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Artificial intelligence as an educational tool to improve teaching practices in early childhood education (Project in progress)

Inteligencia artificial como herramienta educativa para mejorar la práctica docente en educación inicial (Proyecto en ejecución)

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ABSTRACT

Artificial Intelligence (AI) is being incorporated into the educational process and teaching work with the aim of improving the quality of the teaching-learning process. The general purpose is to apply AI as an educational tool to improve teaching practice in early childhood education, specifically at "Niño Simón" Early Childhood Education Center, located in the Jalisco parish, Motatán municipality, Trujillo state. For this reason, a diagnosis was prepared jointly with the social actors, building the plan of approach to the group, which allowed to demonstrate among the existing problems the lack of technological activities. Methodologically, a Participatory Action Research (PAR) is presented, adopting the model proposed by Kemmis and Mctaggart (2007), consisting of four fundamental phases represented in planning, action, observation, and reflection. For the collection of information, the techniques of interviews, brainstorming, roll-call votes, and problem and solution trees are used.

Keywords:
Artificial Intelligence; Educational Tool; Teaching Practice; Early Childhood Education; Innovation

RESUMEN

La Inteligencia Artificial (IA) se está incorporando en el proceso educativo y en la labor docente con el objetivo de mejorar la calidad en el proceso de enseñanza-aprendizaje. El propósito general es aplicar la IA como herramienta educativa para mejorar la práctica docente en educación inicial específicamente en el Centro de Educación Inicial "Niño Simón", ubicado en la parroquia Jalisco, municipio Motatán del estado Trujillo. Por tal razón se elaboró un diagnóstico en conjunto con los actores sociales construyendo el plan de acercamiento al grupo, que permitió evidenciar entre los problemas existentes la falta de actividades tecnológicas. Metodológicamente se presenta una Investigación Acción Participativa (IAP) adoptando el modelo propuesto por Kemmis y Mctaggart (2007), constituido por cuatro fases fundamentales representadas en la planificación, acción, observación y reflexión. Para la recolección de la información se utiliza la técnica de la entrevista, lluvia de ideas, voto nominal, árbol de problema y soluciones.

Palabras clave:
Inteligencia Artificial; Herramienta educativa; Práctica docente; Educación Inicial; Innovación

INTRODUCTION

Currently, Information and Communication Technologies (ICTs) are present throughout society in a profound way, causing countless changes in social, cultural, and educational matters. All of this affects the path, time, space, and access to information. These tools influence schools and the ways we teach and learn. In this sense, the challenges teachers face are numerous, diverse, and often conflicting, including decontextualized training, lack of resources, and the demotivation and fatigue inherent in an aging and disenchanted classroom.

In this regard, Cruz (2011) states that "ICTs can induce innovative processes, particularly in terms of work methodology, whether of teachers or students inside or outside of learning spaces" (p. 1), recognizing the need to innovate methods and means made available for teaching and learning. In other words, schools must adapt to the demands of an increasingly technological society, where the students who inhabit it are motivated by everything digital from an early age.

Among ICTs is AI, which for Parga (2023) has the potential to transform the Venezuelan education system, in order to offer alternatives to improve the quality, equity and efficiency of education.

That is to say, education must break with the traditional pedagogy present in learning environments, and in turn, be based on current teaching theories such as constructivism and critical theory to interpret the avalanche of information to which the global human being is subjected. Due to this fact, new essential elements emerge in the use of AI in teaching and learning processes to achieve its development. Seen in this way, education has become a highly important strategy to foster the awakening of society to the contemporary educational conditions.

Therefore, it is important to recognize that incorporating ICTs into educational practice requires the construction of a framework for thinking, teaching techniques, and implementation. This creates significant challenges, responsibilities, and opportunities for embracing ICTs as a means of sharing, thinking, collaborating, and constructing knowledge. Consequently, it is necessary to change educational practices through the use and adoption of AI. All of this requires that teachers be provided with the pedagogical tools for the use and application of AI in order to appropriate them, enabling students to assimilate the use and mastery of these technologies.

This is contemplated by Díaz (2021) when stating that AI in educational environments provides and originates the establishment of teaching and learning processes in a flexible way and adapted to the needs and interests of those involved, where it allows the application of intelligent learning spaces, characterized by flexibility, adaptation and autonomy. Likewise, in the Beijing Consensus (2019) where AI and Education were addressed, the emphasis was on integrating AI in the educational field to activate the creation of an open and equitable educational system, in order to allow the personalization of learning taking into account student´s individual characteristics (Hutchins, 2017).

