The Teacher and his or her role in the use of Artificial Intelligence: the conflict of AI in the Educational System

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Abstract.

The focus of the essay "Artificial Intelligence and the Teacher" focuses on exploring the impact of the integration of artificial intelligence in the educational field, specifically on the role and pedagogical practices of teachers.

Through a detailed and thoughtful analysis, the essay examines how artificial intelligence is transforming the way educators teach, interact with students, and manage the learning process in the classroom. Key aspects such as the personalization of learning, the adaptation of teaching methods, and the ethical and practical challenges that arise with the implementation of this technology in the educational environment are addressed.

In addition, the essay seeks to provide a comprehensive view of how teachers can leverage the capabilities of artificial intelligence effectively to improve the quality and equity of education.

It explores strategies, tools, and best practices that enable educators to maximize the benefits of artificial intelligence while attempting to mitigate potential risks and challenges.

Ultimately, the essay's focus seeks to contribute to the academic and practical dialogue on the role of technology in education, offering valuable knowledge and recommendations for the development of educational policies and practices that promote an ethical and effective use of artificial intelligence in the classroom.

Keywords: artificial intelligence, educational system, conflicts, negotiation and mediation.

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1. Introduction.

Artificial Intelligence (hereinafter AI) is a relatively new theoretical conception that is constantly evolving, becoming a competitive approach with high international recognition.

There are various approaches to AI, ranging from machine learning to natural language processing, through a transversal methodology that makes computer systems a way of "learning" from data, performing specific tasks through an algorithmic process to create machines that imitate human intelligence in order to perform tasks. Likewise, the scientific and research community has a wide variety of studies and bibliographic sources that enrich the development of this subject.
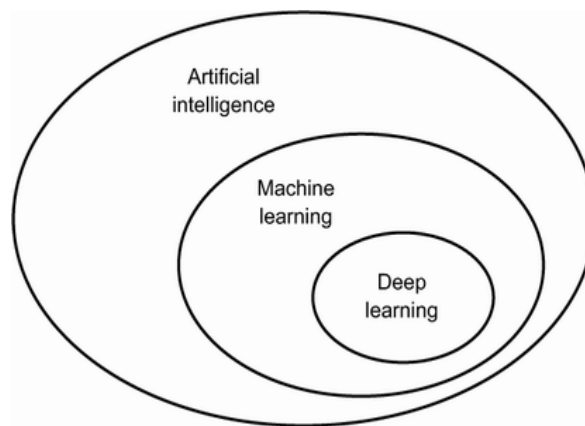
Authors such as Gradolí (2021), analyzes artificial intelligence, autonomous robotics and big data in Europe between 1950 and 2019, such as Iglesias et al. (2020), who based on different situational analyses of the current scientific and technological world in the face of the so-called 4th Industrial Revolution and the impact of AI, make recommendations and suggestions on AI aimed at public policies in Latin America, and how its implementation can help the Public Administration and the business fabric in the growth of investment and productivity.

Naudé and Dimitri (2020) analyze AI as a mechanism designed to solve problems in virtual space, elements such as image recognition software, disease mapping and prediction tools, robot manufacturing, drone manufacturing, filters for junk emails, "spam", social media monitoring for dangerous content, recommendations for internet searches or suggestions for digital marketing content, GPS navigation, etc. Periañez (2023) who recommends through his studies and analyses, the use of AI in the financial industry, credit risk assessments, algorithmic trading, even fraud detection.

Institutions such as EUROPARL (2020) consider AI as the ability of a machine to present the same capabilities as human beings, such as reasoning, learning, creativity and the ability to plan; entities such as HubSpot through Londoño (2023) state that AI works through the implementation of intelligent algorithms and computer techniques, which allow the machine or gadget to learn from the data provided to it and improve its performance as it is fed back with information in the processes.

In this algorithmic learning process, AI, as Chollet (2018) explains, applies deep intelligence (Deep learning) as the driving nerve of machine learning, as well as *Machine learning* to generate knowledge based on data, and later on its own experience, so *deep learning* is immersed in *machine learning* and both in AI. as can be seen in Figure 1.
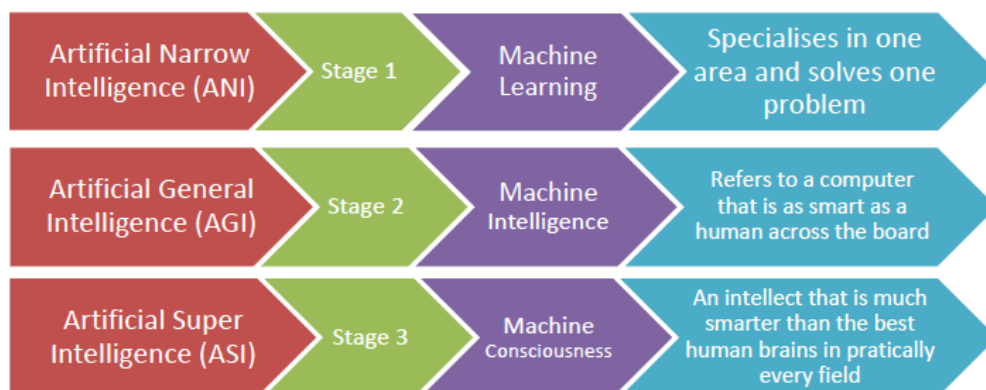
Figure 1. Artificial Intelligence Learning Environment

IA can be classified into three types of methods of use (Grasso, 2023), as reflected in Figure 2, and they are: *Narrow AI* [ANI], strong or *General AI* [AGI] and *super intelligence* [ASI]. (Thaichon, Quach, 2023, p.12).

