p>Free online platform for distance learning.</p> <p>Free tool for uploading videos.</p> <p>Classroom organization tools.</p> <p>Non-profit organization offering free education.</p> <p>Open source platforms in the field of virtual education.</p> <p>Visual collaboration tool to facilitate course planning.</p>
LEVERAGING IA IN EDUCATION	TOOLS	WHAT IS IT?
Interactive tools	<a href="#">Baamboozle<sup>10</sup></a> <a href="#">Kahoot<sup>11</sup></a> <a href="#">Mentimeter<sup>12</sup></a>  <a href="#">Quizizz<sup>13</sup></a>  <a href="#">WordArt<sup>14</sup></a>	<p>Creator of question and answer games.</p> <p>Tool to gamify learning in the classroom.</p> <p>Encourages student participation through word clouds, surveys and quizzes.</p> <p>Gamification tool that allows evaluation.</p> <p>It allows to show the results of a survey in a visual way.</p>
Inclusion	<a href="#">Bear File Converter<sup>15</sup></a>  <a href="#">Dictation<sup>16</sup></a>  <a href="#">Dytective<sup>17</sup></a>	<p>Speech recognition and transcription that converts spoken language into text.</p> <p>Online realistic voice generator tool from text.</p> <p>Tool to improve literacy skills.</p> <p>Online text-based realistic voice generator tool.</p>

	<a href="#">SpeechGen</a> <sup>18</sup> <a href="#">Trastorno Espectro Autista</a> <sup>19</sup> <a href="#">Understood</a> <sup>20</sup>	Intelligent emotional robots. Classroom adaptations for sensory processing difficulties.
Electronic portfolios or E-portfolios	<a href="#">Portafolios digital</a> <sup>21</sup>	Self-assess academic progress through the collection of projects on a physical or digital support (Education 3.0).
Virtual Reality	<a href="#">Asignatura empatía</a> <sup>22</sup>	Project developed with the aim of fighting against bullying.
Augmented reality	<a href="#">StorySign</a> <sup>23</sup>	
LEVERAGING IA IN EDUCATION TOOLS		WHAT IS IT?
Open Educational Resources (OER)	<a href="#">CK-12</a> <sup>24</sup> <a href="#">Procomún</a> <sup>25</sup> <a href="#">AI 4 ALL</a> <sup>26</sup>	It has a large collaborative environment for students and teachers. Open educational resource network. Non-profit program aimed at promoting inclusion in education.
Supervision in discussion forums	<a href="#">Jill Watson</a> <sup>27</sup>	Tool that classifies forum posts and automatically responds to them.

Regarding the use of these tools, we would like to raise two fundamental reflections:

1<sup>st</sup> - What should be the profile of the director who has to manage the "digital disruption" that is transforming educational centers at great speed?

As Ferrás, H. (2021) points out, many transformation processes fail due to the inability of management to understand the strategic dimension of technology. The leader of an educational center will have to be a

"technomanager", must know the levers of change of technology, know how to evaluate its potential, its power to create new opportunities and the collision between what is coming and what already exists. A manager must have skills such as resilience, flexibility, creativity, social interaction and personal relationships. A professional who understands that, although ChatGPT (to mention one in particular) can be a useful tool, it cannot completely replace human interaction and the experience of education professionals. It must be used as a complementary tool and be supported by a strong educational team to ensure a quality educational experience.

2nd - Are technological tools being analyzed in which it is not necessary to use personal or potentially sensitive data (or that use the minimum possible amount of such data)?

This is a fundamental question that should be raised in educational centers, as indicated by the European Union in 2019 as one of the ethical guidelines to be followed for a reliable AI. The protection of natural persons in relation to the processing of personal data is a fundamental right protected by article 18.4 of the Spanish Constitution and in Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016. The Organic Law 3/2018, of December 5, on the Protection of Personal Data and guarantee of digital rights states in its preamble, that "the challenges posed by the rapid technological evolution and globalization, which has made personal data the fundamental resource of the information society". Educational establishments must make use of the tools offered by technology without infringing data protection regulations. In the proposal for a Regulation of the European Parliament and of the Council laying down harmonized rules in the field of artificial intelligence (Artificial Intelligence Act), the European Parliament and of the Council have proposed a new regulation on the protection of personal data.