In relation to the above implications, preschool age becomes an important period in boys´ and girl´s life , where the skills and abilities achieved by them exceed the appropriation of reality, that is, the acquisition of knowledge through lived experiences, specifically through the use of television, video, computing, mobile devices, video games and other technological equipment in their daily lives and in teaching, are coexisting with AI, all of this generating the ability to capture information, understand, decide, act and learn, intelligently.

It should be noted that Yanes and Coca (2021) make the discovery that through games, boys and girls obtain knowledge of the objects and phenomena of the world around them, with the purpose of developing psychic and cognitive processes such as memory, thought, imagination, language, among others; which favor their integral development, in addition to that, it attenuates the satisfaction of their needs and interests.

Thus, it is through games that preschool-aged children are introduced to the world of AI. Indeed, they achieve independence, imagination, creativity, and positive relationships, among other things. It also broadens children's relationships and

fosters delight in participating in adult activities. Based on these factors, the challenge of technological innovation is considered to be a shift in teachers' mindsets toward their work practices. Therefore, teachers must understand, accept, assimilate, and appreciate that, through new technologies, knowledge is constantly changing. This will allow them to enhance their personal and professional development, and consequently, increase their productivity and competitiveness. This is confirmed by Freire's (1998) approach, when he states that teachers have the responsibility of transforming a reality initiated within themselves and then spreading it to others to achieve common goals.

Similarly, Rodriguez (1975), the great teacher, suggests that an educational revolution is necessary in order to break free from the oppression that society was experiencing until then, to change the educational system based on originality, which is where the phrase "WE INVENT OR WE ERR" is based. A revolution that transforms man's awareness in accordance with the liberation of himself, against the scourging dictatorship and the domesticated methods that existed at that time, there is today's philosophy, whose foundation is based on the critical thinking of today's man. Based on this, boys and girls in preschool age acquire skills that go beyond the appropriation of reality, that is, the knowledge acquired through their own experiences brings to society creativity, critical, analytical thinking, imagination, among others; due to the use of television, videos, computing, mobile devices, video games and other technological equipment in their daily lives, thus achieving their own teaching that in one way or another also makes them coexist with AI when interacting with devices capable of executing actions with rational behavior such as understanding, deciding, acting and learning, in an intelligent way.

Accordingly, in practice, the situation appears inconsistent, and the gap between information and communication technologies and teacher training, whose mission is to lead the change in future professionals, is growing. In this sense, it can be stated that new information and communication technologies demand a new literacy from professionals, with a command of new language codes to be used as channels of expression and for constantly improving the quality of work in the educational process.

In view of this, the relevance and interest of this research results from the convergence of three factors: first, the transformation of the perception about the importance of ICTs in early childhood education contexts, the application of the Curriculum Guidelines for Early Childhood Education, which protects, in its learning guidelines, the ICTs Component, and verification of the lack of studies in this context. Equally, as an object of study, it is relevant because it strengthens educational dynamics. AI in relation to the teaching and learning process plays a fundamental role in ensuring that such learning is lasting and also favors the growth of boys and girls with defined and solid thought and personality structures that allow them to function in different environments and situations, making sound decisions, aware of their capacities for success and with the development of qualities that allow them to improve every day, making the most of their abilities.

Within this framework, and specifically for the "Niño Simón" Early Childhood Education Center in Motatán municipality, critical issues arise regarding the incorporation of technology into planning. This is understood as having great potential to transform the Venezuelan education system, providing successful options for transforming the quality, equity, and efficiency of education. This is due to various situations such as reluctance to change, lack of training in technology, lack of knowledge about the use of technology in planning, among others. All of the above has been generated by a lack of interest in innovating in school activities, as well as difficulties in understanding concepts, limited creativity in teaching and lack of educational resources, among others. However, traditional teaching methods are often not personalized to meet the individual needs of each child, which leads to poor academic performance.