Figure 2. Three types of Artificial Intelligence.

According to Khan (2021), when we analyze the three types of AI, we find a narrow AI or weak AI, which is applied to a specific task with limited memory, a powerful AI that can be compared to the thoughts of the mind, and a Super Intelligence that so far does not exist.

For all these reasons, and focusing on the educational field, the integration of AI has generated a profound impact on the way teachers approach teaching and learning.

In the digital age, where information is at the click of a button, AI emerges as a powerful tool that not only facilitates information management, but also offers innovative opportunities to personalize the educational experience.

Some teachers, as facilitators of knowledge, are actively exploring how to harness the capabilities of AI to tailor their teaching methods to the individual needs of students, thereby fostering more inclusive and effective learning in the classroom.

However, the incorporation of AI in the educational field also poses challenges and ethical dilemmas for teachers. To what extent should educators rely on algorithms and automated systems in pedagogical decision-making? How can teachers ensure that AI not only improves efficiency, but also equity, educational quality, and social justice?

These questions reflect the complexity of the relationship between artificial intelligence and the traditional role of the teacher, highlighting the need for a thoughtful and critical approach in the integration of these technologies in the classroom.

In this perspective, educators play a fundamental role as mediators between technology and the educational process, ensuring that AI is used ethically and responsibly to enhance the integral development of students.

2. AI in the Education System.

Currently, there has been an exponential increase in AI in the educational system compared to studies and research ten years ago, an advance that has radically transformed various aspects of our lives and consequently, influenced by the development of machine learning techniques, natural language processing (NPL) and neural networks. among other techniques that required a large amount of data for training (Chen et al., 2022; Prahani et al., 2022). This, combined with educational data mining, learning analytics, multi-agent systems, fuzzy logic, Bayesian systems, and more, make it possible to analyze large amounts of student data in order to identify patterns and trends in academic performance, behavior, and student interaction, which can help educators design personalized curricula and provide detailed feedback students (Chan et al., 2022). All this will promote an intelligent tutoring model, adapted, personalized and interactive learning with students.

There are many positive factors that will make AI a key factor in the development of the education system, such as the early detection of learning problems (Chen et al., 2022; González-González, 2004), the personalization of learning for students' work, which can save time and improve the objectivity of assessments (Murtaza et al., 2022) to improve the effectiveness of the learning process and automated assessment (Lloret et al., 2022), allows the learning experience to be adapted to the individual needs of students (Duque-Méndez, 2009), interacting with abstract concepts and exploring simulated environments (Puerto, Gutiérrez-Esteban, 2022) that will increase motivation, commitment and knowledge retention.

AI-based virtual tutoring gives students the opportunity to receive immediate and personalized assistance anytime, anywhere (Domínguez, 2020), allows them to understand their strengths and areas for improvement, allows them to correct mistakes, and motivates them to continue improving (Betancourt & Gómez, 2017), and also alleviates the workload of educators. since it allows them to dedicate more time to teaching activities and personalization of learning.

Importance of strategy and negotiation in conflict resolution.

Artificial intelligence, as stated by the World Economic Forum (2023), has two distinct effects on the education sector. The first is through the active development of technology to help teachers actively educate their students, and the second is marked by the demand for AI talent globally, as it is the way in which AI affects the education sector. If we take the case of Singapore as a reference, robots have already been introduced at an initial educational level (Preschool), which allows them to help in educational instruction.

In the case of Dubai, as Toolify (2024) points out, the use of AI is proposed to personalize teaching, develop the virtual tutoring system and adaptive learning platforms, as also exposed by Zhang and Li (2020) and Yang et al. (2019) in their respective research in China, to promote the improvement of educational outcomes; using automated assessment of assignments and exams to provide immediate feedback between students and teachers.

In the educational field, the Netherlands has integrated AI to personalize learning, improve educational assessment, and promote innovation in educational institutions (Bosch et al., 2021), a flexible method is also used that engages students in learning through the use of intelligent agents and AI-based techniques to retrieve information from the Internet.

This strategy seeks to promote the development of digital skills among students and raise educational quality in general. In this case, the use of AI to personalize teaching and improve educational outcomes is being explored, and virtual tutoring systems and adaptive learning platforms are being developed that use AI to adapt educational content to the individual needs of students.

Likewise, different countries have introduced AI in their education systems (Lloret et al., 2022; Fengchun et al., 2021). For example, the Finnish education system has implemented the *Elements of AI* and *Building AI* programs, designed by the University of Helsinki, which use machine learning techniques to teach citizens without technical knowledge on the subject. Estonia uses methods based on data mining and machine learning to identify factors that may contribute to the cause of student dropouts. In Poland, a *chatbot* has been implemented to teach technical and programming skills to students.

The author Cognizant (2024) launched various research on the application of AI when carrying out knowledge transfer results in R+D in universities, research centers and laboratories, to see how machines and robots manage to execute tasks in an intelligent way.

On the other hand, we can point out that strategy and negotiation are fundamental in conflict resolution within the context of the integration of AI in education. The strategy allows teachers to plan and execute effective actions to address conflicts that may arise in the process of implementing AI in the classroom.

By developing clear and well-defined strategies, educators can anticipate potential challenges, identify opportunities for improvement, and design action plans that promote collaboration and consensus among all parties involved.