There is great concern regarding the scientific basis of AI systems that seek to detect emotions, physical or psychological traits, such as facial expressions, movements, heart rate or voice (...) the main risks of abuse, may arise especially when the system is deployed in real-life situations related to law enforcement, border management, the workplace and educational institutions.

These are just some general considerations for AI education. As technology advances, it is important to adapt and evolve educational approaches to adequately prepare our principals and equip them with the skills needed for an increasingly AI-driven world. To this end, they could be provided with a user guide on how to apply AI in their schools.

### **Reflection points for the elaboration of a guide for the application of the IA in schools**

1. Before implementing any AI system, it is essential to define What specific problems or challenges are AI expected to address? How does the implementation of AI align with the school's Educational Project (PEC)?

To respond to the first question, we use our basic regulations as a fundamental anchor. As established by Article 111 bis of Law 2/2006 of May 3, Information and Communication Technologies, in subsection 5, Educational Administrations and the Management Teams of the centers will promote the use of information and communication technologies (ICT) in the classroom as an appropriate and valuable teaching tool for carrying out teaching and learning tasks. Educational Administrations must establish conditions that make it possible to eliminate situations of risk derived from the inadequate use of ICT in the school environment, with special attention to situations of online violence. These



instances of online violence can be a clear example of the specific challenges that can be detected through tools such as AI.

1. Monitoring social networks and other online platforms to identify posts, comments, or profiles containing violent content.
2. Establishing channels for members of the educational community to report cases of violence.
3. Combining technologies with human review to address complex cases and avoid false positives.

Another example of challenges that can be detected through AI is predicting academic performance, using predictive analysis to assess possible difficulties, enabling early interventions and preventive strategies based on AI-driven pedagogical approaches.

To answer the question, "How does the implementation of AI align with the Educational Center Project (PEC)?" we will consider the dialogue between applicable regulations and the involved educational professionals. Title V of the LOE, "Participation, Autonomy, and Governance," places special emphasis on the autonomy of educational centers, particularly in pedagogical aspects through the development of Educational Projects. In Chapter I, titled "Autonomy of the centers," institutional documents, the Educational Project (article 121), Rules of Organization, Operation, and Coexistence (article 124), and the Annual General Programming (article 125) are regulated.

The Educational Center Project reflects the idiosyncrasies of the center, its values, and priority actions, based on defined strategic lines through fundamental axes that shape the center's culture. Basic documents, such as the center's digitalization plan, are included in it. This plan can be one of the strategic lines of the Educational Project, outlining how the center will integrate technology into its educational processes and understand the role of AI in the center.

In the event that the introduction of AI is desired, as a responsibility of the Management Team, specific educational goals regarding AI management should be established, improving participation and selecting AI tools that best fit the center's needs. Security measures must be in place or implemented to protect sensitive information, ensuring privacy, and, finally, families, teaching staff, and students must be involved in the digitization process.

The education inspectorate evaluates the work plan of the Information and Communication Technologies (ICT) coordinator as well as its development and compliance. This plan will be included in the Annual General Programming (PGA) that will contain all the mandatory documents of the different projects in which the center participates related to ICT, such as innovation projects related to IA. Innovation through AI can contribute to improve the quality and impact of the evaluation of educational institutions, leverage technology, collect evidence-based data, adopt a formative approach, foster participation and collaboration, and achieve a more effective educational system focused on continuous improvement of education.

2. Ensure that any AI implementation complies with ethical and legal principles. Respect the privacy of students and staff, ensuring the protection of personal data and compliance with data protection laws and regulations.
3. Evaluate and plan the necessary technological infrastructure for AI implementation, including appropriate hardware, software, and connectivity. Ensure that there are trained human resources to manage and maintain AI systems.
4. Provide training opportunities for educational staff so that they acquire the skills and knowledge necessary to use AI effectively. This includes understanding how to interact with AI systems, interpret results, and use them to enhance teaching and learning.