Undoubtedly, to transform and transform teaching and promote and improve learning, it is necessary to analyze the challenges, possibilities,

and effects of AI in educational processes. Furthermore, the construction of new communicative frameworks that lead to breaking the basic conceptions of the teaching and learning scheme permeated by Information and ICTs, which reinforce existing approaches and practices, rather than transforming them. Therefore, it is necessary to link the contributions of these categories as educational tools to help children find that balance that allows them to consolidate learning effectively as part of their comprehensive development. Thus, the current research seeks to apply AI as an educational tool to improve teaching practices and learning for children in early childhood education, specifically at "Niño Simón" Early Childhood Education Center, located in the Jalisco parish, Motatán municipality, Trujillo state, as a way to significantly contribute to educational work from the fundamental role of teachers in school institutions. Based on the situation stated, the following research questions were raised:

- What is the importance of applying AI as an educational tool to improve teaching practice and learning of children in early childhood education, specifically at “Niño Simón” Early Childhood Education Center, located in the Jalisco parish, Motatán municipality, Trujillo state?
- What knowledge do teachers have about AI as an educational tool?
- What are the innovative strategies that early childhood education teachers can apply?

General Purpose:

Apply AI as an educational tool to improve teaching practices and the learning of children in early childhood education.

Research justification

Regarding the theoretical aspect, this research presents theories related to the title, such as AI, an educational tool, and practical pedagogy. Each of these theories can be compared with reality, in order to use AI as an innovative tool in teachers' planning. Also, the theory helps strengthen the appropriate knowledge for teachers, as well as for all organizations and university communities or researchers who require it. Furthermore, socially, this study proposes actions, based on AI, a practical pedagogical tool to acquire the capacity to confront changes in society.

On a practical level, AI is presented as a tool for teachers, generating meaningful recommendations that will serve as a guide to understanding all the benefits and advantages it offers in the teaching and learning process. This will then allow reflecting on the alternatives that can be implemented to consolidate active and leading participation by teachers, including children. Finally, from a methodological perspective, it aims to transform the thinking and actions of social stakeholders in order to improve educational quality.

METHOD

This research focuses on AI as an educational tool to improve teaching practice and learning in early childhood education. For the development of the experience, the author and the research team assume participatory action research as a methodological option, as a genuine expression of qualitative research, within the critical-reflective paradigm. For Valledor and Ceballo (2010, p. 35), they propose that "Participatory Action Research (PAR) is also gradually making its way into schools, especially since the strengthening of the teacher-researcher movement, because it is the teacher who is responsible for perfecting his or her own activity." It means then that this type of research allows the teacher to be a researcher and perfect his or her work, thus achieving better educational quality.

In order to carry out the actions that guide the research process, it is necessary to find a model that consolidates action research, in this sense it is necessary to rely on the model developed by Kemmis and Mctaggart (2012, p.14), which includes keywords that are used from the beginning of the research: reflection, understanding and learning, through action research which is defined as: "Participatory Action Research, which arises from the shared concerns of a group of people who seek solutions or improvements to certain situations." That is, participatory action research aims at the production of transformative knowledge, through a process of debate, reflection and collective construction of knowledge among the different actors in a territory in order to achieve social transformation.

Kemmis and Mctaggart´s model proposal (1989) has been used in this research, cited by Berrocal (2018) when expressing "participatory action research is based on observation and reflection on practice, which allows modifications to the action plan during its execution". (p.4). That is to say, action research deciphers what happens, from the point of view of those who act and interact in the same problem situation, for example, teachers and students, teachers, and director, in order to have a process of change or reality transformation.

Hence, this method requires an effort to expand research approaches that involve people participation, including those involved in design formulation, data collection, and information interpretation. This process is linked to several phases, described below: It begins with the observation phase, which constitutes the beginning of the researcher's experimental proximity to the socio-educational reality, with the objective of assuming the commitment and responsibility to improve or transform the field of study. Based on this approach to the socio-historical context with which the researcher interacts, the researcher fosters spaces for the construction of a practice that will strengthen their professional profile by integrating the knowledge developed with the socio-educational field. This begins with the diagnosis of educational institutions and their surrounding environments; dialogic encounters, individual reflections, and the collective knowledge construction.

At Niño Simón Early Childhood Education Center, the researcher met with the school principal, teachers, parents, and guardians to gain insight into the group and prioritize their needs. Observation allows for the organization, grouping, arrangement, and correlation of data according to the research objectives. That is, the information can be organized for analysis and interpretation. This allows for an understanding of the situation and, consequently, a diagnosis to be made.

The next phase is the planning phase, which refers to the process of assuming the actions necessary to achieve the objectives. It requires a plan through which the researcher defines their mid- or long-term vision and the strategies to achieve the stated objectives. Therefore, it must be a general plan constructed with the flexibility to allow for elements inclusion not foreseen during the research. In this research, a schedule of activities was planned according to the selected need regarding AI.