On the other hand, negotiation becomes an essential tool to manage conflicts constructively and reach mutually beneficial agreements, for this, teachers must have solid negotiation skills when facilitating dialogue, finding creative solutions and promoting a climate of trust and respect in the process of implementing AI.

By negotiating effectively, educators can mitigate tensions, resolve discrepancies, and ensure that the interests and needs of all parties are taken into account, contributing to a harmonious school environment conducive to learning.

In this sense, strategy and negotiation are fundamental pillars that allow teachers to face the challenges and maximize the benefits of integrating AI in education.

But we also have to take into account a series of ethical considerations that can cause social conflicts, for this it is necessary to guarantee the privacy and security of the data of the school community, address the digital divide and the consequent inequality of access to technology and digital inputs, emotional control, the use and abuse of technological resources and computer applications that can lead to future addictions (Aguilar, 2020).

3. The Conflict Theory of AI in the Educational System.

Conflicts in the context of integrating AI into education can manifest themselves in a variety of ways and span a wide range of areas. Initially, conflicts can arise between the different actors involved in the process of implementing AI in the classroom, such as teachers, school administrators, technology developers, and students themselves.

These conflicts may be related to differences in views and expectations about the role of AI in education, as well as concerns about privacy, fairness, and data security. In addition, conflicts can arise in relation to changes in the role and responsibilities of teachers as a result of the integration of AI into the educational environment.

This can include internal conflicts within the faculty, such as resistance to change, fears about job obsolescence, or perceived threats to professional autonomy. Teachers may also face external conflicts with students and parents, such as disputes over the effectiveness of AI in learning, concerns about the loss of human contact in teaching, or challenges related to adapting traditional teaching methods to new technologies.

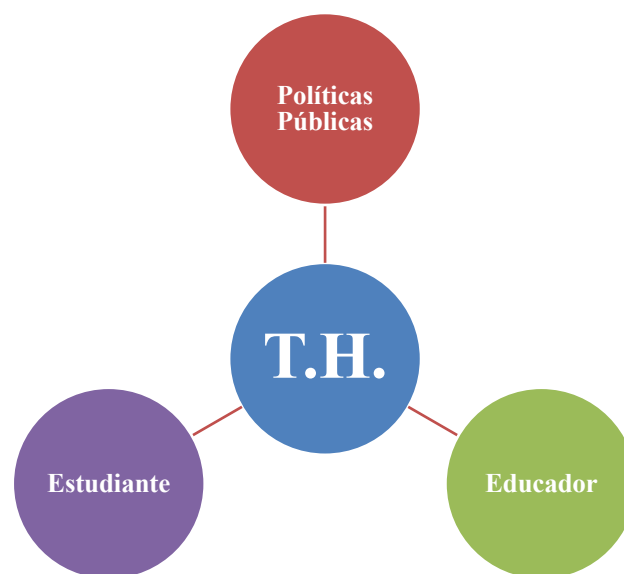### Application of conflict theory in negotiation.

Understanding and addressing the challenges associated with integrating AI into education is essential in conflict theory. This theory recognizes that conflicts arise when there are divergences of interests, needs or values between the parties involved and, in turn, they can manifest themselves in various ways in the educational context.

By applying conflict theory in negotiation, a proactive approach can be taken to identify and address the underlying causes of conflicts related to the implementation of AI in the classroom. First, conflict theory can be used to analyze the different perspectives and concerns of stakeholders, such as school administrators, teachers, and students. Then, by understanding the needs and motivations of each group, negotiation strategies can be designed that seek equitable and sustainable solutions that meet the interests of all parties involved.

In addition, it can help conflict mediators identify areas of potential cooperation and collaboration among stakeholders, thereby promoting a constructive and consensus-oriented approach to the process of implementing AI in education.

In this theme, three groups involved in the process can be seen in Figure 3: the first is the government and its policies in education, the second is the educator and his vision of AI in the teaching process, and the third is the students and their goals.

Figure 3. The Triple Helix of the AI Conflict in the Education System.

Source: Own elaboration.

Public education policies.

The position of public policies on the use of AI in education varies by country; some countries, such as China and Singapore, have adopted ambitious national strategies to integrate AI into their education systems.

In China, the Education Technology Plan (Liu et al., 2022; Teo, 2018) highlights AI as a key element for system modernization. Singapore, for its part, has implemented pilot programs to

use AI in personalized tutoring and learning assessment (Singapore AI for Education) (Prudente and Quimí (2023).

In other countries, the adoption of AI in education has been more gradual and cautious. For example, in the United States, Every Student Succeeds Act (ESSA) of 2015, as indicated by Close et al. (2020) and Hendley (2017), encourages the use of educational technology, including AI, but does not provide specific funding for its implementation.

In Europe, the European Commission has published a set of guidelines for the ethical development of AI in education, as reflected in the studies of Aguilar and Hocajo (2015), Colcelli and Burzagil (2021), Estela (2023), emphasizing the importance of transparency, accountability and data protection.

In the case of Costa Rica, there is no clearly defined position on the use of artificial intelligence by the corresponding Ministry, and if they were to adapt it, the question would be: How do infrastructure and internet access affect the use of artificial intelligence in the classrooms of the public education system in Costa Rica?

High-speed internet access is critical to making the most of the AI-based tools and resources available online. Poor network infrastructure or intermittent connectivity can limit the ability of students and educators to access educational platforms, AI applications, and relevant digital content.

To effectively use AI in the classroom, students and educators need appropriate technological devices, such as laptops, tablets, or mobile devices. Lack of access to, maintenance and updating of these devices can hinder the implementation of AI-based solutions.