5. Recognize the limitations of AI and ensure adequate human supervision at all stages of its implementation. AI should not completely replace human interaction and decision-making but rather complement and improve it.
6. Implement assessment and monitoring mechanisms to measure the impact of AI on educational outcomes and student satisfaction. Use this data to make adjustments and continuous improvements in AI implementation.
7. Communicate openly and transparently about the implementation of AI in the educational center, both internally and externally. Encourage the participation of the educational community and address any concerns or questions related to AI in a clear and accessible manner.

These points provide a basis for school principals to consider when implementing AI in their schools.

### **Practical tool: CHATGPT**

One of the tools, as a practical generative artificial intelligence tool, that managers can implement would be the use of ChatGPT. ChatGPT is a chat system designed to interact with you and answer questions. It is able to simulate a conversation, answering your questions and understanding the context of the conversation. What sets it apart from other tools such as typical chatbots, which can be found on many websites, is that it has a language model based on GPT-3. What this means is that this AI has been trained with more than 175 million text parameters (books, news, articles, conversations) so that it can perform tasks such as answering questions, translating text and understanding human conversation with AI. ChatGPT could be leveraged in educational institutions in several ways. Here are some ideas on how it could be used.

1. Data analysis and performance tracking: ChatGPT could analyze educational data such as grades, attendance, and class participation to provide information about student performance. This could help identify patterns, detect areas for improvement, and personalize the educational experience based on individual needs.
2. Virtual assistance: ChatGPT could function as an online virtual assistant for students. It could provide information about educational programs, admission requirements, important dates, and answer general education-related questions.
3. Decision-making assistance: ChatGPT can provide answers to frequently asked questions, allowing students to interact with the model to obtain updated and accurate information in real-time, enabling them to make informed and efficient decisions.
4. Academic counseling and guidance: ChatGPT could assist students in choosing subjects, study programs, or careers based on their interests, skills, and goals. It could provide academic guidance and suggestions on available courses and options.
5. Support and guidance for teachers: Educational inspectors could use ChatGPT as a tool to provide assistance and guidance to teachers. For example, teachers could ask questions related to pedagogical aspects, lesson planning, teaching strategies, classroom management, among others. ChatGPT could offer answers based on its prior training and accumulated knowledge until 2021, providing useful information and practical suggestions.
6. Problem-solving support: Students could use ChatGPT to get help with specific issues in their assignments or school projects. The model could provide step-by-step guidance, explain difficult concepts, and offer relevant examples to help students understand and solve their difficulties.
7. Early detection of problematic situations: AI can analyze large amounts of data,

such as behavior records, online interactions, and student feedback, to identify patterns and early warning signs related to coexistence issues.

8. Establishing the school/classroom climate: AI can analyze data collected from various sources, such as student and teacher surveys, to assess the school climate. This could help identify potential issues or situations that may affect coexistence, such as cases of bullying or discrimination. Educational inspection could use this data to implement specific strategies and programs to promote coexistence.

9. Personalized tutoring: ChatGPT could adapt to provide personalized tutoring for students. Using the information and data provided by the student, the model could identify areas for improvement and provide specific recommendations, additional resources, and practical activities to strengthen learning.

10. Formative assessment: ChatGPT could help students practice and assess their knowledge through interactive questions and answers. The model could provide immediate feedback and detailed explanations to enhance understanding of concepts.

The European Union (EU) has developed its own AI strategy, as reflected in the National Artificial Intelligence Strategy. In Spain, the deployment of the Spanish Agency for the Supervision of Artificial Intelligence (AESIA) is being finalized, supported by the NextGenerationEU program as a mechanism for Recovery and Resilience to finance the Recovery, Transformation, and Resilience Plan (PRTR), which proposes a series of investments in innovation for AI development.