Like action, it must be flexible and open, allowing for the recording of the unexpected. It is vital for the researcher to keep a journal to record all observations within the educational institution. Finally, reflection, as a cycle that seeks to make sense of processes, problems, and other aspects, and strategic action through an exchange of various points of view, this phase within groups, leads to the reconstruction of the meaning of the social situation, providing the basis for a revised plan. It also benefits from the reflections of the social subjects involved.

In relation to the population, Condori (2021) are "accessible elements or units of analysis that belong to the special area where the study is carried out." (p. 2). Indeed, the population is distributed by a series of characteristics which allow individuals to be differentiated from each other. The geographical context where the research was carried out is the Motatán municipality, Trujillo state; the population object of study is made up of 18 teachers and the boys and girls for the 2024–2025 school year. Regarding the sample, Condori (2021) considers is the "representative part of the population, with the same general characteristics as the population." (p. 3). That is, it represents a part of the population that is the object of study; in this sense, the researcher considered it pertinent to work with 8 teachers, who are at the preschool level and in classroom conditions.

All of this is achieved by using the most appropriate instruments to achieve success. For Murcia (2001), data collection methods can be defined as "the means through which the researcher interacts with participants to obtain the necessary information to achieve the research objectives" (p. 76). In this sense, the following are used within the research: Participant observation, Sepúlveda (2016) defines observation as "a systematic method that allows to appreciate each of the phenomena and actions that take place in the setting to account for the problems affecting the research

environment" (p. 16). It should be noted that in the research there are two types of observation: that of the researcher, which is focused, and that of the participants, favoring the researcher's approach to perceptions.

On the other hand, Gamba (2010) argues that "it is a conversation between two or more people on a specific topic according to certain schemes or guidelines" (p. 90). This means, it seeks to institutionalize a space for the exchange of ideas, within the framework of the relationship between different parties, therefore, it is about energizing ideas related to communication. For his part, brainstorming is proposed by Hurtado (2007) as "… A technique that consists of a proposal of ideas and then organizing and consulting them in a group to provide the opportunity to give opinions about a specific problem." (p. 98). Meanwhile, the daily report: for Martínez (2011) is one that "clearly and precisely compiles the transactions carried out each day in an investigation to establish the reflections and conclusions reached, taking into consideration the operations." (p. 388).

Likewise, Murcia (2014) considers photographs as "documents or evidence of human behavior in naturalistic environments, and their purpose is to demonstrate the transformation process carried out." (p. 128). In addition, the Meetings were an essential part of the actions undertaken, which is why Lokpez (2011) establishes that "it is a technique for direct interaction between social actors in order to present and explain the research methodology, as well as the composition of the work team, and equally, it establishes by consensus the aspects involved in the process." (p. 183). Group discussion, according to Hurtado (2007: 90), "is a technique that allows capturing affective, value, and ideological representations about a particular problem."

After establishing the purposes that lead to the research, it is necessary to categorize it, as it allows all the information to be classified in a clear, precise, and unquestionable way, and then analyzed, interpreted, theorized, and contrasted. In this regard, González-Díaz et al. (2021) conceptualize the coding process as the "parameterization of citations from documents (video, audio, texts, images, and photographs), where an extract of them provides meaning, to draw or blur the phenomenon studied as a whole or in its particulars, to give meaning to what is being examined." (p. 342). In other words, it is a process of grouping the collected information based on certain criteria, which can be outlined in advance or subject to revision. Categories are concepts derived from the data that represent phenomena and have the ability to bring together groups of concepts or subcategories. Table 1 below shows the categories that are broken down from the ongoing research.

Table 1. *Preliminary Categorization of the Research*

Categorization	Theoretical Definition	Theoretical Reference	Empirical Reference	Bibliographic Reference
Artificial Intelligence	It is the the ability of machines to use algorithms to acquire knowledge from data and apply that learning to decision-making in the same way that a human would.	• Characteristics of artificial intelligence • Challenges of artificial intelligence in the educational process. • Benefits of applying artificial intelligence	Teachers Boys Girls Educational planning	Rouhiainen, L. (2018). Artificial intelligence. Mexico: Alienta
Educational tool	It allows you to reach the student in an attractive way.	Teaching Competencies of the 21st century Benefits and advantages of digital tools. Teaching strategies	Teachers Boys Girls Educational planning Content evaluation	Duque-Romero, My Acero-Quilumbaquin, E. (2022). Educational tools as support in teaching. pp.1099-1108. https://mendive.upr.edu.cu/index.php/MendiveUPR/article/view/2955
Teaching practice	It is metacognitive action from which we systematize, investigate and reflect on our practical experience. a	Dimensions of early education teaching practices. The Teacher becomes a Researcher of his Practice •Constructivism theory.	Teachers Educational planning	Alvarado, N. (2020). Teaching Task from the View of the Constitutive Interests of Knowledge. Network of Educational Researchers REDINE, 12(2), 46-55. https://revistas.uclave.org/index.php/redine/article/view/2809