The Educator.

Various studies and surveys reveal a growing interest and openness on the part of educators towards AI. A study conducted by the World Economic Forum in 2021 (Artopoulos, 2023. Pereyra, 2023, Ros, 2024) it is clear that with generative AI we can reimagine education; in this way it was found that 72% of the educators surveyed believe that AI will have a positive impact on education in the coming years.

Similarly, a survey conducted by the EdTech (K12 and Higher Education Technology) organization in 2023, as stated by Alam and Mohanty (2022), that 85% of educators consider AI to be a valuable tool to improve student learning.

Despite widespread enthusiasm, there is also a wariness among educators about the indiscriminate use of AI in the classroom. Concerns such as the potential digital divide, the need for adequate training for teachers, and the importance of preserving human interaction in the educational process are aspects that are taken into account.

A study by the University of Oxford in 2022 (Oxford AI in education: where we are and what happens next) Aslan et al. (2023) pointed out that 68% of educators surveyed believe that AI

should not replace teachers, but should be used as a complementary tool to support their work.

Similarly, a study by the Massachusetts Institute of Technology (MIT) carried out by Wang (2023) (MIT leaders in education explore the future of technology in and beyond the classroom) identified the following areas where AI has the greatest potential to improve education:

1. Personalization of learning by adapting the content and teaching methodology to the individual needs of each student.
2. Immediate assessment and feedback to students, helping them identify their strengths and areas for improvement.
3. Detection of learning difficulties by analyzing the behavior and performance of students to detect possible learning difficulties early.
4. Creation of educational content such as personalized educational materials adapted to the specific needs of students.

In Costa Rica, for example, the President of Colypro[3] reports in her interview (Chaves, 2024), that multiple study programs of education careers taught have between 10 years of outdated in public universities and up to 40 years in private universities.

This generates a problem in the capacity of teachers for the effective use of AI in the classroom, these findings emerged from the review of 183 careers that are linked to the 12 included in the so-called National Qualifications Framework of Costa Rica (Directorate of Press and Public Relations (2024), whose purpose is to establish the quality guidelines that graduates in teaching must meet to practice in the educational system.

However, and in addition to the above, the Ministry of Public Education of Costa Rica (MEP) or the National Council of Private University Higher Education (CONESUP) are not providing training on the use of AI to their teachers in a generalized way. Therefore, in the public or private Higher Education sector, most teachers are not teachers and do not have the bases of pedagogical training, didactics and teaching methodologies. Most are experts in their field of study, and practical experience in a specific area, but with weaknesses in theories and teaching models.

The Student.

In recent years, there has been a significant increase in students' interest in the use of AI in education. This trend is due to various factors, including familiarity with technology, as they have grown up surrounded by technology and are familiar with its use in various aspects of their lives, which makes them more receptive to the application of AI in the educational environment.

AI has the potential to offer personalized learning experiences, adapting to the needs, rhythms and learning styles of each student, allowing to increase *student engagement* and

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motivation. And access to resources and tools should not be neglected, providing students with access to a wide range of resources such as virtual tutors, automatic feedback systems, and adaptive learning platforms.

The Stanford University study (AI will transform teaching and learning let's get it right) developed by Chen (2023) found that 82% of secondary school students surveyed believe that AI can improve education and 75% stated that they would be willing to use AI-powered virtual tutors.

By applying Conflict Theory in negotiation, it can contribute to the effective resolution of conflicts associated with the integration of AI in education, thus fostering a more harmonious school environment conducive to learning, where the country's policies, the educator and his training, the student and his or her work desires are taken into account.

While it is true that many teachers, students, and governments welcome the potential of AI in education, the practical implementation of this technology can face several challenges and conflicts.

Many educational institutions, especially in developing countries or marginalized communities, lack the technological infrastructure and resources needed to effectively adopt AI.

The entry of AI into education can create equity and access gaps between different groups of students, where there are those who have access to high-quality technology and educational resources and those who lack access may be left behind.

The lack of clear regulations and adequate safety measures can lead to mistrust among parents, educators, and students about the use of AI in education.

And finally, the inclusion of AI in classrooms may be met with resistance from some educators and members of the education community who may feel threatened by technology or concerned about its impact on traditional teaching and the lack of understanding or familiarity with AI, can also lead to fear or skepticism about its effectiveness and relevance in the educational environment.

4. Mediation models.

Concept of mediation.

Mediation plays a crucial role in negotiation within the context of integrating AI into education. By employing the concept of mediation, teachers can act as impartial facilitators who help the parties involved to communicate effectively and find mutually satisfactory solutions to conflicts related to the implementation of AI in the classroom.

Rather than imposing a top-down solution, mediation promotes a collaborative and participatory approach to the conflict resolution process, allowing all parties to feel heard and valued.

In addition, mediation in negotiation can help teachers to effectively manage the emotions and tensions that may arise in the context of integrating AI in education. By acting as neutral mediators, teachers can create a safe and respectful space where stakeholders can voice their concerns, share their views, and work together towards constructive solutions.

Mediation also fosters the building of relationships of trust and collaboration between the various actors in the education system, which contributes to a more positive school climate conducive to learning and innovation.

In summary, by applying the concept of mediation in negotiation, teachers can play a critical role in managing conflicts related to the integration of AI in education, thereby promoting a collaborative and consensus-focused approach to the decision-making process.