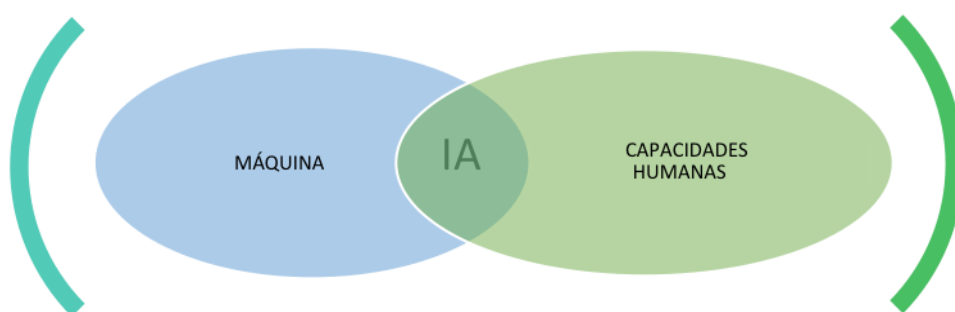
AI applications designed for education have been categorized into three main groups: system-oriented, student-oriented, and teacher-oriented (Baker et al., 2019). In relation to this categorization by Baker and colleagues, we propose incorporating a fourth main category of AI applications oriented toward

Educational Inspection. These applications should aim to eliminate gender biases to promote equality.

To conclude, it is essential to emphasize the importance for Educational Inspection to officially recognize and comprehend AI, considering it as the machine's ability to exhibit human-like behavioral capabilities, as illustrated in Figure 4, created by ourselves.

#### Figure 4

*AI intersection machine-human capabilities*



#### **Ways in which innovation can be applied in the Educational Inspection service. (SIE)**

We develop some of the ways in which innovation can be applied in the SIE:

1. Use of technology: The implementation of technology can facilitate and streamline inspection processes. For example, mobile applications or online platforms can be used to collect and analyze data, track inspections and share

reports more efficiently.

Evidence-based data collection: The Education Inspectorate can benefit from evidence-based data collection. This involves using research and data analysis techniques to obtain accurate and reliable information on the performance of educational institutions. This enables decision making and effective interventions to improve educational quality.

3. Establishing effective communication channels to take advantage of technological tools to facilitate communication and collaboration among the different educational stakeholders is fundamental to achieve a more inclusive, transparent and effective inspection process which will contribute positively to the development and improvement of the entire educational institution.

There are some strategies that the Education Inspectorate can implement to encourage participation and collaboration through open communication channels:

- Regular meetings with the Management Teams of the reference inspector's centers.
- Periodic information sessions to inform the educational actors about the objectives and processes of the Inspectorate.
- Online platforms. The following is an example of a prompt that is the following statement that we formulated to ChatGPT:

ChatGPT 3.5



¿Cómo puedo ayudarte hoy?

Recomendar actividades  
para una jornada de team building con empleados re...

Crea un plan de entrenamiento  
para entrenamiento de resistencia

Dame ideas  
sobre cómo planificar mis propósitos de año nuevo

Comparar estrategias de negocio  
para la transición del presupuesto al lujo frente al lujo...

Mensaje ChatGPT...



ChatGPT puede cometer errores. Considere verificar información importante.



Tú

¿Cómo establecer plataformas en línea que favorezcan la comunicación efectiva entre la Inspección Educativa y los demás actores educativos?



ChatGPT

Establecer plataformas en línea efectivas para facilitar la comunicación entre la Inspección Educativa y otros actores educativos es fundamental para mejorar la coordinación, la transparencia y el intercambio de información. Aquí hay algunos pasos y consideraciones clave:

#### 1. Identify needs and objectives:

- Conduct a detailed analysis of the communication needs of the Educational Inspectorate and the different educational stakeholders.
- Define clear objectives for the online platform, how to improve coordination, share relevant information and facilitate feedback.

#### 2. Selecting a suitable platform:

- Choose a secure and easy-to-use online platform that suits the specific needs of the education system and the Education Inspectorate.