Analyzing the table above, it is understandable that AI becomes an important complement to the planning carried out by teachers as a support for the learning and development of children. Therefore, the involvement of ICTs in the educational process should be developed both at the institutional times and spaces in the different activities and initiatives that the school plans.

Based on this, the Prioristics Categorization Matrix of Research is presented in detail in Table 2, because it is necessary to take into account the breakdown of the specific purposes of the study and thus obtain better results in its development and successfully achieve the fulfillment of the general purpose.

Table 2. *Prioristic Research Categorization Matrix*

Specific Purposes	Categories	Definition
Diagnose the that teachers implement in the learning environment related to artificial intelligence.	Application of artificial intelligence in preschool education	It allows children to deepen their progress, giving them the opportunity for an equal process, thus obtaining a detailed evaluation of the child's performance, showing their strengths and weaknesses. This provides the teacher with essential information on the topics to be reinforced in the learning environment.
Establish the types of learning generated by educational tools in early childhood education.	Types of learning generated by educational tools	These are the learning experiences designed by the teacher to develop content and achieve objectives and competencies. Students learn in different ways.
Identify the factors that improve the pedagogical practice of teachers in early childhood education.	Factors that improve pedagogical practice	These are all indicators that help children successfully carry out pedagogical practice and contribute to achieving meaningful learning

Based on the table above, it can be seen that AI aims to be present in education and, thus, enable teachers to leverage this technology to improve the quality of the teaching-learning process. This allows learning to be personalized through an innovative and promising approach that adapts education to the individual needs and characteristics of each student. Based on this, each of the categories that reinforce research in the field of education is broken down below.

Table 3. *Preliminary Categorization*

	Discovery Learning	Allows the student to discover concepts and their relationships.
Factors that improve pedagogical practice	Adequate educational infrastructure	Improves student learning. Facilitates the pedagogical process. Boosts interest in learning. Generates motivation for learning.
	Sufficient and appropriate educational materials	Facilitates the evaluation of learning. Stimulates the acquisition of knowledge. Awakens interest in learning. Develops children's creativity.
	Access to reference materials	Supports teachers' pedagogical practice. Serves as support for the development of activities in the curricular areas.
	Access to technology	Helps a deepen learning. Serves as support for the acquisition of knowledge. Must be appropriate for the age and the environment in which the children operate.
	Reflection and systematization of pedagogical practice	Seeks to generate more questions than answers. Generate greater inquiry. Undertakes innovations in their pedagogical practice

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Category	Subcategory	Key Features
Application of intelligence in preschool education	Applications	Can reinforce knowledge. Each student learns differently.
	Social networks	Interaction between teacher and parents. Strengthens communication between educational stakeholders.
	Robotics	Strengthens students' creativity. Allows students to learn to create devices.
Types of learning generated by educational tools	Receptive	The student understands and reproduces the content without experiencing any discovery. Receives knowledge from the teacher.
	Repetitive	The student memorizes the content without understanding it or relating it to prior knowledge.
	Meaningful learning	The student relates new knowledge to prior knowledge and is able to apply it to their daily lives

RESULTS

It is stated that this is the procedure through which the entities involved are informed about the interpretation of the analyzed area, that is; the way to return the information so that the educational actors are considered an essential part of the shared situation. It should be added that the action research process is clinical, since until a transformation of reality occurs, each cycle starts over. To conclude, it was demonstrated in the activities planned by the researcher in the participatory diagnosis of the school community at CEI "Niño Simón", located in Jalisco parish, Motatán Municipality, Trujillo State, since positive results were achieved, determined by the participation of the actors involved (management, teachers, parents, representatives, of the school community and also the researcher), which allowed to delve into the critical nodes existing in the institution, making each one of them fulfill the role that corresponds to them for the common good of the educational context and in this case the application of AI in planning.

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