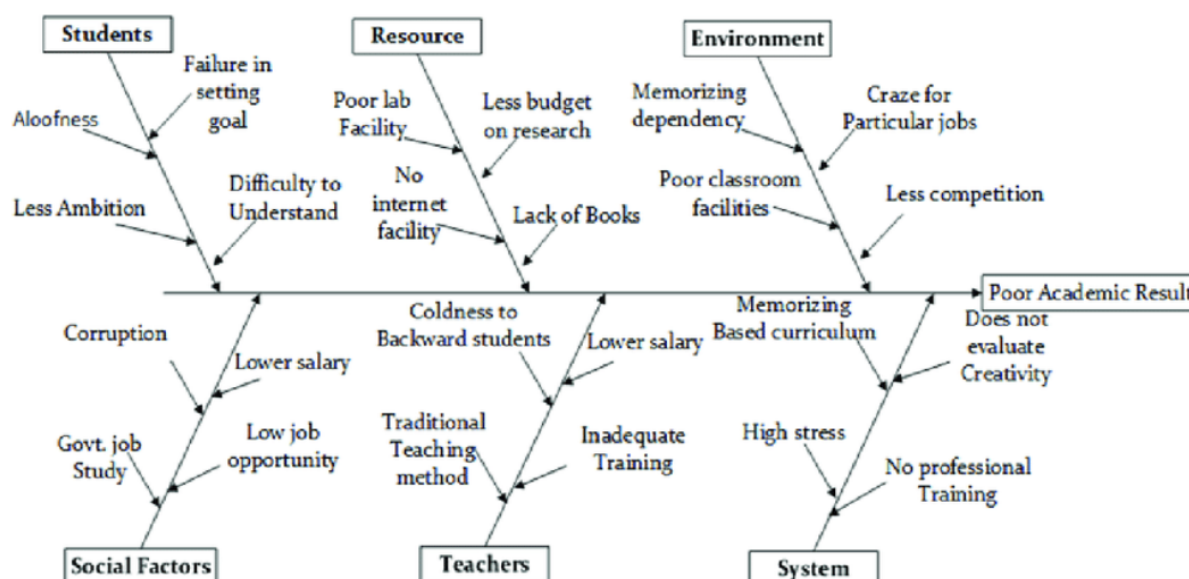## 5. Negotiation and Conflict Management Techniques.

In the context of integrating AI into education, basic principles of negotiation, such as effective communication technique and conflict management tools, are critical to facilitating constructive dialogue and reaching mutually beneficial agreements.

Effective communication involves the ability to express ideas clearly and accurately, as well as actively listening to the perspectives of others. Mediators can apply this technique when communicating the benefits and challenges of AI in the classroom, as well as addressing the concerns and expectations of students, teachers, and school administrators.

In addition, conflict management tools are essential for resolving disputes constructively and preventing them from escalating into more difficult situations. Mediators can employ problem-solving techniques, such as interest analysis and option generation, to find creative solutions that meet the needs of all parties involved.

Using agile methodologies, the Ishikawa diagram, also known as the fishbone diagram or cause and effect diagram, where Abdur et al. (2018, p.66), state that it is a useful tool to identify and visualize the possible causes of a problem in education, as reflected in Figure 4.

Figure 4. Cause-effect diagram for poor Academic Result.

Source: Higley, 2018.

The first step is to clearly define the problem to be addressed in education. For example, it could be the poor academic performance of students.

Next, you create main categories that may be contributing to the problem. These categories can include factors such as curriculum, teaching methodology, educational resources, school environment, parental involvement, among others.

Within each category, all possible causes that could contribute to the problem are identified. For example, under the category of teaching methodology, possible causes could include a lack of teacher training in effective teaching methods, a lack of interactive educational resources, or a lack of individualized attention to students' needs.

Once all the possible causes have been identified, the cause-effect relationships between them are analyzed. This can help to understand how the various causes contribute to the main problem and how they are interconnected with each other.

Identified causes can be prioritized according to their potential impact on the problem and the ability to intervene in them. Those causes that have a greater impact and are most likely to be addressed may receive priority attention in the problem-solving process.

Finally, once the root causes of the problem have been identified, specific strategies and solutions can be developed to address each of them. These solutions may include implementing new educational programs, training teachers, allocating additional resources, or collaborating with relevant stakeholders.

They can also use collaborative negotiation strategies (Figure 5), such as focusing on common interests (Arboleda, 2023) and the search for integrative solutions, to foster a climate of cooperation and trust in the decision-making process.

Figure 5. Process of Negotiation Skills.

By applying the basic principles of negotiation, such as effective communication technique and conflict management tools, teachers can play a key role in facilitating constructive dialogue and finding mutually beneficial solutions in the context of integrating AI in education.

By promoting a collaborative and consensus-based approach, teachers can contribute to the creation of a more harmonious school environment that is conducive to student learning and development.

6. Alternative Dispute Resolution Mechanisms (ADR)

According to Rùa et al. (2020) and Delgado et al. (2022), alternative dispute resolution mechanisms (ADR), as noted in Figure 6, offer in the educational context a complementary way to traditional methods to address and resolve disputes related to the integration of AI in teaching.

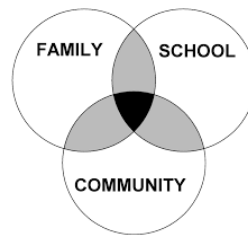Figure 6. Alternative Mechanisms to Conflict Resolution.

PRINCIPIOS DE LOS MECANISMOS ALTERNATIVOS

MASC

Voluntariedad
La participación debera ser por decisión propia, libre de coacción y no por obligación

Información
Debera informarse sobre las consecuencias y alcances

Confidencialidad
La información no debera ser divulgada o utilizada en perjuicio del otro. Salvo excepciones

Flexibilidad
Propiciarán un entorno que sea idoneo para cada propuesta.