- Consider options such as education management platforms, secure messaging systems, or even educational social networks.
3. Ensuring information security:
- Implement robust security measures to protect the confidentiality of shared information.
  - Ensure compliance with privacy and data protection regulations.
4. Facilitate two-way communication:
- Provide tools that enable two-way communication between the Education Inspectorate, teachers, families and other members of the educational community.
  - Integrate features such as real-time chat, discussion forums and comments on shared documents.
5. Customization and accessibility:
- Design the platform to be easily accessible and customizable according to the needs of different users.
  - Ensure that the platform is compatible with mobile devices to ensure anytime, anywhere accessibility.
6. Training and support:
- Provide training to all users to ensure effective use of the platform.
  - Provide ongoing technical support to address any problems or questions that may arise.
7. Integration with existing systems:
- Integrate the platform with existing educational systems to facilitate data transfer and minimize duplication of effort.
  - Ensure that the platform is scalable to adapt to future needs and changes in the infrastructure.
8. Establish communication protocols:

- Develop clear protocols for communication, ensuring consistency and efficiency in the transmission of information.
9. Promote active participation:
- Implement strategies to encourage the active participation of the entire educational community, such as automatic notifications, reminders and collaborative activities.
10. Evaluar y ajustar continuamente:
- Conduct periodic evaluations to measure the effectiveness of the platform.
  - Adjust and improve the platform based on feedback and changing needs.

These specific measures promote active participation and collaboration among the different educational actors, which contributes to a more inclusive, transparent and effective inspection process. By involving the educational community in the SIE, better results are generated and a culture of continuous improvement is promoted in educational institutions.

### **In the near future...**

Thanks to ChatGPT, the use of active methodologies is widespread in the majority of educational centers in Spain. The alternatives that began to be considered back in 2017 by the most innovative teachers are now part of our daily practices in the classrooms: [Flipped Classroom](#), , project-based learning, cooperative learning, collaborative work, etc. The old practice of memorizing information to later reproduce it in an exam is a thing of the past. How antiquated now sound typical teacher phrases to their students like, "I won't have time to

cover the entire syllabus, so work on this at home, and if you have questions, we'll discuss them tomorrow." It makes sense, as in a competency-based education, that approach is no longer relevant. Competencies such as creativity, critical thinking, etc., will be integrated into all curricula in different autonomous communities. The future, shaped by technology, holds uncertainty but promises potential. It will depend on us to navigate that uncertainty. Educational Inspection plays a key role in harnessing the benefits of AI, as highlighted by Peñaherrera Acurio (2022), to "Ensure inclusive, equitable, and quality education, as well as lifelong learning opportunities for all".

We could not close this article without mentioning the applications, the result of AI, that an inspector can and/or will enjoy in order to perform his job more productively.

- a) Tools that allow you to take notes in meetings, extracting the most salient points, some allow editable notes: [TL](#), [DV](#), [Copilot de Microsoft](#), [Otter](#).
- b) Tools that, after reading articles, PDF documents, summarize them and even propose key questions on the subject after reading them: [Merlín](#), [Chat PDF](#), etc.
- c) Chatbots, to be developed for educational inspection, containing useful information for the inspector and within an adequate data protection, can report relevant data for the daily life of an inspector: number of visits made in a center, pending actions, dates and deadlines in WhatsApp itself....
- d) Tools that use formal language to write e-mails, notes, reviews, that elaborate questions after introducing a situation from which we need to obtain more information (chatbots).
- e) Tools that allow the creation of statistical tables with the causes of concern to the educational community, and are answered by telephone, making a precise and formal analysis ([Julius AI](#), [MonkeyLearn](#)).

We have framed the article with the awareness that the future of education lies in effectively harnessing digital culture. We have dissected some of the major advances achieved and analyzed the future projections of educational technology. The industrial era is being replaced by the digital era, leading to anticipated new challenges and needs in the educational domain. We are creating the unavoidable spaces to introduce this urgently needed digitization in which we are immersed.