Simplicidad
Se evitarán formalismos innecesarios y se usará lenguaje sencillo

Imparcialidad
Deberan ser conducidos con objetividad, evitando juicios, perjuicios o preferencias

Equidad
Propiciaran condiciones de equilibrio entre los intervinientes

Honestidad
Se debera conducir la participación con apego a la verdad

Source: Pereznieto (2000, p.12).

These mechanisms go beyond legal or disciplinary actions and promote more collaborative and participatory approaches to dispute resolution. One of these mechanisms is mediation, which involves the intervention of an impartial third party who helps the parties to dialogue and find consensual solutions.

By implementing mediation in the context of AI and teaching, teachers can facilitate a constructive dialogue (Figure 7) between students, parents, and other stakeholders, thereby promoting greater understanding and cooperation in handling edtech-related challenges.

Figure 7. Epstein's Theory of Overlapping Spheres of Influence.

Source: Flores, Pérez (2022, p. 75).

Another alternative mechanism is the facilitation of structured conversations, where the parties involved meet to openly discuss their concerns and perspectives with the guidance of a neutral facilitator. These conversations can help clarify underlying issues, identify common interests, and explore creative solutions.

By fostering a space for respectful dialogue focused on problem-solving, teachers can promote a more inclusive and collaborative school climate, where differences are addressed constructively and relationships between members of the educational community are strengthened.

The Community of Practice (CoP) in the agile methodology, as indicated by Smith et al (2017) and Ulla and Perales (2021), are an example of an adequate way for the implementation of conversations to resolve conflicts, collaborative negotiation is key to conflict resolution in the context of AI and teaching. This technique involves the parties in a structured dialogue process, where options are explored and mutually beneficial solutions are sought.

Figure 8. Communities of Practice have three different characteristics.

Source: Wenger (1999).

By adopting an approach based on common interest and the search for integrative solutions, teachers can help build bridges between different perspectives and promote a culture of collaboration and commitment in problem-solving.

7. Observation Processes as a Transversal Technique for Negotiation and Conflict Resolution.

Observation in negotiation and conflict resolution plays a crucial role in providing valuable information about the dynamics and behaviors of the parties involved, observing what happens in the classroom would be an exercise of great importance.

This cross-cutting technique involves conscious attention to detail during the negotiation process, allowing the observer to identify patterns of behavior, underlying needs, and points of tension.

By adopting an active, non-judgmental observation posture, mediators and facilitators can gain a deeper understanding of the parties' motivations and concerns, making it easier to design more effective conflict resolution strategies focused on the real needs of those involved.

The importance of observation lies in its ability to provide objective, evidence-based information that can guide the negotiation process toward mutually beneficial solutions.

By analyzing nonverbal behaviors, nonverbal communication, and other subtle indicators, the observer can pick up on key cues that may go unnoticed during direct interactions.

This more complete understanding of the situation allows the mediator to intervene more effectively to defuse emerging conflicts, foster empathy between the parties, and facilitate collaboration in finding solutions.

The role of the observer in the negotiation and resolution of conflicts is essential to maintain impartiality and objectivity in the process. By acting as a neutral witness, the observer can provide constructive feedback, identify cognitive biases, and help parties overcome obstacles to effective communication.

In addition, by staying focused on the objectives of the negotiation process and the well-being of all parties involved, the observer can contribute significantly to the creation of an environment of trust and collaboration that favors the peaceful resolution of conflicts.

8. Results of the Integration of AI in teaching.

The integration of AI in the educational field, as Berrones and Salgado (2023) point out, has generated a significant impact on the way teachers approach teaching and learning. This emerging technology offers a suite of innovative tools and resources that have the potential to

transform education, personalizing learning, improving assessment and feedback, promoting inclusion and accessibility, and preparing students for a technology-driven future.

AI allows teaching to be tailored to each student's individual needs, creating personalized learning plans that consider their pace, learning style, and strengths. This can lead to increased motivation, engagement, and improved academic outcomes.

In addition, improved assessment and feedback allows students to analyze student performance in real time, providing immediate and personalized feedback, which allows teachers to identify areas of difficulty early and adjust their teaching strategies accordingly, to prevent academic delay and improve the chances of success for all students.

Something very important about technology is that AI can make education more accessible for students with disabilities or those in remote or hybrid learning environments, assistive technology tools such as screen readers and speech recognition systems can help overcome barriers and ensure that all students have the same learning opportunities (Luzon et al., 2023; Saltos et al., 2023; Sánchez et al., 2024).

Another plus point is the ability to automate repetitive tasks, such as exam grading, reporting, and data management; freeing up time for teachers to focus on what really matters, such as interaction with their students and planning effective teaching strategies.

9. Addressing the challenges associated with AI in education: Strategies for effective implementation.

The integration of AI in education presents a number of challenges that need to be addressed to ensure effective and accountable implementation, among them it can focus on 4 major areas.

The first area is the Digital Divide that makes access to technology unequal and internet connectivity can increase existing educational gaps and create new barriers to learning, in a public education, as is the case in Costa Rica or Spain, it is essential to ensure that all students have equitable access to AI-based tools and resources.

Some strategies to work on would be:
1. Investment in infrastructure where governments and educational institutions invest in improving technological infrastructure in schools and communities, including the provision of devices, access to high-speed internet and adequate educational software.
2. Development of digital literacy programs for teachers, students, and parents on the effective use of educational technology, including basic digital skills, online safety, and critical evaluation of information.
3. The hybrid learning model that combines the use of AI with traditional teaching methods, ensuring that all students have meaningful learning opportunities, regardless of their access to technology.

The second area would be ethical concerns about the collection, use and storage of student data that raises important ethical concerns related to privacy, security and transparency, for which it is necessary to establish clear regulatory frameworks and data protection policies to ensure the responsible use of AI in education.

Some strategies for your approach would be:

1. Establishing clear data policies on the collection, use, and storage of student data, ensuring informed consent from parents and guardians, and ensuring the protection of individual privacy.

2. Implement robust security measures to protect student data from unauthorized access, hacking, and misuse.

The third area is the implementation challenges which require a significant investment in technological infrastructure, teacher training and development of adequate educational resources.

1. Comprehensive teacher training that provides comprehensive training on the effective use of AI in teaching, including the design of AI-based learning activities, the assessment of the impact of technology on learning, and the resolution of technical problems.

2. The development of high-quality, quality educational resources that meaningfully and effectively integrate AI into curricula, ensuring that these resources are accessible to all students.

3. Ongoing technical support to ensure the smooth operation of the technology and provide assistance in resolving technical issues.
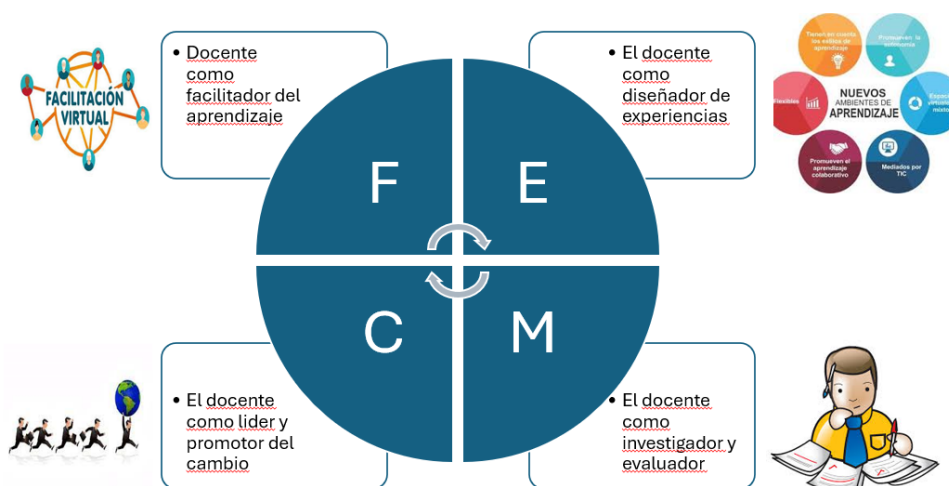
The fourth and no less important point is the resistance to change to the integration of AI in education, for fear that technology will replace its role or diminish the quality of human teaching. To address these concerns through open communication, training, and ongoing professional development.

1. Open and transparent communication about the benefits and challenges of AI in education, addressing their concerns and creating an environment of mutual trust.

2. The active participation of stakeholders in the decision-making process on the implementation of AI, ensuring that their perspectives are considered and valued.

3. Ongoing professional development so that they can develop the skills and knowledge needed to integrate AI into their teaching practices effectively.

10. Conclusions.

In order to summarize the different formats when explaining the *process flow* of the use of artificial intelligence by the teacher, we will rely on Figure 9.

Figure 9: Process Flow del uso de la AI.

<div align="right">Source: Own elaboration.</div>

The Fourth Industrial Revolution (4IR) is transforming all sectors of society, including education. AI has the potential to revolutionize the way students learn and teachers teach. However, it is important that AI is used responsibly and ethically in the classroom.

In this context, the *Catudhatu* of AI in the teacher's view from its use in the classroom proposes a framework for the effective integration of AI in teaching practice. This framework is based on four essential roles of the teacher, and they are:

1. Learning Facilitator:

Role: The teacher as a guide and mentor who helps students navigate the complex world of information and technology.

Activities: Curate and curate high-quality AI resources, design learning activities that promote critical thinking and problem-solving, provide personalized support and feedback to students, and foster collaboration and peer-to-peer learning.

2. Experience Designer:

Role: The teacher as a creator of engaging and meaningful learning experiences that harness the power of AI.

Activities: Design and implement AI-based learning projects, use AI tools to personalize learning, create playful and motivating learning environments, and incorporate AI into assessment and feedback.

3. Researcher:

Role: The teacher as researcher who explores new ways of using AI to improve learning.