### **Glossary of terms**

- Autonomy: Condition of someone who, for certain things, does not depend on anyone (Diccionario de la lengua española de la Real Academia Española. RAE).
- Adaptability: Quality of people or things to have the capacity to adapt, that is, to adapt to something (Diccionario de la lengua española, RAE).
- Algorithm: An ordered and finite set of operations to find the solution to a problem (Diccionario de la lengua española, RAE).
- Machine learning: Analyzes large amounts of data to identify patterns and build a model that is then used to predict future values.
- Deep learning: A subcategory of machine learning, deep learning enables hierarchical learning of a large amount of information. In other words, the machine processes data in order of complexity to understand a reality and grasp it by its own means with the help of a neural network.  
<https://www.serem.com/language/es/blog/2018/08/21/glosario-inteligencia-artificial-terminos-conocer/>

- Big data or massive data: Refers to data sets so large that they exceed the capacity of traditional computer applications to deal with them in a reasonable amount of time (economipedia).  
<https://economipedia.com/definiciones/big-data.html>
- Chatbot: A computer program that utilizes artificial intelligence (AI) and natural language processing (NLP) to understand user questions and automate responses, simulating human conversation (IBM).
- Creativity: It is demonstrated by bringing something new into existence. The essence here lies in novelty and the nonexistence of the idea or product previously. Creativity is demonstrated by inventing or discovering a solution to a problem and showcasing exceptional qualities in solving it (Flanagan, 1958).
- Digital: It is commonly used to refer to all those systems that represent, store or use information in binary system, that is, to almost all the electronic and computer devices that surround us nowadays.  
<https://sistemas.com/digital.php>
- Experimentation: Scientific method of investigation, based on the provocation and study of phenomena (Diccionario de la lengua española, RAE).
- Gamification: Learning technique that transfers game mechanics to the educational-professional environment (EDUCACIÓN 3.0).
- Hardware: Set of devices of a computer (Diccionario de la lengua española, RAE).
- Innovation: Represents the action of innovating. It is a process where something new that adds value is added; that is, when elements or ideas that already exist are changed, transforming them into something better or creating new ones that generate a positive impact.  
<https://conceptodefinicion.de/innovacion/>

- Internet of things: Interconnection of people, animals and things (household appliances, cars, etc.) with the Internet (Diccionario panhispánico del español jurídico).
- Educational research: Discipline that deals with questions and problems related to the nature, epistemology, methodology, aims and objectives within the framework of the progressive search for knowledge in the educational field (Arnal 1994).
- Tag cloud: Also known as tag cloud or word collage) is a visual representation of the most used words in a text.
- Physical or electronic portfolio: A learning portfolio is a collection of materials selected with the intention of explaining the learning performed, reflecting on this material and evaluating it (Francesc Martínez-Olmo).  
<https://www.educaciontrespuntocero.com/noticias/evaluar-dosier-portfolio-aprendizaje-que-es-como-aplicarlo/>
- Suitcase word: Marvin Minsky, cognitive scientist and one of the great pioneers of AI, coined the term "suitcase word" to refer to those words that carry many different meanings that are present even when we refer to only one of them. <https://course.elementsofai.com/es/1/1>
- Quiz: This is a dynamic or game where students choose the correct answer among several questions in a given list.
- Augmented reality: Coined by Caudell in 1990, it describes a set of technologies that add virtual information to the existing real context, where a virtual component appears in reality.
- Virtual reality: Describes the technology that allows you to immerse yourself in a virtual world as if it were the real world. Pioneered by Heilig, who built the Sensorama machine in 1962.
- Neural networks: Artificial neural networks are a computational model that allows simulating the behavior of the human brain. In other words, they

consist of units or nodes that receive information from the external environment or other neurons, similar to the nerve impulses received by neurons in the human brain (UNIR).

- Resilience: Adaptive capacity of a living being to adapt to a disturbing agent or an adverse state or situation (Diccionario de la lengua española, RAE).
- Software: set of programs, instructions, and mathematical rules for performing certain tasks on a computer.
- Technologies: A set of theories and techniques that enable the practical application of scientific knowledge (Diccionario de la lengua española, RAE).
- Tecnologías 5G: 5G is the new generation of technology used in the communication between mobile devices that offers higher connection speeds.

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