Activities: Experiment with different AI tools and technologies, analyze data to identify patterns and trends, share findings and best practices with other teachers, and participate in research on the use of AI in education.
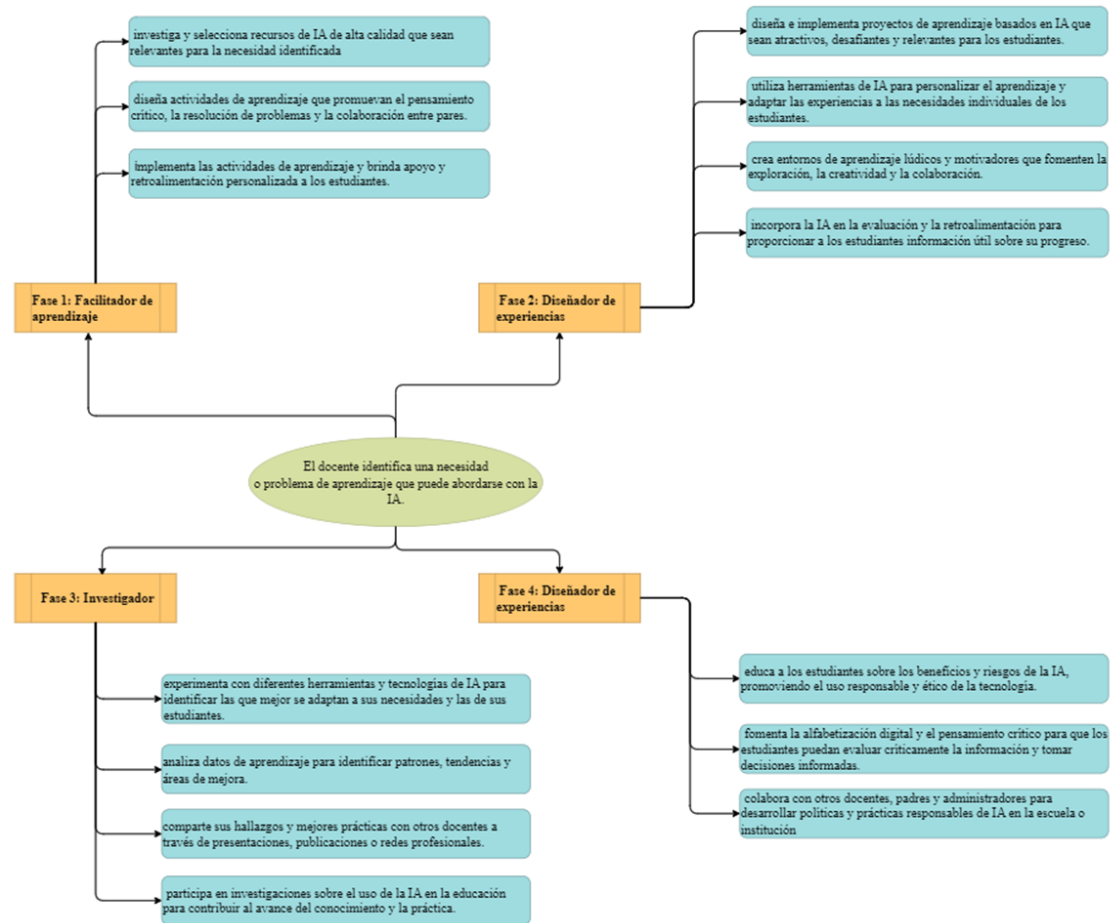
4. Promoter of change:

Role: The teacher as a leader who advocates for the responsible and ethical use of AI in education.

Activities: Educate students about the benefits and risks of AI, promote digital literacy and critical thinking, collaborate with other teachers, parents, and administrators to develop responsible AI policies and practices, and advocate for the use of AI to promote equity and inclusion in education.

From the *Faculty* of AI from the teaching perspective, we can establish a proposal for a **flow algorithm** (Figure 10) so that the teacher can identify the learning need or problem that can be addressed with AI.

Figure 10: Flow algorithm.

Source: Own elaboration.

Phase 1: Learning facilitator.
1. Research and select high-quality AI resources that are relevant to the identified need.
2. Design learning activities that promote critical thinking, problem-solving, and peer-to-peer collaboration.
3. Implements learning activities and provides personalized support and feedback to students.

Phase 2: Experience designer.
4. Design and implement AI-based learning projects that are engaging, challenging, and relevant to students.
5. Use AI tools to personalize learning and tailor experiences to individual student needs.
6. Create playful and motivating learning environments that encourage exploration, creativity, and collaboration.
7. Incorporate AI into assessment and feedback to provide students with useful information about their progress.

Phase 3: Researcher.
8. Experiment with different AI tools and technologies to identify the ones that best suit your needs and those of your students.
9. Analyze learning data to identify patterns, trends, and areas for improvement.
10. Share their findings and best practices with other teachers through presentations, publications, or professional networks.

11. Participate in research on the use of AI in education to contribute to the advancement of knowledge and practice.

Phase 4: Promoter of change.
12. Educate students about the benefits and risks of AI, promoting the responsible and ethical use of technology.
13. Encourages digital literacy and critical thinking so that students can critically evaluate information and make informed decisions.
14. Collaborate with other teachers, parents, and administrators to develop responsible AI policies and practices in the school or institution

We have explored in detail the importance of strategy and negotiation in conflict resolution in the integration of artificial intelligence in education. Key aspects such as conflict theory, mediation models, negotiation techniques and conflict management have been addressed, as well as alternative conflict resolution mechanisms and observation processes as a transversal technique. It has been highlighted how these elements contribute to promoting constructive dialogue, facilitating decision-making and fostering collaboration between all parties involved.

Ultimately, it has been concluded that strategy and negotiation are fundamental tools to effectively manage conflicts related to the implementation of artificial intelligence in the educational field.

The ability of teachers and other education actors to apply these principles effectively can have a significant impact on creating more harmonious school environments, where peaceful dispute resolution is promoted and the potential of technology to enhance the learning experience for students is maximized.

For future research in this field, it is suggested to further explore the specific role of artificial intelligence in mediation and conflict resolution in the educational field. In addition, one could investigate how AI tools and techniques can be used to improve the effectiveness of negotiation processes and to identify patterns of behavior and needs more accurately.

This research could contribute to enriching our understanding of how technology can be optimally leveraged to promote a culture of peace and collaboration in educational institutions.

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